# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

*(Use as many sheets as necessary)*

**SHEET 1 of 2**

| *Complete if Known* | |
|---|---|
| Application Number | TBD |
| Filing Date | Filed Herewith |
| First Named Inventor | Steven W. Goldstein |
| Art Unit | TBD |
| Examiner Name | TBD |
| Attorney Docket No. | AMBZ-101US |

**U.S. PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Document Number: Number - Kind Code[2] (If known) | Publication Date (MM-DD-YYYY) | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|
| | | US-2011/0065451 | 03-17-2011 | Danado et al. | |
| | | US-2010/0299615 | 11-25-2010 | Miluzzo et al. | |
| | | US-2009/0327478 | 12-31-2009 | Krause et al. | |
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**FOREIGN PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Foreign Patent Document: Country Code[3] - Number[4] - Kind Code[5] (If known) | Publication Date (MM-DD-YYYY) | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
|---|---|---|---|---|---|---|
| | | | | | | ☐ |
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| Examiner Signature | | Date Considered | |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

[1]Applicant's unique citation designation number (optional).

[2]See Kind Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04.

[3]Enter Office that issued the document, by the two-letter code (WIPO Standard St.3).

[4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

[5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible.

[6]Applicant is to place a check mark here if English language translation is attached.

The collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.*

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

*(Use as many sheets as necessary)*

**SHEET 2 of 2**

| *Complete if Known* | |
|---|---|
| Application Number | TBD |
| Filing Date | Filed Herewith |
| First Named Inventor | Steven W. Goldstein |
| Art Unit | TBD |
| Examiner Name | TBD |
| Attorney Docket No. | AMBZ-101US |

**NON-PATENT LITERATURE DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published | T[2] |
|---|---|---|---|
| | | Lane et al., "A Survey of Mobile Phone Sensing, " IEEE Communications Magazine, September, 2010, pp. 140-150. | ☐ |
| | | Singh, et al., "Towards Environment-to-Environment (E2E) Multimedia Communication Systems," Multimed Tools Appl (2009) 44:361-388. | ☐ |
| | | International Search Report for International Application No. PCT/US11/068103, dated May 3, 2012. | ☐ |
| | | Written Opinion for International Application No. PCT/US11/068103, dated May 3, 2012. | ☐ |
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| Examiner Signature | | Date Considered | |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

[1]Applicant's unique citation designation number (optional).

[2]Applicant is to place a check mark here if English language translation is attached.

The collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 120 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.

**SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.*

PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| Applicant's or agent's file reference AMBZ-101WO | **FOR FURTHER ACTION** | see Form PCT/ISA/220 as well as, where applicable, item 5 below. |
|---|---|---|
| International application No. PCT/US 11/68103 | International filing date *(day/month/year)* 30 December 2011 (30.12.2011) | (Earliest) Priority Date *(day/month/year)* 30 December 2010 (30.12.2010) |
| Applicant AMBIENTZ | | |

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

   ☒ the text is approved as submitted by the applicant.

   ☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

   ☒ the text is approved as submitted by the applicant.

   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

   a. the figure of the **drawings** to be published with the abstract is Figure No. 1

   ☒ as suggested by the applicant.

   ☐ as selected by this Authority, because the applicant failed to suggest a figure.

   ☐ as selected by this Authority, because this figure better characterizes the invention.

   b. ☐ none of the figures is to be published with the abstract.

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 11/68103

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06F 11/00 (2012.01)
USPC - 702/188
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC: 702/188

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC: G06F11/00; USPC: 702/188; 702/127; 702/1; 709/201; 709/217 (keyword limited; terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST (USPT, PGPB, EPAB, JPAB); Google Scholar; Google Patents
Keywords: Mobile devices; sensors; audio; environment; server; interchanging; acoustic analysis; event

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | LANE, et al. 'Survey of Mobile Phone Sensing' IEEE Communications Magazine, September 2010, Retrieved online 18 April 2012 at: <http://nslab.kaist.ac.kr/courses/2011/cs710/paperlist/1-1.pdf>, entire document | 1 - 39 |
| X | SINGH, et al. 'Towards Environment-to-Environment (E2E) multimedia communication systems' Published online: 05 May 2009; Retrieved online 18 April 2012 at: <http://webhotel2.tut.fi/emmi/forum/sites/webhotel2.tut.fi.emmi.forum/files/2009a/entries/08%20E2E%20(Environment-to-Environment)%20Communication%20Systems/Article_with_technical_details_of_E2E_paradigm.pdf> | 1 - 39 |
| P/X | US 2011/0065451 A1 (DANADO et al.) 17 March 2011 (17.03.2011), entire document | 1 - 39 |
| A | US 2010/0299615 A1 (MILUZZO et al.) 25 November 2010 (25.11.2010), entire document | 1 - 39 |
| A | US 2009/0327478 A1 (KRAUSE et al.) 31 December 2009 (31.12.2009), entire document | 1 - 39 |

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 18 April 2012 (18.04.2012) | 03 MAY 2012 |
| Name and mailing address of the ISA/US<br>Mail Stop PCT, Attn: ISA/US, Commissioner for Patents<br>P.O. Box 1450, Alexandria, Virginia 22313-1450<br>Facsimile No. 571-273-3201 | Authorized officer:<br>Lee W. Young<br>PCT Helpdesk: 571-272-4300<br>PCT OSP: 571-272-7774 |

Form PCT/ISA/210 (second sheet) (July 2009)

# PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: JONATHAN H. SPADT
RATNERPRESTIA
P.O. BOX 980
VALLEY FORGE, PA 19482

# PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

| | |
|---|---|
| Date of mailing *(day/month/year)* | 03 MAY 2012 |
| Applicant's or agent's file reference<br>AMBZ-101WO | **FOR FURTHER ACTION**<br>See paragraph 2 below |

| International application No. | International filing date *(day/month/year)* | Priority date *(day/month/year)* |
|---|---|---|
| PCT/US 11/68103 | 30 December 2011 (30.12.2011) | 30 December 2010 (30.12.2010) |

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - G06F 11/00 (2012.01)
USPC - 702/188

Applicant AMBIENTZ

1. This opinion contains indications relating to the following items:

- [X] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [X] Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 *bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Fom PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

| Name and mailing address of the ISA/US | Date of completion of this opinion | Authorized officer: |
|---|---|---|
| Mail Stop PCT, Attn: ISA/US<br>Commissioner for Patents<br>P.O. Box 1450, Alexandria, Virginia 22313-1450<br>Facsimile No. 571-273-3201 | 18 April 2012 (18.04.2012) | Lee W. Young<br>PCT Helpdesk: 571-272-4300<br>PCT OSP: 571-272-7774 |

Form PCT/ISA/237 (cover sheet) (July 2011)

**WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US 11/68103

**Box No. I Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

      ☐ on paper

      ☐ in electronic form

   b. (time)

      ☐ in the international application as filed

      ☐ together with the international application in electronic form

      ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

**WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US 11/68103

**Box No. V** **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Claims | None | YES |
| | Claims | 1 - 39 | NO |
| Inventive step (IS) | Claims | None | YES |
| | Claims | 1 - 39 | NO |
| Industrial applicability (IA) | Claims | 1 - 39 | YES |
| | Claims | None | NO |

2. Citations and explanations:

Claims 1-39 lack novelty under PCT Article 33(2) as being anticipated by 'Survey of Mobile Phone Sensing' to Lane et al. (hereinafter 'Lane').

As per claim 1, Lane discloses a distributed system comprising a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices and/or with a communication system and each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device (Abstract, pg. 141, pg. 142, social networking), and wherein at least one of the communication system or one or more of the devices is configured as a controller, the controller being configured to: select a subset of devices from among the plurality of devices, receive information based on the acquired sensor data of the selected subset, and combine the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices (Abstract, pg. 140, pg. 141, sensors; pg. 142, FIG. 2; pg. 143, FIG. 3; pg. 144-145, Learn, Inform, Share, and Persuasion).

As per claim 2, Lane discloses that the distributed system includes a server hosted at the communication system (pg. 140, col. 2, In para 1 -2).

As per claim 3, Lane discloses that at least one of the devices includes at least one of a wireless device or a wired device (Abstract, pg. 141).

As per claim 4, Lane discloses that at least one of the devices includes at least one of a fixed device or a mobile device (Abstract, mobile device).

As per claim 5, Lane discloses that at least one of the devices includes at least one of a mobile telephone device an earpiece, a hearing aid, a navigation device, a computer a sensor module having at least one sensor (Abstract, pg. 141, sensors).

As per claim 6, Lane discloses that the one or more sensors includes at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor (pg. 141, sensors).

As per claim 7, Lane discloses that at least one of the devices includes a position module for determining a position of the respective device (pg. 141, sensors).

As per claim 8, Lane discloses that each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller for determining the characteristic of the environment (pg. 141, sensors; pg. 144, mobile phone sensing architecture).

As per claim 9, Lane discloses that the local data analysis module includes an acoustic analysis module to process audio information (pg. 141, sensors; pg. 144, learn).

As per claim 10, Lane discloses that the local data analysis module includes a sensor analysis module to process non-audio related information (pg. 141, sensors; pg. 144, sense).

As per claim 11, Lane discloses that the controller is configured to determine locations for at least some of the devices (pg. 141-142).

As per claim 12, Lane discloses that the controller is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices (pg. 142, FIG. 2).

As per claim 13, Lane discloses that the controller is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices (pg. 142; pg. 143; pg. 145, programmability).

--- Please see Continuation Sheet ---

**WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US 11/68103

**Supplemental Box**

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Box No. V.2. Citations and explanations:

As per claim 14, Lane discloses that the configuration information includes data characterizing events to be detected in the sensor data (pg. 141, sensors; FIG. 4; pg. 145, programmability).

As per claim 15, Lane discloses that the environment includes an audio scene (pg. 141, sensors; FIG. 4).

As per claim 16, Lane discloses that the characteristic of the audio scene includes at least one of speech events or non-speech events (pg. 141, sensors).

As per claim 17, Lane discloses that when the distributed system records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded (pg. 144, col. 1, para 1-2; pg. 145, inform, share, and persuasion; pg. 149, privacy).

As per claim 18, Lane discloses that the distributed system further determines trend information across a population of users of the devices from the combined information (pg. 143, FIG. 3; FIG 4; pg.144, learn).

As per claim 19, Lane discloses that the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information (pg. 142; pg. 143; pg. 144, FIG. 4).

As per claim 20, Lane discloses that the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information (pg. 140, col. 1, para 3; pg. 141, sensors; pg. 145).

As per claim 21, Lane discloses that the aggregated motion-related characteristics comprise human or vehicle flow characteristics (pg. 140, col. 1, para 3, humans; para 141, sensors).

As per claim 22, Lane discloses that at least one of the devices includes at least one of a user interface, a display, a warning indicator, a speaker or a privacy module (pg. 141, sensors, UI, display).

As per claim 23, Lane discloses that the controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller (pg. 145, inform, share, and persuasion).

As per claim 24, Lane discloses a controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices, the controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the controller comprising a selection/acquisition module configured to select a subset of devices from among the plurality of devices and for receiving information based on the acquired sensor data of the selected subset of devices (Abstract, pg. 141, pg. 142, social network; FIG. 2); and a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices (pg. 143, FIG. 3; pg. 144-145, learn, inform, share, and persuasion).

As per claim 25, Lane discloses that the controller is configured to determine locations for at least some of the devices (pg. 141-142).

As per claim 26, Lane discloses that the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices (pg. 142, FIG. 2).

As per claim 27, Lane discloses that the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices (pg. 142; pg. 143; pg. 145, programmability).

As per claim 28, Lane discloses that the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module (pg. 142, FIG. 2).

As per claim 29, Lane discloses a sensor module including at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor (pg. 141, sensors).

As per claim 30, Lane discloses a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment (pg. 141, sensors; pg. 144, mobile phone sensing architecture).

As per claim 31, Lane discloses that the controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment (pg. 143, FIG. 3).

--- Please see Continuation Sheet ---

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | |
| **Filing Date:** | |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Filer:** | Deborah M. Grove/Edna Phelan |
| **Attorney Docket Number:** | AMBZ-101US |
| Filed as Small Entity | |

## U.S. National Stage under 35 USC 371 Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| Basic National Stage Fee | 2631 | 1 | 140 | 140 |
| Natl Stage Search Fee - Report provided | 2642 | 1 | 240 | 240 |
| Natl Stage Exam Fee - all other cases | 2633 | 1 | 360 | 360 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| Claims in excess of 20 | 2615 | 19 | 40 | 760 |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| Patent-Appeals-and-Interference: | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |
| Miscellaneous: | | | | |
| | | | Total in USD ($) | 1500 |

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 16170351 |
| **Application Number:** | 13976636 |
| **International Application Number:** | PCT/US11/68103 |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 71158 |
| **Filer:** | Deborah M. Grove/Edna Phelan |
| **Filer Authorized By:** | Deborah M. Grove |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 27-JUN-2013 |
| **Filing Date:** | |
| **Time Stamp:** | 14:34:40 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $1500 |
| RAM confirmation Number | 1046 |
| Deposit Account | 180350 |
| Authorized User | GROVE, DEBORAH |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:<br>Charge any Additional Fees required under 37 C.F.R. 1.492 (National application filing, search, and examination fees) | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Application Data Sheet | ADS.pdf | 236719<br>b1b3934519a67f24f31ba4a542f4053757900a6d | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| This is not an USPTO supplied ADS fillable form | | | | | |
| 2 | Documents submitted with 371 Applications | PCTPublication.pdf | 2031369<br>6a6c2fd99fd90053dc28ad45b4b65e1b6cc34518 | no | 38 |
| **Warnings:** | | | | | |
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| 10 | Non Patent Literature | Writtenopinion.pdf | 266182<br>c3f4982aaf2a5d8f15d0ae473b2e9c6ba5150520 | no | 4 |
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| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | AMBZ-101US |
|---|---|---|
| | Application Number | |
| Title of Invention | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | |

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
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## Applicant Information:

**Applicant 1**

**Applicant Authority** ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
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**Residence Information (Select One)** ◉ US Residency ○ Non US Residency ○ Active US Military Service

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| Title of the Invention | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | | |
|---|---|---|---|
| Attorney Docket Number | AMBZ-101US | Small Entity Status Claimed | ☒ |
| Application Type | Nonprovisional | | |
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| Prior Application Status | | | Remove |
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| | a 371 of international | PCTUS2011068103 | 2011-12-30 |
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| PCTUS2011068103 | non provisional of | 61431507 | 2011-01-11 |
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| | | | Remove |
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| | Application Number | |
| Title of Invention | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | |

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If the Assignee is an Organization check here. ☒

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| **Signature** | | | | Date (YYYY-MM-DD) | 2013-06-27 |
|---|---|---|---|---|---|
| First Name | Deborah M. | Last Name | Grove | Registration Number | 61091 |

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(54) **Title**: INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

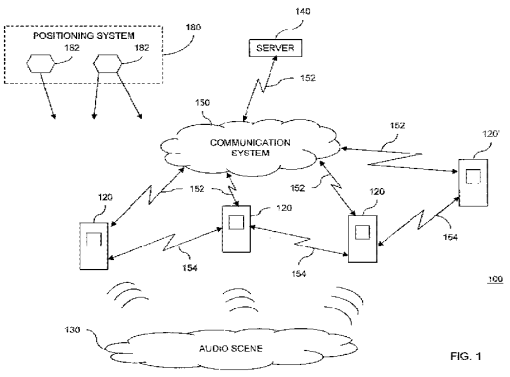



FIG. 1

(57) **Abstract**: Distributed systems, controllers and methods for processing information from a plurality of devices are provided. A distributed system includes a plurality of devices distributed in an environment. Each device has at least a communication capability for interchanging information with others of the devices and/or with a communication system. Each of at least some of the devices has one or more sensors for acquiring sensor data related to the environment proximate to the device. At least one of the communication system or one or more of the devices is configured as a controller configured to: select a subset of devices from among the plurality of devices, receive information based on the acquired sensor data of the selected subset, and combine the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices.

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# INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

## CROSS REFERENCE TO RELATED APPLICATIONS

**[0001]** This application is related to and claims the benefit of U.S. Provisional Application No. 61/431,507 entitled "INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES" filed on January 11, 2011 and claims the benefit of U.S. Provisional Application No. 61/428,369 entitled "INFORMATION PROCESSING USING A POPULATION OF DATA AQUISTION DEVICES" filed on December 30, 2010, the contents of which are incorporated herein by reference.

## FIELD OF THE INVENTION

**[0002]** The present invention relates to processing of information from a population of data acquisition devices, and in some examples, relates to processing of audio or multimedia data acquired from an adaptively selectable population of personal wireless devices.

## BACKGROUND OF THE INVENTION

**[0003]** Devices that are capable of acquiring, and in some cases locally processing, audio or multimedia information from their local environment have become ubiquitous over the past several years, and there is little reason to expect that such a trend will not continue. For example, "smart" cellular telephones (e.g., Apple iPhone®, Android™-operating system based phones) have significant local processing capabilities as well as audio and video acquisition devices.

## SUMMARY OF THE INVENTION

**[0004]** In one aspect of the present invention, in general, the audio and multimedia acquisition capabilities of a set of devices may be exploited to aggregate acquired content and fuse the information in that content, for instance, for audio scene analysis. In some example embodiments, devices from a large population may be adaptively selected and/or configured according to triggering events detected at the devices or by the network. Relating to the audio scene, the information sensed and acquired from one or more devices may be processed, customized and personalized to consumers to mitigate, amplify or pass-through acoustic and other information to users, based on factors such as models of users' requirements and users' past information consumption behavior. Thus an exemplary system of the present invention may mediate ambient and explicitly supplied information, especially audio information, and may act as an arbiter of information for the user. Some of the system actions may be based on information from one device, while other actions may be based on information from multiple devices. The information filtered to users may be utilized to form virtual communities based on shared interests and common information, and to ensure that

relevant information including alerts, marketing information, and news reaches these communities.

**[0005]** According to another aspect of the present invention, in general, a distributed system may include a plurality of distributed devices, with at least one of a communication system or one or more of the distributed devices configured as a controller. Each device has at least a communication capability for interchanging information with other of the devices and/or with the communication system. At least one of the devices may include one or more sensors for acquiring sensor data related to the environment of the device. The controller is configured to perform functions including: determining locations of at least some of the devices, selecting devices from among the plurality of devices and receiving information based on the sensor data acquired at the selected devices, and combining the information received from multiple of the selected devices to determine one or more characteristics of the environment of one or more of the devices.

**[0006]** In other aspects of the present invention, the distributed system may include devices that mediate all audio information sensed at the device to mitigate, amplify or pass-through information. In some examples, such information is optionally logged and analyzed to determine trend-related information.

**[0007]** Other features and advantages of the invention are apparent from the following description, and from the claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]** The invention may be understood from the following detailed description when read in connection with the accompanying drawing. It is emphasized, according to common practice, that various features of the drawings may not be drawn to scale. On the contrary, the dimensions of the various features may be arbitrarily expanded or reduced for clarity. Moreover, in the drawing, common numerical references are used to represent like features. Included in the drawing are the following figures:

**[0009]** FIG. 1 is a functional block diagram of an information processing system, according to an exemplary embodiment of the present invention;

**[0010]** FIG. 2A is a functional block diagram of a distributed device of the system shown in FIG. 1, according to an exemplary embodiment of the present invention;

**[0011]** FIG. 2B is a functional block diagram of a controller of the system shown in FIG. 1, according to an exemplary embodiment of the present invention; and

**[0012]** FIG. 3 is a flowchart diagram of an exemplary method for processing information from a plurality of distributed devices, according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

1 System overview

**[0013]** Personal wireless devices, as well as other types of computing or communication devices, have become ubiquitous in our environment. Generally, such devices have a number of sensors, which may include, for instance, microphones, cameras, accelerometers, and in some cases may even have sensors for biometric information, such as heart rate. Such devices also generally include one or more communication systems, for example, a cellular telephone radio system (e.g., Code Division Multiple access (CDMA) or Global System for Mobile Communications (GSM)), a wireless local area network system (e.g., Wi-Fi, IEEE 802.11), wired computer network connections (e.g., data network connections via USB cradles, possibly via desktop computer applications) and in some cases other systems based on radio frequency (e.g., Bluetooth®) or optical (e.g., infra-red) transmission. Finally, such devices generally are "location aware" and/or locatable by the infrastructure in which they operate. For example, such devices may have global positioning system (GPS) receivers, enhanced GPS (which operates in conjunction with cellular telephone infrastructure), and/or Wi-Fi based maps (which use a map of Wi-Fi access points to locate the device). The cellular infrastructure may, for example, be able to locate the device based on cellular signal strength and/or triangulation approaches.

**[0014]** In some aspects of the present invention, the combination of characteristics of these devices provides a potentially rich source of information that may be combined in a way that generates valuable information that is not necessarily available to any individual device. As an illustrative example, audio processed locally at many different devices may be combined to identify geographic or social group trends based on keywords spoken or other acoustic events (e.g., coughs) that are detected at the devices.

**[0015]** Detection of coughs is an example where detection of non-speech acoustic events may be useful. Because a cough is often a sudden and often repetitively occurring reflex, frequent coughing may indicate the presence of a disease (e.g., many viruses and bacteria benefit evolutionarily by causing the host to cough, which helps to spread the disease to new hosts). Most of the time, coughing is caused by a respiratory tract infection but can be triggered by choking, smoking, air pollution, asthma, gastro-esophageal reflux disease, post-nasal drip, chronic bronchitis, lung tumors, heart failure and medications such as ACE inhibitors. Detection of such events in the vicinity of the devices may provide significant information.

**[0016]** In other aspects of the present invention, the rich sensor capabilities of the devices may provide a way to track activity of a user (e.g., owner) of the device, to enhance the user's experience with various computing applications (such as searching or

personalization). As an illustrative example, topics of conversation in the vicinity of the device may affect the ranking of search results or the ordering of presentation of news stories on the device.

**[0017]** In some aspects of the present invention, the rich source of information over many devices and the tracking of individual activity may be combined, to benefit from their synergy.

**[0018]** Referring to FIG. 1, a functional block diagram of an exemplary information processing system, designated generally as system 100, is shown. System 100 may include one or more distributed devices 120 (also referred to herein as devices 120) and device 120' (also referred to as controller 120') in an environment. One or more of devices 120 and device 120' may be configured to acquire information relating to audio scene 130. Device 120' may be the same as device 120, except that device 120' may be configured to act as a controller for selectively acquiring sensor information from among devices 120 and for determining a characteristic of audio scene 130. Although one device 120' is illustrated as being a controller, it is understood that multiple devices 120' may act as controllers.

**[0019]** Although device 120' is illustrated as a controller for gathering sensor information and determining a characteristic of audio scene 130, it is understood that communication system 150 and/or server 140 may also be configured to act as a controller. Communication system 150 or server 140 may collect at least one of sensor information from devices 120, 120', local data analysis information from devices 120, 120' or scene analysis information from device 120'.

**[0020]** Devices 120 and device 120' may be capable of direct communication with each other, via communication link 154. Devices 120 and device 120' may also be capable of communication with communication system 150, via communication link 152. Devices 120 and device 120' may also be in communication with central server 140, via communication system 150 and communication link 152. Devices 120, 120' may include wired or wireless devices. As discussed further below, devices 120, 120' may be at fixed positions or may be mobile devices.

**[0021]** In one exemplary embodiment, a number of devices 120 are present in an environment. In some examples, the devices 120 (and device 120') are cellular telephones (e.g., "smartphones"). The environment represented by audio scene 130 may be an urban environment, for example, with the devices 120, 120' being present on city streets, in office buildings, or in homes of the users. Generally, the devices 120, 120' may be personal to the users/owners (of the devices), and may be mobile devices, carried with the user throughout the day.

**[0022]** In FIG. 1, a small number of representative devices 120, 120' are illustrated. As discussed further below, the potentially enabled devices 120, 120' may be part of a

large population of devices (e.g., a large fraction of the telephones in a metropolitan area) and system 100 may adaptively enable particular subsets of the devices 120 and/or selectively configure enabled devices 120. For instance, device 120' (or server 140) may enable and/or configure the devices 120 according to triggering events detected at one or more devices 120, 120'.

**[0023]** It should be understood that the description below focuses on smartphones as an example, and other types of fixed or mobile devices may be used in conjunction with or instead of smartphones. Also, the description below focuses on aggregation or combination of audio information as an example, but aggregation and processing of other forms of information, including video and biometric information may be performed in conjunction with or instead of the audio data examples described below.

**[0024]** As introduced above, any particular device 120, 120' is able to sense some aspect of an overall audio "scene" in its environment. Such a scene may include, for example, the device owner's own speech even when not carrying out a telephone call, other sounds made by the owner (such as coughing), the speech of others in proximity to the user and environmental sounds in proximity to the user (such as sirens, gunshots, etc.).

**[0025]** Generally, system 100 makes use of the audio acquisition capabilities of one or more of the devices 120, 120' in order to extract information related to the views of the audio scene 130 by the one or more devices 120, 120'. In one exemplary approach to acquisition of the raw content, every device 120 could continually transmit its acquired signals over communication system 150 to a central server 140 (via communication link 152). For example, the communication system 150 may comprise a cellular telephone system and/or a wireless data network. However, such continual transmission may not be feasible due to the sheer volume given the large number of devices 120, 120' that are fielded, and may raise other issues regarding privacy of those in the environments of the devices 120, 120'.

**[0026]** Another exemplary approach to extracting information is for each device 120, 120' to perform a local signal analysis based on the signals acquired by that device. However, such an approach may have limitations due to the computational limitations of the devices 120, 120'. Also, a purely local processing may lose advantages that could be gained by fusing of information from multiple devices 120, 120'.

**[0027]** An exemplary approach describe below addresses some of the limitations of a purely local or a purely centralized approach using a combination of one or more of the following features:

1) Local processing of acquired signals (on devices 120), at least to identify occurrences of events that may be of interest;

2) Local buffering of audio for selective transmission to device 120' or central server 140, for example, on an ongoing basis or based on a request from device 120' or server 140, or based on local identification of a local event (at one or more of devices 120); and

3) Selective enabling of acquisition and/or processing (or specification of the type of processing) at particular devices 120, 120', for example, based on their geographic location and/or other proximity metrics (e.g., a social network rather than a geographic distance metric).

**[0028]** Note that the locations of the devices 120, 120' (e.g., three-dimensional coordinates) are generally known by the devices 120, 120' and/or central server 140. As an example, a positioning system 180 makes use of units having known locations, such as GPS satellites 182, fixed cellular transmission towers, Wi-Fi access points, etc. to maintain an estimate of the positions of the devices.

**[0029]** Referring to FIG. 2A, a functional block diagram of exemplary device 120 is shown. Device 120 may include one or more of sensor module 202, local data analysis module 204, communication module 206, controller 208, media/state storage 210, position module 212, user interface 214, display 216, warning indicator 218, speaker 220 and privacy module 236.

**[0030]** A typical device 120 includes communication module 206, which provides a communication link 152 through the communication system 150 to sever 140 and/or a communication link 154 to other devices 120, 120'. Communication module 206 may also serve a role in acquiring positioning signals (e.g., GPS signals, Wi-Fi signal strengths, etc.), and may also provide a way to communicate directly with other devices 120.

**[0031]** Device 120 may include sensor module 202 for the acquisition of sensor information. Sensor module 202 may include one or more microphones 222 for collecting acoustic information regarding audio scene 130 (FIG. 1). Sensor module 202 may also include one or more environmental sensors (such as a temperature sensor, a motion sensor such as an accelerometer) for collecting environmental information associated with device 120. Sensor module 202 may also include one or more biometric sensors 226 (such as heart rate) for sensing biometric information regarding a user of device 120. Sensor module 202 may also include camera 228 (i.e., an image sensor) for capturing still images and/or video of the surrounding environment of device 120. Sensor module 202 may also include a compass for providing location information. In general, sensor module 202 may include any sensor capable of measuring a physical quantity and converting it into a signal that may be used by system 100. For example, sensors in sensor module 202 may also include, without limitation, one or more of light detection sensors, proximity sensors, gravity detection sensors, a magnetic field

detection sensors, electrical field detection sensors, vibration sensors, pressure sensors, humidity sensors, moisture sensors, toxin detection sensors, nutrient detection sensors or pheromone detection sensors.

**[0032]** User interface 214 may include any suitable user interface capable of providing parameters for one or more of sensor module 202, local data analysis module 204, communication module 206, media/state storage 210, position module 212, display 216, warning indicator 218, speaker 220 and privacy module 236. User interface 214 may include, for example, a pointing device, a keyboard and/or a display device.

**[0033]** Device 120 may include display 216, warning indicator 218 and/or speaker 220 for presenting information to a user of device 120. Display 216 may include any suitable display device capable of presenting information on device 120. Warning indicator 218 may include any suitable visual indicator for presenting a warning on device 120. The warning may include, for example, an indication that audio information is being recorded. It is understood that speaker 220 may also audibly present a warning indication. Although user interface 214 and display 216 are illustrated as separate devices, it is understood that the functions of user interface 214 and display 216 may be combined into one device. According to an exemplary embodiment, device 120 may receive acoustic and/or other information (via display 216, warning indicator 218 and/or speaker 220) that has been mitigated, amplified and/or passed to device 120 from device 120' (FIG. 1) based on information acquired from one or more devices 120.

**[0034]** Device 120 may include position module 212, to maintain a position estimate for device 120. For example, position module 212 may use positioning system 180 (FIG. 1) to obtain the position estimate.

**[0035]** Media/state storage 210 may store at least one of raw sensor information (from sensor module 202), locally analyzed information (from local data analysis module 204) or location information (from position module 212). Media/state storage 210 may include, for example, a magnetic disk, an optical disk, flash memory or a hard drive.

**[0036]** Controller 208 may be coupled, for example, via a data and control bus (not shown) to one or more of sensor module 202, local data analysis module 204, communication module 206, media/state storage 210, position module 212, user interface 214, display 216, warning indicator 218, speaker 220 and privacy module 236. Controller 208 may be configured to control acquisition of sensor information, local analysis of sensor information, transmission and/or receipt of sensor information, transmission and/or receipt of local analysis information, as well as any presentation of information by device 120 (such as via display 216, warning indicator 218 and/or speaker 220). Controller 208 may include, for example, a logic circuit, a digital signal processor or a microprocessor. It is understood that one or more functions of local data analysis module 204 may be performed by controller 208.

**[0037]** Local data analysis module 204 may be configured to analyze information collected locally by sensor module 202 for device 120. Local data analysis module 204 may include acoustic analysis module 230 for analyzing audio information (such as from one or more microphones 222). The audio information may include speech, music as well as environmental sounds (such as an approaching train). The speech may be generated by a user of device 120, as well as by other individuals proximate to device 120. Local data analysis module 204 may perform the analysis either locally or with the aid of backend server architecture or similar mechanisms.

**[0038]** Local data analysis module 204 may also include other sensor analysis module 232 for analyzing information from other sensors of sensor module 202. For example, other sensor analysis module 232 may analyze information from one or more of environmental sensor(s) 224, biometric sensor(s) 226 and/or camera 228. Local data analysis module 204 may combine results from acoustic analysis module 230 (such as keywords, target sounds) and other sensor analysis module 232 to determine the occurrence of one or more particular events (and/or a characteristic of audio scene 130).

**[0039]** Acoustic analysis module 230 and/or other sensor module 232 may also pre-process the respective sensor information, for example, to substantially remove or reduce noise. Modules 230, 232 may also filter the noise-reduced sensor information to identify high value signals which may be indicative of the occurrence of particular events.

**[0040]** Local data analysis module 230 may include classifiers 234 associated with acoustic analysis module and/or other sensor analysis module. Classifiers 234 may be used to build profiles of audio information, environmental information, biometric information and/or image information.

**[0041]** In an exemplary embodiment, acoustic analysis module 230 may preprocess the audio information to recognize speech, perform keyword spotting on speech information, and in addition build voice models of various speakers within the auditory range of the device. The models may, for example, use classifiers 234 and machine learning methods to identify gender, probable age range, nationality and other demographic features from the speech signals.

**[0042]** In addition, there may be classifiers 234, for instance, to recognize any slurring due to the influence of alcohol or similar substances, accent classifiers to detect and identify accent patterns belonging to specific language groups, and emotion classifiers to classify speakers and speech into happy, sad, stressed, angry or other emotional states. Thus, given any audio input that includes any speech, individual devices 120 or system 100 (FIG. 1) as a whole may be able to build an acoustic profile of each speech participant in that input, where the profile not only includes the keywords spotted, but

also other data such as demographic data about each speaker including gender, probable age, possible nationality etc., as well as classifier results about emotional state, and/or whether the speaker is under the influence.

**[0043]** The acquisition of keywords with demographic data may help advertisers target their sales, based on factors such as gender, age and potential levels of disposable income, and to track their sale cycle from users noticing their advertisements to those users who actually make a purchase. Emotion indicators may be used to take palliative or preventative steps to avoid customer dissatisfaction. Other information like slurring may be used as corroboratory information in situations such as accidents or may be used to prevent accidents.

**[0044]** Privacy module 236 may include mechanisms to implement privacy and/or security requirements and policies for applications relating to the acquisition and use of information of various kinds, including audio information, by one or more devices associated with a number of carriers. These policies and mechanisms may control the use of devices 120 (and device 120' (FIG. 1)) including the ability to remotely switch on and switch off sensing (e.g., listening), the ownership of any audio information garnered by these devices 120 (and device 120' (FIG. 1)), the users' ability to easily control sensing and information acquisition, mechanisms to opt-in and opt-out of applications, carrier-wide or network-wide data gathering, the protection of any audio personally identifiable information (PII) that is gathered, and any aggregated data that is created from a number of devices 120 (device 120' (FIG. 1) and networks. Policies or standard practices may also be established for private or semi-private situations where not all users present have opted-in for data acquisition. For example, when system 100 (FIG. 1) records speech from users that are not likely to be opted-in to the information acquisition, system 100 may provide a warning indication to all devices 120 in the immediate vicinity to indicate that audio information is being recorded. The warning indication may be provided on warning indicator 218.

**[0045]** Referring next to FIG. 2B, a functional block diagram of exemplary device 120' is shown. Device 120' is similar to device 120 (FIG. 2A), except that device 120' may also include device selection/data acquisition module 240 and scene analysis module 242. Similarly to device 120 (FIG. 2A), components of device 120' may be coupled together via a data and control bus (not shown).

**[0046]** Device selection/data acquisition module 240 (also referred to herein as module 240) may receive sensor information and/or locally analyzed information from selected devices 120 (FIG. 1). Scene analysis module 242 may combine the sensor information and/or locally analyzed information from among the selected devices, in order to determine at least one characteristic of audio scene 130 (or the environment, in general).

**[0047]** Module 240 may determine the locations of at least some of devices 120 (FIG. 1). Module 240 may select one or more devices 120 (FIG. 1) from among plural devices 120, for example, based on the location of these devices 120 as well as any characteristics (such as an event) determined by scene analysis module 242. Accordingly, as a characteristic is detected (by scene analysis module 242), module 240 may adaptively acquire information from selected devices 120 (FIG. 1), in order to better analyze audio scene 130. Module 240 may also configure selected devices 120 (FIG. 1) to acquire specific information, (for example one device 120 may acquire image data via camera 228 (FIG. 2A) whereas another sensor may be configured to acquire audio data via microphone 222 (FIG. 2A). As another example, module 240 may configure multiple devices 120 to acquire audio data via respective microphones 222 (FIG. 2A), so that the multiple microphones 222 form a beam forming array.

**[0048]** Referring generally to FIGs. 1, 2A and 2B, system 100 makes use of one or more of enabling and configuring of devices (via device selection/data acquisition module 240) for prospective monitoring, access to logged data for retrospective analysis, and real-time notification of events (such as by scene analysis module 242). This adaptation of system 100 may be based on detection of triggering events at the devices 120, 120'. For example, device 120' may enable detection of certain acoustic events (e.g., words, spoken topics, music, and environmental sounds) and may adapt the configurations on selected devices 120 based on reports from other devices 120.

**[0049]** Device 120' (and devices 120) may include software for coordinating the set of devices 120. The software may have centralized control, peer-to-peer control or a hybrid model involving centralized, peer-to-peer and other control mechanisms. Individual devices 120, 120' may switch between being master devices controlling other devices, or slave devices under the temporary partial control of other devices. The network of devices 120, 120' may so configure itself to optimize power consumption on individual devices 120 by distributing the sensing load across a number of devices 120, 120', or by other mechanisms such as sharing bandwidth across devices 120, 120'. The networking used may be based on ideas related to mobile ad hoc networks (MANET), Scatternet or other mechanisms.

**[0050]** For example, system 100 may dynamically organize and reorganize its nodes into hierarchies or graphs, with some devices 120, 120' chosen to be master nodes while other possibly geographically proximate devices to be slave nodes. Slave nodes may perform actions based on instructions from master nodes. They may preprocess information and convey processed information to master nodes, instead of conveying all information acquired, thus distributing computation among nodes and reducing the communication bandwidth. In addition, communication requirements may improve because only a few master nodes may communicate with each other, instead of all, say

N devices trying to communicate with each other, which would require ($N^2/2$) connections.

**[0051]** Because each node knows its location, depending on system requirements, the network may organize itself into one or more linear chains or local groups, where information is passed between physically proximate devices, very much like a bucket brigade conveying information. With a peer-to-peer architecture, individual devices 120, 120'– either just master nodes or both master nodes and slave nodes – may record information about neighboring nodes and their capabilities and features, so that, for instance, connectivity between any pair of nodes can easily and effectively be established at low computational cost.

**[0052]** Other optimization techniques may also be adopted – for instance, when data logs are recorded, the system may determine if several devices are in the same audio or other sensor context. For example, if several phones 120, 120' are located in the same context, not every phone 120, 120' has to record all data – the system 100 may designate a scribe node which acts as a local repository for data and for ensuring the data gets stored to some centralized server 140 (or device 120') in the cloud. This may save considerable logging effort on the part of the other nodes.

**[0053]** Alternatively or in addition, the system 100 may distribute sensor load among devices 120, 120' so that not every node has to acquire information via all of its sensors in sensor module 202. Some sensor modules 202 may concentrate on acquiring audio information, while other devices 120, 120' may acquire position information and still other sensor modules 202 may acquire temperature or altitude information, and so on. This may reduce power and communication bandwidth requirements for the entire system 100. Several such schemes may be devised to optimize the throughput and efficiency of the system as a whole. According to an exemplary embodiment, system 100 may also distribute processing of sensor information among devices 120, 120', so that different individual tasks are performed by devices 120, 120'. This may reduce the computational burden on some devices 120 (or device 120') which may not have suitable processing capabilities for a specific task.

**[0054]** The system 100 as a whole may use carrier-agnostic handlers in the cloud. Specifically, the networking may utilize services from a number of wireless telephony, Wi-Fi or other carriers, and suitable policies may be put in place to enable carrier-agnostic behaviors. Specifically, so that no user may be denied sharing of information because of association with specific carriers, and so that digital bridges exist to share information across carriers where desired. In a variant, some features may be made unique to a carrier for marketing reasons.

**[0055]** It is understood that devices 120, 120' do not have to be phones. Devices 120, 120' may be stand-alone devices, or may be an integral part of a GPS, hearing aid,

mobile phone, TV remote, car key fob, portable game controller or similar device. Device 120 (and/or device 120') may be carried by the user on his person, or be installed in or on a vehicle such as a car.

**[0056]** For certain applications, devices 120 (and/or device 120') may be fixed and installed at home, or be part of fixed telephones, desktop computers, TV sets or game consoles. Each device 120 (and/or device 120') may include one or more sensors with associated software. Different kinds of devices 120, 120' may include different sensors and/or different software. If device 120 or device 120' is more like a smartphone, system 100 may have access to textual data including electronic mail, chat transcripts and documents, and audio data including phone conversations, music on the device or streamed to the device, ambient audio picked up by microphones, and user search logs. All of this data may be relevant to the user. This data, along with the user's context and environmental variables, may be used for personalization of information consumed by the user and then where appropriate repurposed for commercial applications to the user or the community at large.

**[0057]** Referring to FIG. 3, a flowchart diagram of an exemplary method for processing information from a plurality of distributed devices is shown. The steps illustrated in FIG. 3 represent an example embodiment of the present invention. It is understood that certain steps may be performed in an order different from what is shown. It is also understood that certain steps may be eliminated.

**[0058]** At step 300, the location of devices 120 (FIG. 1) may be determined, for example, by controller 120' based on information previously received from devices 120. For example, controller 120' (FIG. 1) may directly communicate with devices 120 to determine their locations. As another example, the location of devices 120 (FIG. 1) may be known from communication with communication system 150 and/or sever 140.

**[0059]** At step 302, a subset of devices 120 (FIG. 1) may be selected, for example by device selection/data acquisition module 240 (FIG. 2B) of controller 120'. For example, controller 120' (FIG. 1) may select one or more devices 120 based on a predetermined characteristic of the environment and the location of devices 120.

**[0060]** At step 304, sensor information and/or locally processed information may be received by controller 120' (FIG. 1) from the selected subset, for example, by device selection/data acquisition module 240 (FIG. 2B). For example, controller 120' (FIG. 1) may receive raw sensor information from respective sensor modules 202 (FIG. 2A) and/or locally processed information from respective local data analysis modules 204 (FIG. 2A). Controller 120' (FIG. 2B) may also acquire sensor information and/or locally processed information from its own sensor module 202 and local data analysis module 204. The information from at least one of the devices 120 may be received responsive to a confirmation indication from the respective device 120, to indicate an allowance by

device 120 to release its respective information to the controller. For example, the confirmation indication may be provided manually by a user of the respective device 120, or may be provided automatically by the respective device 120, based on the privacy settings of the device 120.

**[0061]** At step 306, information received from the subset (as well as, optionally, from controller 120' (FIG. 1)) is combined to determine a characteristic of the environment, for example, by scene analysis module 242 (FIG. 2B) of controller 120'.

**[0062]** At step 308, it is determined whether the subset should be adjusted, for example, by device selection/data acquisition module 240 (FIG. 2B) of controller 120'. For example, the subset may be adjusted based on an event detected by a local data analysis module 204 (FIG. 2A) of one or more devices 120, the characteristic of the environment, any context from the characteristic, the location of devices 120 (FIG. 1) (e.g., position, orientation in space), demographics from the characteristic, any social-graph membership among devices 120, etc. For example, if one device 120 (FIG. 1) detects a gunshot, device 120' may expand the subset of devices 120 to additional devices (to triangulate the location of the gunshot) and/or to send a warning indication to all devices 120 in range.

**[0063]** If it is determined, at step 308, that the subset should be adjusted, step 308 proceeds to step 310. At step 310, selection of the devices in the subset may be adjusted and/or a configuration of selected devices of the subset may be adjusted, for example, by device selection/data acquisition module 240 (FIG. 2B). For example, different devices 120 (FIG. 1) may be switched on or off. As another example, different sensors of sensor modules 202 (FIG. 2A) may be configured to acquire sensor information.

**[0064]** If it is determined, at step 308, that the subset should not be adjusted, step 308 may proceed to step 304, to continually determine a characteristic of the environment.

**[0065]** Alternately, step 308 may proceed to step 312 (environmental monitoring), step 314 (localization and tracking), step 316 (topic monitoring), step 318 (triggering events) and/or step 320 (other monitoring and regulation). The characteristic of the environment may be used for a number of different applications, which are described further below.

**[0066]** Referring generally to FIG. 1, in an exemplary embodiment, a platform may be developed to enable users to develop applications that: harness a set of these devices 120; acquire signals from devices 120; switch subsets of devices 120 on or off (based on information about context, including position, orientation in space, social-graph membership, and demographics); process and analyze information obtained from sensors of devices 120; set triggers to enable or disable sensing, processing or analysis;

and adapt system 100 to sensed, processed or analyzed information. The platform may allow individual devices 120, 120' to be customized and personalized to users (consumers) to mitigate, amplify or pass-through acoustic and other information to users based on acoustic and other information acquired from one or more devices.

**[0067]** Once such a platform is developed, applications may be developed for many of the scenarios and use-cases described herein. The platform may specify minimum hardware requirements, such as minimal sensor numbers and configuration, minimal onboard computing resources in terms of hardware and software, and an application programming interface (API) to allow developers to access all the features and resources available on the device.

**[0068]** An example platform specification may include: one or more microphones or a microphone array; one or more accelerometers typically to cover two or three axes of motion or orientation; a compass; an on-board GPS system; zero or more other sensors such as contact or non-contact temperature sensors; cameras with a minimal required resolution, with Bluetooth®, Wi-Fi and other capabilities; software including classifiers to analyze speech, to analyze media including music, video, and still images; software to acquire environmental metrics and analyze them in various contexts such as urban vs. suburban, and residential vs. industrial; software to preprocess signals acquired to remove or reduce noise, filter the remaining signals to identify high value signals and to transmit them to a server 140 in a compressed form if desired; a database of sound signatures; and software to handle reactive mechanical tasks in response to sensor data- all with enough power to provide a realistic and acceptable user experience.

## 2 Example use cases

**[0069]** In this section, a number of example use cases are provided to illustrate how an exemplary system 100 (FIG. 1), described above, may be used in practice.

### 2.1 Environmental monitoring

**[0070]** A number of uses relate to monitoring an environment of a set of smartphones. In a public health monitoring example, the on-board audio processor may be configured detect occurrences of coughs, typically by the owner of the device or by other people in the proximity of the device. Such detection may use, for example, statistical spotting techniques (e.g., Hidden Markov Model (HMM) techniques, Gaussian Mixture Model (GMM) techniques) trained on a corpus of recordings of coughs know as a Universal Background Model. Communication of locally aggregated results, for example, a number of coughs per hour, may be uploaded to the central server 140 or device 120' on a schedule, or when the rate deviates from an expected or maximum value. In this way, the controller 120' (or server 140) may be able to identify local "hot spots" of coughing.

**[0071]** Other educational and public health uses may be possible with epidemiological applications of such systems. For example, pertussis (whooping cough) is a highly

contagious disease and one of the leading causes of deaths world-wide that is preventable with the use of vaccines. Exemplary system 100 may be used to provide information to parents of children with coughs or with other symptoms such as asthmatic symptoms to help them decide when to seek medical help, and to provide epidemiological data about pertussis, asthma and related illnesses.

**[0072]** In some scenarios of such monitoring, only a limited subset of devices may be initially configured to perform the local processing needed to detect the coughs. However, when controller 120' determines that there is a possible hot spot of activity, controller 120' may enable further devices in the geographic proximity of the hot spot to gain further information about the extent of the situation. In some examples, the controller 120' may enable further devices based on a social proximity, for example, to account for the possible transmission of an illness to others that are close in a social sense. In addition to enabling further devices, the controller 120' may disable devices and control the overall monitoring set for the task.

**[0073]** In a variant, the system 100 may use sensed information to alert patients to asthmatic attacks in children, along with information on the child's environment at the onset of the attack, to enable them to ensure that prompt remedial or palliative action is taken.

**[0074]** In yet another variant, the system may be used to alert patients of breathing disorders such as sleep apnea. Sleep apnea is a disorder that is characterized by abnormal low breathing or abnormal pauses in breathing during sleep, often accompanied by snoring. Often the snorer is not aware that they snore or that they could have a life threating medical issue, and they suffer from fatigue, daytime sleepiness and other symptoms, often for years and years. Diagnosis often requires an overnight sleep study in a special lab set up with sensors. Knowledge about snoring and having a record of snoring behavior can help in the diagnosis and remediation of this condition. System 100 may be trained to recognize snoring, and to distinguish it from other kinds of similar noises, and help in detecting and recording snoring behavior to help people with breathing disorders identify their problems and seek appropriate help.

**[0075]** In another monitoring use case, the devices 120 may be used to monitor environmental sound levels (e.g., sound pressure level), for example, for workers in a factory workplace. Devices 120 of workers monitor the noise level and maintain a record, for example, cumulative durations of various ranges of noise level. This locally-determined information may be provided on regular or locally triggered basis, for example, if the noise level exceeds certain prescribed limits (e.g., an absolute limit, a limit for accumulated time above a prescribed sound pressure level, etc.). The controller 120' (or server 140) may query further devices 120 to determine the location of high noise levels, for example, based on locally logged detailed information that correlate

noise level and location within the workplace. Also, other characteristics of environmental sound, for instance, related to the source of the sound may be detected. For example, a machine type (e.g., whistle, engine, press, saw, drill etc.) may be discriminated, for instance using pattern matching techniques (e.g., HMM, GMM techniques).

**[0076]** A similar sound-level monitoring may be used to track environmental sounds levels, for example, in particular restaurants, on particular streets, etc. and such monitoring may also identify time-of-day variation of such levels. Ornithologists may be interested in the ability to monitor the presence or absence of bird songs over time and space. Others might be interested in using sound arrays to monitor insect infestations. Exemplary system 100 may make it possible to compare treatment areas with controls to measure the effectiveness of proposed countermeasures. In some examples, if the device 120 is not connected to the communication system 150, information is logged, time stamped and stored in a non-volatile memory and then uploaded when the device 120 is once again connected or its memory is interrogated. This may be typical after an automobile accident or other fatal or non-fatal incidents.

**[0077]** If a large number of cars on the same highway suddenly decelerate at the same time, then the network could decide to issue a warning to cars a few miles behind the obstacle. In addition, the ability to measure traffic flow using an array of smartphones (equipped with communication networks and sensors such as accelerometers and microphones and GPS/location sensors) has the potential to improve traffic routing in the short term, and traffic planning in the long term. Many of the applications envisioned in the present invention may have both short-term and long-term benefits. Short-term benefits use networks with low latency (such as the radio stack), whereas long-term applications can make use of networks with longer latency (such as uploading information at the end of the day when the device is docked in a networked cradle).

**[0078]** In another monitoring use, phones may be enabled to "name that tune" in the environment, and both provide the owner to download that song to their device library and upload the location of the playing to the central controller, which monitors the aggregated presence of different songs. Consider a music festival with several stages, where different groups are playing. As the user walks around these stages, a network of systems may be continuously acquiring audio data, detecting and isolating, for instance, music, identifying the music and showing users the name of the piece being played, the album, the artistes playing etc. The system may provide a mechanism for users to purchase the music if it is of interest to them. There are stand-alone programs to identify music being played, but they require a single device to collect a good sample of music, send it to a server and then possibly identify the music. In contrast, by having a

network of devices 120 collect data, data acquisition is more robust and distributed, and users are able to get their music identified faster.

**[0079]** Detection of particular music being played in the environment of devices may be aggregated to determine marketing related information. By monitoring what people hear as they go about their lives, the system may acquire considerable information about the media segment. The information captured on music played, the artiste/group being played, the volume of music purchased etc. is very valuable, especially when pivoted on various dimensions. In addition, in stores where music is sold, features such as the audio background and lingering behavior may also be valuable.

**[0080]** These devices may also be used to share information about what users listen to or see, or to find out what their friends are seeing or listening to. Currently users have to take the effort to tweet or post their music-playing or video-watching behavior. However, a few days of this can get tedious, and soon users may no longer post information on their listening or viewing habits. Exemplary devices 120 may automatically identify songs or TV programs, inform friends in the users' social graph or create virtual communities of users with similar listening or viewing interests.

2.2 Localization and Tracking

**[0081]** Some use cases take advantage of the multiple locations of the devices 120 to perform localization and/or tracking of audio sources. In one example, aircraft noise data may be obtained by having a "jet detector" implemented in the on-board audio processor of a set of devices 120. Upon detection of a loud jet noise, which is reported to the controller 120' (or server 140), other devices 120 in the proximity of the reporting device(s) 120 are enabled. Buffered time stamped audio and device location data is uploaded to the controller 120' (or server 140), where a triangulation approach may be used to determine a track of the detected audio source. Based on the track, further devices 120 may be enabled along the project track so that the audio source may continue to be tracked. If the source is lost (i.e., doesn't follow a predicted tract), more devices 120 over a larger area may be enabled to re-acquire the location of the audio source. In this way, an overall assessment of the audio tracks of loud aircraft may be determined based on the aggregated acquired audio data.

**[0082]** The selected set of devices 120 effectively acts as a configurable microphone mesh for acquiring audio data. In other examples, the devices 120 can act as a configurable accelerometer mesh for acquiring spatially and/or temporally distributed motion-related data.

**[0083]** Similar tracking information may be used, for example, to track sirens in a city. Such tracking may be used, for example, to predict traffic flow in a city that may be affected by an emergency.

**[0084]** Another type of localization may be used in near real-time or in an after-the-fact forensic mode. For example, the devices 120 may be carried by police officers or bystanders near the scene of a shooting. After detection of a gunshot event by one or more of the devices 120 (e.g., the officers' devices), the controller 120' (or server 140) may upload locally buffered audio from the officers' devices 120 or other devices 120 in the environment, and perform a localization of the source of the shooter's location. In a near real-time example, this information may be provided to the police officers to aid in their police duties. A similar type of arrangement may be used in a military situation in which audio is buffered at devices 120 carried by multiple soldiers, and the combined information may be used to estimate the direction of a sniper location.

**[0085]** Note that a central server 140 is not necessarily required. For example, devices 120 may locally exchange information to perform aggregated analysis, such as localization. In one such example, each device 120 may include a detector for an event of interest (e.g., gunshot), and upon detection of the event may pass the raw audio or a partially processed version of the audio (e.g., an intensity time profile) to nearby devices 120 (e.g., using ad hoc wireless communication), which perform local assessments of shooter direction based on the information they obtain.

**[0086]** In yet another scenario, these devices 120 may be used for adaptive crowd control. In situations with high traffic, whether vehicular or pedestrian traffic, these devices 120 may be configured as a mobile ad hoc network to estimate traffic flow from noise, with no requirement for any fixed or embedded sensors. Using the dynamically acquired traffic pattern information, the system 100 may broadcast instructions though the devices 120 or through other means to direct people through paths of lower traffic density, open up different gates or paths, or use sonification or acoustic visualization to alert users to high traffic versus low traffic paths.

**[0087]** A related idea is to create mobile sound-based security systems where the system 100 is able to quickly learn about ambient conditions and sound trends, and use this to signal situations away from normal conditions.

**[0088]** In another use case, these devices 120 may use sentiment detection and emotion detection to identify centroids of trouble in large crowds. A variant of this system 100 can be used to detect user dissatisfaction in their language, or in non-speech audio to alert management to, for example, open more counters in stores.

**[0089]** When users try to meet up with friends in large auditoria or sports stadia, it is often impossible to use mobile phones or to hear conversations on phones. The system 100 may use knowledge of users' social graphs to indicate the presence of friends using directional sonic visualization or sonification, with some variation in tone or volume as users approach their friends. Using the peer to peer architecture of the system 100 along with the knowledge in each device 120 about its neighboring devices 120 and their

features, the system 100 can quickly and effectively determine the possible locations of friends. By utilizing the position information, and the orientation information acquired from the user's device 120, the system 100 can provide differential tones, volumes or other signals to indicate whether the user is moving towards or away from their friends (and whether they are pointed towards or away from their friends), and provide an indication about how far away they are. The precision of this indication may go up with the number of peer devices 120 contributing information to the system 100.

**[0090]** In another localization use case, a number of devices 120 may be enabled to sense audio, for example, for a group conference call. The locally acquired audio may be used to identify the location of the speaker, and to control which device 120 (or devices 120) are used to generate the audio for the call. For example, a device 120 closest to the person speaking, or the device 120 providing the highest signal quality or intelligibility, may be selected, thereby providing an improved audio quality.

**[0091]** In another localization use case, devices 120 may be tracked during a shopping trip, for example, in a grocery store or at a mall. The track taken by the user with corresponding audio or video information may be used to identify areas of customer focus and interest, and provide user-specific information, for example, promotional information related to purchase opportunities in the vicinity of the device 120.

**[0092]** After-the-fact analysis of a track may be used to correlate movement with actual purchases made, or to possible interest in various classes of items. For example, a relatively high time spent in the vicinity of a product type may indicate an interest in that product type. Users may be interested in opting in to having their path tracked in exchange for receiving promotions.

2.3 Topic monitoring

**[0093]** In another use example, a device 120 may be enabled to monitor the owner's environment as they converse during the day, and as they listen to media broadcasts. Topic detection techniques, for instance, based on spotting topic-related keywords, may be used to assess topics of interest to the user. During the day, or in a periodic summary, the user is presented with collateral information related to the topics. For instance, if the user enters into a conversation about a particular topic, recent news or background material may be offered on the device 120. Such topic monitoring may also be useful to provide other targeted material to the user, for example, in the form of advertising that is relevant to the user's interests.

**[0094]** The configuration of other devices 120 may be adapted based on what is detected at the user's device 120. For example, other devices 120 in geographic or social proximity to the user's device 120 may be configured to detect the presence of similar topics. In this way, the other devices 120 may have a higher likelihood of

correctly detecting the topics. Furthermore, the controller 120' or server 140 may be able to track the extent of interest in a topic.

**[0095]** Another topic-related monitoring use may be related to a third party requesting detection of audio signals, such as audio components of advertising to determine where these advertisements have been played. For example, an advertiser may have controller 120' or server 140 configure devices 120 to detect an advertisement, and then determine where the advertisement has been played and potentially heard.

**[0096]** In a related use case, the system 100 may use information garnered from the sensors of devices 120 and from other sources such as electronic program guides (EPG) to identify what programs users have been listening to or viewing, to get Nielsen-like viewership statistics or to acquire business intelligence. Current systems tend to rely on home systems or manually created diaries, both of which are prone to error. Using exemplary devices 120 and exemplary system 100 may allow for this monitoring to be done wherever the user is, and whatever media device they use, and to use information from user activity to distinguish active listening or viewing from, for instance, a TV playing to an empty room.

2.4 Triggering events

**[0097]** Generally, use cases described above use various triggering events to begin local logging of audio and/or to initiate communication with the server 140, device 120' and/or other nearby devices 120. In addition to audio-based events (e.g., specific words, spoken topics, music, sounds, etc.), other events may trigger monitoring and/or communication. For instance, content of text communication (e.g., Short Message Service (SMS) messages) may initiate monitoring and/or configure what is to be searched for. Other data, such as accelerometer data, biometric data, and detection of a video image (such as change in luminance, etc.) that is available to the device may also be used in a trigger. For example, high acceleration may be associated with a vehicle accident or a fall, and this may initiate audio monitoring or communication with the server 140 (or device 120'), which may be able to determine if an accident has occurred based on the audio scene 130, in which case emergency help may be summoned.

**[0098]** The system 100 may also be used in the care of the elderly and the disabled. Currently senior citizens and the disabled can purchase a conventional device to signal when they need help, for example if they fall or feel dizzy. However, these conventional systems require the user to consciously make a decision and press a button on the device to ask for help. The problem is that there may be situations where the user cannot make the decision, may be too embarrassed to ask for help, may feel their problem is not critical enough to ask for help, or may not even be able to access the button to call for help. For instance when the user has a stroke or if they have a fall, it

may be difficult for an elderly user to press the button. The system 100 described here may use data fusion ideas to combine speech and noise detection from one or more devices 120 along with other accelerometer data to detect calls for help, or sounds from falls, dropped objects, etc., distinguish between false alarms and real problems, and summon help when required as well. System 100 may also be able to turn on the speaker phone to have a dialog with the "help" side of the call.

**[0099]** In another form of triggering event, when a device 120 is removed from the direct acoustic environment, for example, by being put in a user's pocket, the change in audio signal characteristics may trigger a message to the controller 120' or server 140 to indicate that the device 120 is no longer available for acquiring audio based on a poor signal-to-noise ratio (SNR) operating environment. Similarly, when the device 120 is taken out of the pocket, it may again start monitoring the environment and/of notify the controller 120' (or server 140) that it is once again available. In addition, when the device is no longer obtaining adequate SNR, the device 120 may be able to enable other devices 120 within its proximity to acquire the signal and thus improve the overall SNR. In addition, many devices are now manufactured with multiple microphones (primarily used for beam forming) as to obtain an improved SNR for the user. As the user may often carry the device 120 in their pocket or purse, system 100 may be able to select which microphone in the device 120 is desirably enabled or what beam forming array would be best evoked to obtain a maximum SNR.

**[00100]** In some examples, vehicle texting is disabled by the system 100. By detecting an acceleration signature consistent with being in a moving vehicle and/or by picking up the type of sounds picked up while driving, the device 120 can detect road noise, the engine noise, wheel bearing noise, breaking noise All of these sounds may be used to either disable or enable the user from utilizing their device 120 for texting while the car is in motion. The device 120 may query its proximity and determine if other devices 120 were present within the body of the automobile. Assuming the answer were yes, further analysis may be used to provide limitations on the driver's device 120 from texting while still allowing the balance of the individuals to text. Some cars also disable or limit select navigational controls for safety reasons when the car is in motion. If the device 120 is able to detect a front seat passenger, the system may choose not to limit navigational controls.

**[00101]** In some examples, key word spotting obtained from in-situ conversations is aggregated from both the sender and recipient. During the course of normal telephone conversations, the device 120 may identify specific sounds, words, etc being uttered by both parties of a conversation. The system 100 may interrogate these sounds and provide the user with information either thru a graphical user interface (GUI), or audio

based or text based feedback. As an example, assuming a call was about a trip to Paris, the device 120 could render information about promotional pricing on an airline to Paris.

**[00102]** One or more of these devices 120 may be used to identify trends in audio and other information acquired by these devices 120, for example using keyword spotting in audio streams. Keyword trends may be used to adaptively mediate or modify information consumed by users. In one scenario, information sources such as news media, search engines and similar information outlets may acquire information on trends from individual users or groups of users, and show different items to different users based on keyword trending. Specifically such a system 100 may choose topics users have been known to prefer.

**[00103]** Trending on non-speech audio may be used to identify patterns of people flow or vehicular flow. Aggregated logs of speech and non-speech audio may be used for a number of diverse applications, including identifying less noisy apartments or houses to rent or buy and areas of hotels or theater halls that may be better soundproofed. Longer term trending and identification of trends and periodic variations may be used for soundproofing or weatherproofing offices and residences.

2.5 Other aspects and uses

**[00104]** The ability to aggregate information over many smartphones can be provided with or without the cooperation of the carriers. It could be done, for example, with a third party application, which doesn't need the approval of a particular carrier and communicates via Wi-Fi or Bluetooth®. In this way, information can be aggregated across phones serviced by multiple competing carriers.

**[00105]** In some exemplary embodiments of the system 100, the system 100 may trigger off key events such as rapid deceleration of several cars at the same time and place, sirens, keywords, etc. The ability to collect vast quantities of data may improve the triggering capability. Search companies are providing better search relevancy than ever before, largely because they are collecting more data than was possible before the popularity of modern search engines. But with the exemplary system 100, it may become possible to collect even more data. If every phone were collecting audio data for an hour a day, the aggregate data resource would be much larger and much more valuable than the data collections currently collected by even the largest search companies.

**[00106]** In some exemplary embodiments of the system 100, if a device 120 in the system 100 may detect certain important keywords and phrases like "fire," then the system 100 may respond appropriately. The importance and urgency of a term depends both on the consequences of inaction as well as term weighting concepts that are well known in the field of Information Retrieval.

**[00107]** Similarly, if a system 100 hears an important term (such as a keyword like "fire" or a non-word like a cough or an event picked up on some other sensor of device 120 such as a rapid deceleration), then the system may turn on numerous other nearby sensors in the array to confirm the event, to improve the signal to noise ratio and/or to localize the event in time and space.

**[00108]** In some uses, trending analysis may use the large amount of data available through the system 100. Consider the cough example mentioned above. Aggregations of coughs over time and space may provide tracking of health over time and space. The approach is similar some approaches to prediction of the flu based on queries where they showed that they could predict flu a couple of weeks faster than the Centers for Disease Control and Prevention (CDC). But the proposed cough metric should have even better resolution over time and space since it is based on a larger quantity of sensed data.

**[00109]** Collection of large amounts of sensed data provides a way to systematically predict (e.g., according to a statistical model) sequences or sets of sensed events of other information. Such prediction may effectively be exploited based on principles related to Shannon's Noisy Channel Model, for example, to improve transmission capacity for such events. For example, such data can allow one to create a better "language model" for events, which will do a better job of predicting what sounds to expect to hear (the prior for the noisy channel model) as well as sounds that are anonymous (triggers that should sound alarms and start recording).

**[00110]** In some examples, workplace monitoring (and monitoring of the environment) may be enabled by the system 100. The system 100 may effectively provide "smartdust" on smartphones, which is able to monitor workplaces for health issues by measuring acoustical events like coughs. Moreover, in some uses, the system 100 may sense correlates of stress such as noise. Some call centers, for example, have more stress related illnesses because the call volume has relatively large numbers of unhappy customers. It may be possible to predict risk of certain types of illnesses well before symptoms develop, both at work as well as elsewhere.

**[00111]** An ad hoc network of devices 120 may be used to fine-tune a number of features. Consider concert-hall acoustics, for instance. Concert halls are typically tuned for the major uses of their space. For example, a symphony hall may be tuned especially for a large group of artistes and their instruments, and may not be as well suited to, for example, solo vocalists. Sound quality in a hall is also dependent on the size of the audience, their ambient noise characteristics etc. The network of system 100 may enable data to be acquired from a large number of devices 120 in the audience, so that the hall management can adapt to the ambient noise levels and fine-tune sound

levels for any performance, with any number of performers and instruments, and with different audiences.

**[00112]** The ad hoc network can also be used for monitoring and regulatory purposes. Sound pressure levels or similar measures of rock concerts, gym classes and other potentially noisy environments may be monitored against safe listening levels, and infractions reported to the appropriate management or regulatory agency.

**[00113]** A similar scheme may be used to fine-tune the temperature in large auditoria, rooms or halls, based on data acquired from a number of devices 120 and individual sensors in that space. Large spaces have their own airflow and heating and cooling patterns, based on placement of air ducts, windows, doors and other openings. Heating and cooling is typically based on measuring temperature in one and occasionally more sensing locations. If the sensor is near a sunny window or a draft caused by a constantly open door, the temperature in that space can be unsatisfactory. By measuring temperature in several locations using a set of devices 120 as described in this invention, it will be possible to have finer, more localized control of temperature.

**[00114]** Some exemplary embodiments of the system 100 may make predictions based on a small sample of "opt ins." The system 100 (e.g., "cloud") may be equipped with appropriate logic to determine how to make appropriate inferences based on information gathered from those phones 120 that choose to opt into the system 100. Many of these inferences are relatively straightforward, though care may need to be taken to account for the fact that the sample is not a random sample. The set of people that own a smartphone and choose to participate will be skewed toward certain demographics, at least in the near term.

3 Backup communication uses

**[00115]** In some versions of the system, the mesh-like features of the set of personal devices 120 may be exploited. Cell phones may be viewed as relatively passive (receive only) devices, but there are times, such as during an emergency, where it could be desirable to be able to deploy an active communication network very quickly as an overlay to more traditional telephone and internet networks.

**[00116]** During an emergency such as a man-made event like 9/11 or a natural disaster such as a major hurricane, it is possible that parts of key communication infrastructures could be down. There was a time when telecommunication networks were much more protected than they are these days. The telephone network used to be more reliable than the power grid. Central offices are typically backed up with batteries and generators (and submarine doors in places like New Orleans that are subject to flooding). Plain old telephone service (POTS) handsets used to be powered from the central office, so the service could stay up even if the standard power grid was down.

**[00117]** These days, most handsets sold in popular stores depend on the power grid. Most phones have lots of features and a power cord. Some have battery backup, but there is little incentive to replace the battery. Soon, the battery backup feature may be a thing of the past because many people aren't willing to pay for such features. Engineers like to design bridges for the hundred years' flood, but it is hard to persuade customers to pay for features they probably won't use. Given these realities, it is desirable to develop a way to deploy a backup network just-in-time. Unlike batteries and generators, which are expensive whether we use them or not, a backup network based on phones typically won't cost the public much if any additional capital, because most of the equipment is already in place.

**[00118]** Key features of a backup network:

1. Two-way communication: Telephone receivers normally receive but they can also be used to store and forward information. Thus for example, if a phone was on a mobile platform (say in a pocket or in a car), then the phone could be used in sneakernet mode to store a signal in one place and repeat it from another place.
2. Damage Assessment (the ability to determine quickly and easily what is working and what is not): During 9/11, there were many outages (e.g., fiber cuts under #7 World Trade Center, cell towers on the rooftops, switches under both #1 and #2 World Trade Center, police and fire radio communication in certain places), but some things were working (e.g., cell towers in New Jersey, BlackBerry™ email, systems based on satellites). A key requirement is to determine what is working and what is not, and to communicate workarounds to those that need them. An array of cell phones in a multitude of pockets and cars could determine fairly quickly what is working and what is not. Hopefully, some of these devices may be connected to something that is working (such as a satellite) or would eventually move out of the affected area so enough of them could report an accurate and timely damage assessment picture back to the cloud. Using this information, both digital and real world traffic may be adaptively rerouted.
3. Workarounds: Municipal vehicles such as buses have batteries and generators. Soon, such vehicles may also have Wi-Fi that is connected to satellites. The cloud could direct such resources where they are needed most.

**[00119]** An acoustical array, such as what is described herein, may also be used in damage assessment. For example, the acoustical array may determine both whether there is too much noise (e.g., explosions) as well as too little noise (e.g., absence of human activity), aggregated over time and space.

4 Authorization and privacy

**[00120]** In some exemplary embodiments of the system 100, privacy considerations may be addressed using one or more features, which may include the following. First,

monitoring may be enabled on a device 120 only if the user explicitly "opts in" to permit particular monitoring options. A reason that a user may accept such monitoring is that he, in return, obtains information that is valuable to him, for example, by being provided more relevant search results or other information. Another feature relates to encryption of the monitored information. For example, audio may be encrypted in a manner than prevents interception during uploading and/or processing by a controller 120' or server 140. Furthermore, in systems 100 in which multiple central controllers are used (e.g., one controller 120' or server 140 per cellular telephone carrier), the user may explicitly permit sharing between or among controllers.

**[00121]** In some examples, devices 120 may have features that inhibit collection of audio environment data. Such features may be mechanical (for example, mechanically preventing audio pickup with a shutter mechanism) or can be electronic (for example, with an electronic slider switch on the device).

**[00122]** In some examples, sensors can be selectively turned on or off both at the edge of the network (in the smartphone), as well as in the network (in the cloud), as well as elsewhere. For example, the operator of a movie theatre may have the ability to turn off speakers that would annoy others in the movie theatre, and similarly the operator of an airplane should have the ability to turn off communication features that could jeopardize the safety of fellow passengers. Moreover, after an incident, such as a plane accident, the authorities should have the ability to probe (via a wired or wireless interface to the memory of the phone-could be non-volatile) the smartphones on the plane for information that could be helpful in the investigation. In other words, the array of smartphones on the plane could serve as a kind of "black box" to prevent similar such incidents in the future.

**[00123]** However, privacy is also important in at least some versions of the system 100. In some exemplary embodiments, the owner of the smartphone should have the ability to pull the curtain with confidence that the phone is not invading the user's privacy, even if the phone has been taken over by a virus. When the curtain is pulled, the user wants to be sure that the phone is not recording information that could be embarrassing or self-incriminating. The phone should not be recording information that could be subject to subpoena or a court order such as discovery. The user should have the ability to opt out in a way that cannot be overridden by the owner of the network, government authority, or anyone else (such as a malicious hacker). For example, privacy may be implemented by a switch, as described further below.

**[00124]** Feature interaction can be a tricky problem in a communication network. While it is desirable that many parties have the ability to turn on and off certain features in certain ways, as discussed above, it is also important that it be clear to all parties

what happens when different parties issue commands that may conflict with one another in complicated and unanticipated ways.

**[00125]** In particular, in at least some exemplary embodiments of the system, the owner of the phone ought to be in charge. In such embodiments, the owner may have the ability to physically disconnect the sensors in a way that cannot be overruled by any other party. One such method may include a physical switch that would disconnect the sensors in a way that the user can verify by visual inspection of the phone. The physical switch may be operated manually by the user and cannot be overridden remotely under software control.

**[00126]** In addition to the physical switch, there may also be a software controlled switch that may empower authorized parties to turn on and off features such as recording of sensors, recognizing keywords and uploading appropriate information to the cloud where inferences can be made that aggregate over space and time. Policies may eventually be determined regarding who is allowed to do what, and what is appropriate and what is not.

Other devices

**[00127]** As introduced above, the exemplary approaches described above are not limited to smartphones. For example, in-vehicle systems (e.g., navigation devices), media devices (e.g., televisions, set-top boxes, desktop computers, laptop computers), and other fixed or mobile devices may be used in similar ways. For example, in the case of an in-vehicle navigation system, an in-vehicle conversation may be monitored and information about a location (e.g., a restaurant) that is being discussed may be provided on the device's display.

**[00128]** Another type of device that may be used in such a system is an earpiece that provides audio input and output for a telephone (device). An advantage of monitoring with the earpiece is that it is exposed to the acoustic environment even when the associated phone is not exposed to the environment, for example, when the phone is in a user's pocket, thereby providing an improved signal-to-noise ratio (SNR). Another embodiment may have the entire mobile communication (cell phone) being integrated into the earpiece.

**[00129]** Another type of device 120 that may be used in such a system 100 is a hearing aid. The hearing aid may allow the entire feature set thus described in herein to be made practical. The advantage of this is data which could be mined from this age population is thought to be very different for the generation of users who typically use headphones for their communication activities.

**[00130]** Use of earpieces as described above can be thought of as ownership or control of the "last inch," which is similar to the ownership of the "last mile," which has been strategically important in the telephone business. The same dynamic underlies the

debate over net neutrality. So too, ownership over the last inch will become strategically important in the war over eyes and ears. The web is currently about eyeballs and mouse clicks, but soon the war will move to a struggle for access to ears as well as eyes. The hearing aid or earpiece could be viewed as a chief of staff. It gets to decide what the user hears and what the user doesn't hear. The hearing aid could give the wife preferred access. It could also block spam, and filter out unwanted commercials. Alternatively, the hearing aid or earpiece could run an auction similar to a paid search, where the hearing aid is a market maker that attempts to find an equilibrium between the need of the user for relevance and utility to the advertiser.

**[00131]** These auctions typically use a Vickrey auction to encourage advertisers to bid their true utility. If the user chooses to follow up on an ad (with a mouse click), then the advertiser pays the second highest bid. The hearing aid or earpiece could work in a similar way though, perhaps, instead of clicking on an ad, it might be easier for the user to participate by some other means such as a spoken command.

**[00132]** Although the invention has been described in terms of systems and methods for processing information from a plurality of distributed devices, it is contemplated that one or more steps and/or components may be implemented in software for use with microprocessors/general purpose computers (not shown). In this embodiment, one or more of the functions of the various components and/or steps described above may be implemented in software that controls a computer. The software may be embodied in non-transitory tangible computer readable media (such as, by way of non-limiting example, a magnetic disk, optical disk, flash memory, hard drive, etc.) for execution by the computer.

**[00133]** For example, some of the software may include instructions for execution at the personal devices 120 and device 120'. This software may be stored on a non-transitory tangible computer readable medium at a central location, for example, at a server 140 for distribution to the devices 120, 120', may be transferred over a digital communication medium, and/or stored in a machine readable medium at the devices 120, 120' (e.g., as downloaded applications/applets). Some of the software may be hosted at central servers 140 (e.g., in a distributed "cloud" of processors) and made accessible by storing it on non-transitory tangible computer-readable media for execution on processors of the servers 140.

**[00134]** Although the invention is illustrated and described herein with reference to specific embodiments, the invention is not intended to be limited to the details shown. Rather, various modifications may be made in the details within the scope and range of equivalents of the claims and without departing from the invention.

What is claimed is:

1. A distributed system comprising:

a plurality of devices distributed in an environment,

each device having at least a communication capability for interchanging information with others of the devices and/or with a communication system, and

each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, and

wherein at least one of the communication system or one or more of the devices is configured as a controller, the controller being configured to: select a subset of devices from among the plurality of devices, receive information based on the acquired sensor data of the selected subset, and combine the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices.

2. The system of claim 1, wherein the distributed system includes a server hosted at the communication system.

3. The system of claim 1, wherein at least one of the devices includes at least one of a wireless device or a wired device.

4. The system of claim 1, wherein at least one of the devices includes at least one of a fixed device or a mobile device.

5. The system of claim 1, wherein at least one of the devices includes at least one of a mobile telephone device, an earpiece, a hearing aid, a navigation device, a computer a sensor module having at least one sensor.

6. The system of claim 1, wherein the one or more sensors includes at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

7. The system of claim 1, wherein at least one of the devices includes a position module for determining a position of the respective device.

8. The system of claim 1, wherein each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller for determining the characteristic of the environment.

9. The system of claim 8, wherein the local data analysis module includes an acoustic analysis module to process audio information.

10. The system of claim 8, wherein the local data analysis module includes a sensor analysis module to process non-audio related information.

11. The system of claim 1, wherein the controller is configured to determine locations for at least some of the devices.

12. The system of claim 11, wherein the controller is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

13. The system of claim 1, wherein the controller is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

14. The system of claim 13, wherein the configuration information includes data characterizing events to be detected in the sensor data.

15. The system of claim 1, wherein the environment includes an audio scene.

16. The system of claim 15, wherein the characteristic of the audio scene includes at least one of speech events or non-speech events.

17. The system of claim 16, wherein when the distributed system records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded.

18. The system of claim 1 wherein the distributed system further determines trend information across a population of users of the devices from the combined information.

19. The system of claim 1, wherein the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

20. The system of claim 1, wherein the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

21. The system of claim 20, wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

22. The system of claim 1, wherein at least one of the devices includes at least one of a user interface, a display, a warning indicator, a speaker or a privacy module.

23. The system of claim 1, wherein the controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

24. A controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices, the controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the controller comprising:

a selection/acquisition module configured to select a subset of devices from among the plurality of devices and for receiving information based on the acquired sensor data of the selected subset of devices; and

a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

25. The controller of claim 24, wherein the controller is configured to determine locations for at least some of the devices.

26. The controller of claim 25, wherein the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

27. The controller of claim 24, wherein the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

28. The controller of claim 24, wherein the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module.

29. The controller of claim 24, further comprising a sensor module including at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

30. The controller of claim 29, further comprising a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment.

31. The controller of claim 24, wherein the controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment.

32. A method for processing information from a plurality of devices distributed in an environment, the method comprising:

selecting a subset of devices from among the plurality of devices by a controller, the controller including at least one of a communication system or a device, each device having at least a communication capability for interchanging information with others of the devices and/or with the communication system, each of at least some of the devices

having one or more sensors for acquiring sensor data related to the environment proximate to the device;

acquiring sensor data by the selected subset of devices;

receiving information based on the acquired sensor data of the selected subset of devices; and

combining, by the controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

33. The method of claim 32, wherein the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the controller for the information.

34. The method of claim 32, wherein the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment.

35. The method of claim 32, the method further including determining trend information across a population of users of the devices from the combined information.

36. The method of claim 32, the method further including monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

37. The method of claim 32, the method further including determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

38. The method of claim 32, the method further including adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment.

39. The method of claim 32, wherein the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

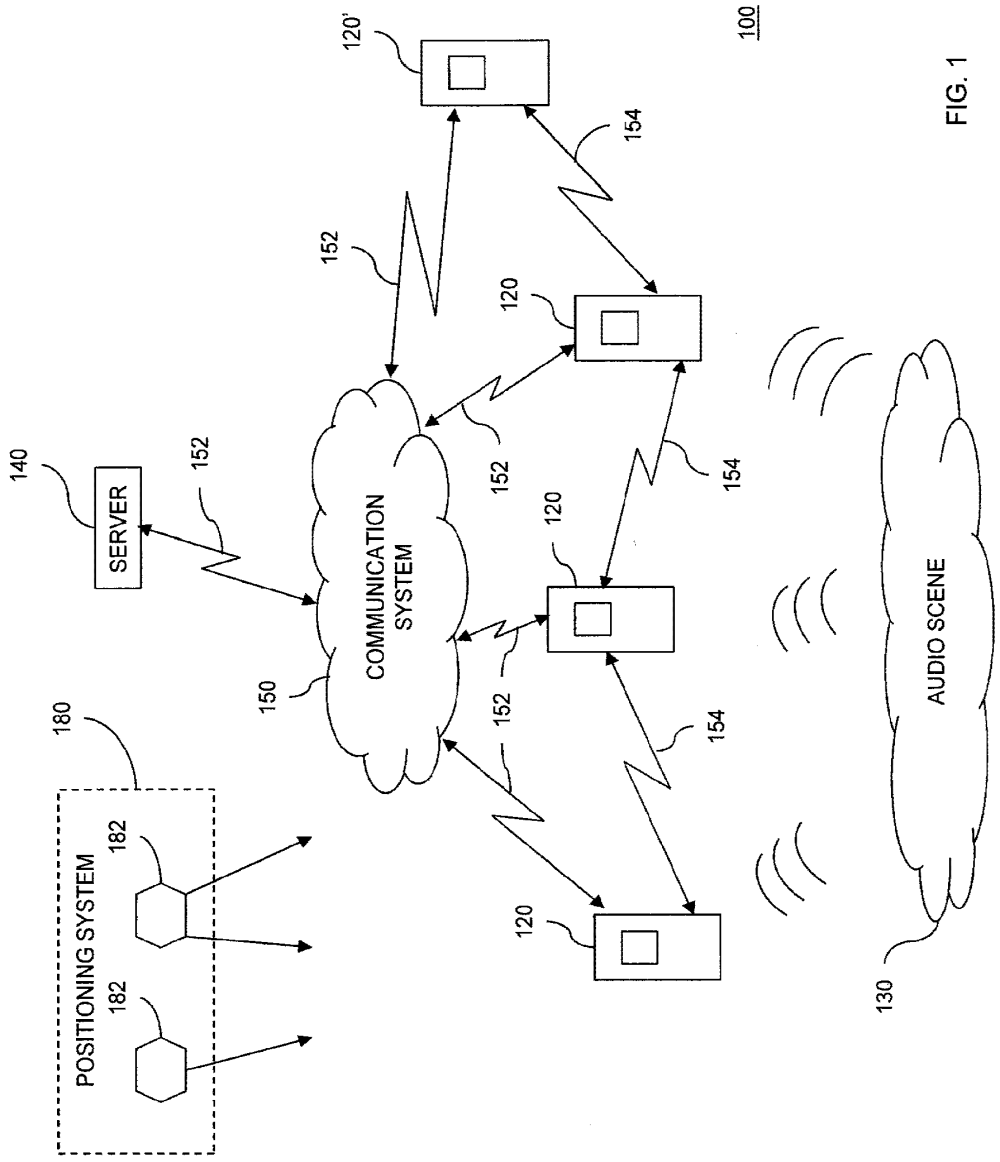

100
120'
154
152
120
152
154
140
SERVER
152
COMMUNICATION SYSTEM
120
150
152
154
180
POSITIONING SYSTEM
182
182
120
AUDIO SCENE
130

FIG. 1

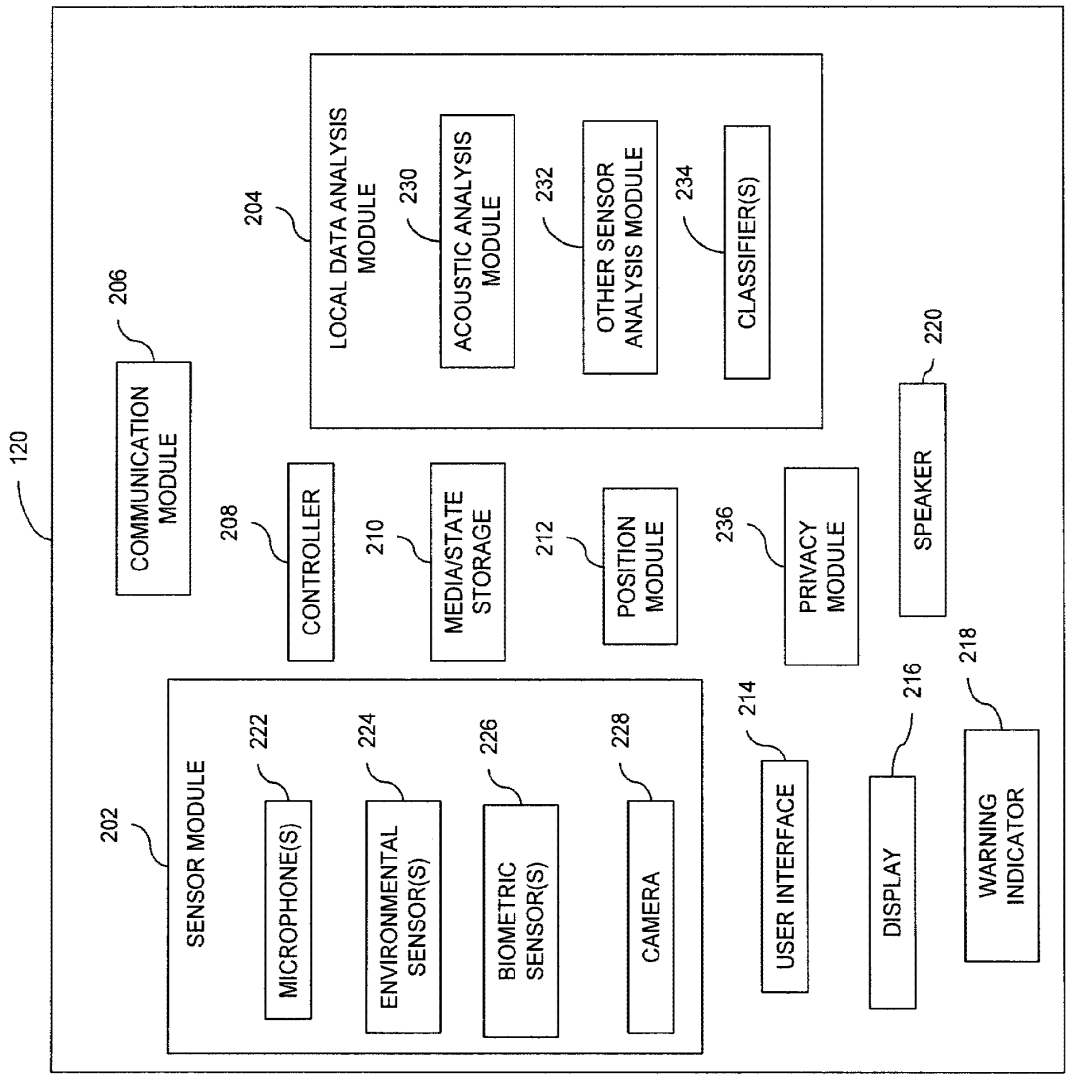

120
COMMUNICATION MODULE
206
LOCAL DATA ANALYSIS MODULE
204
ACOUSTIC ANALYSIS MODULE
230
OTHER SENSOR ANALYSIS MODULE
232
CLASSIFIER(S)
234
CONTROLLER
208
MEDIA/STATE STORAGE
210
POSITION MODULE
212
PRIVACY MODULE
236
SPEAKER
220
SENSOR MODULE
202
MICROPHONE(S)
222
ENVIRONMENTAL SENSOR(S)
224
BIOMETRIC SENSOR(S)
226
CAMERA
228
USER INTERFACE
214
DISPLAY
216
WARNING INDICATOR
218

FIG. 2A

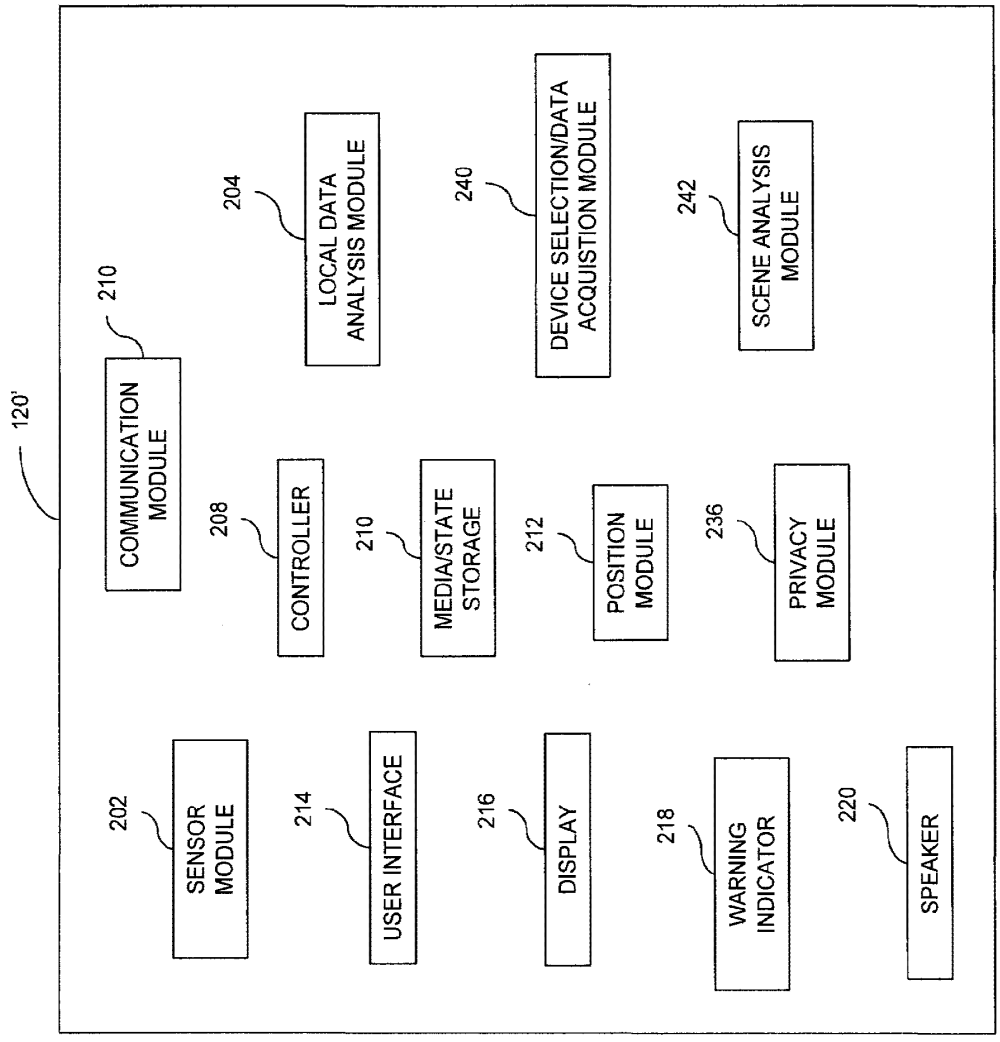

120'
COMMUNICATION MODULE
210
LOCAL DATA ANALYSIS MODULE
204
DEVICE SELECTION/DATA ACQUISTION MODULE
240
SCENE ANALYSIS MODULE
242
CONTROLLER
208
MEDIA/STATE STORAGE
210
POSITION MODULE
212
PRIVACY MODULE
236
SENSOR MODULE
202
USER INTERFACE
214
DISPLAY
216
WARNING INDICATOR
218
SPEAKER
220

FIG. 2B

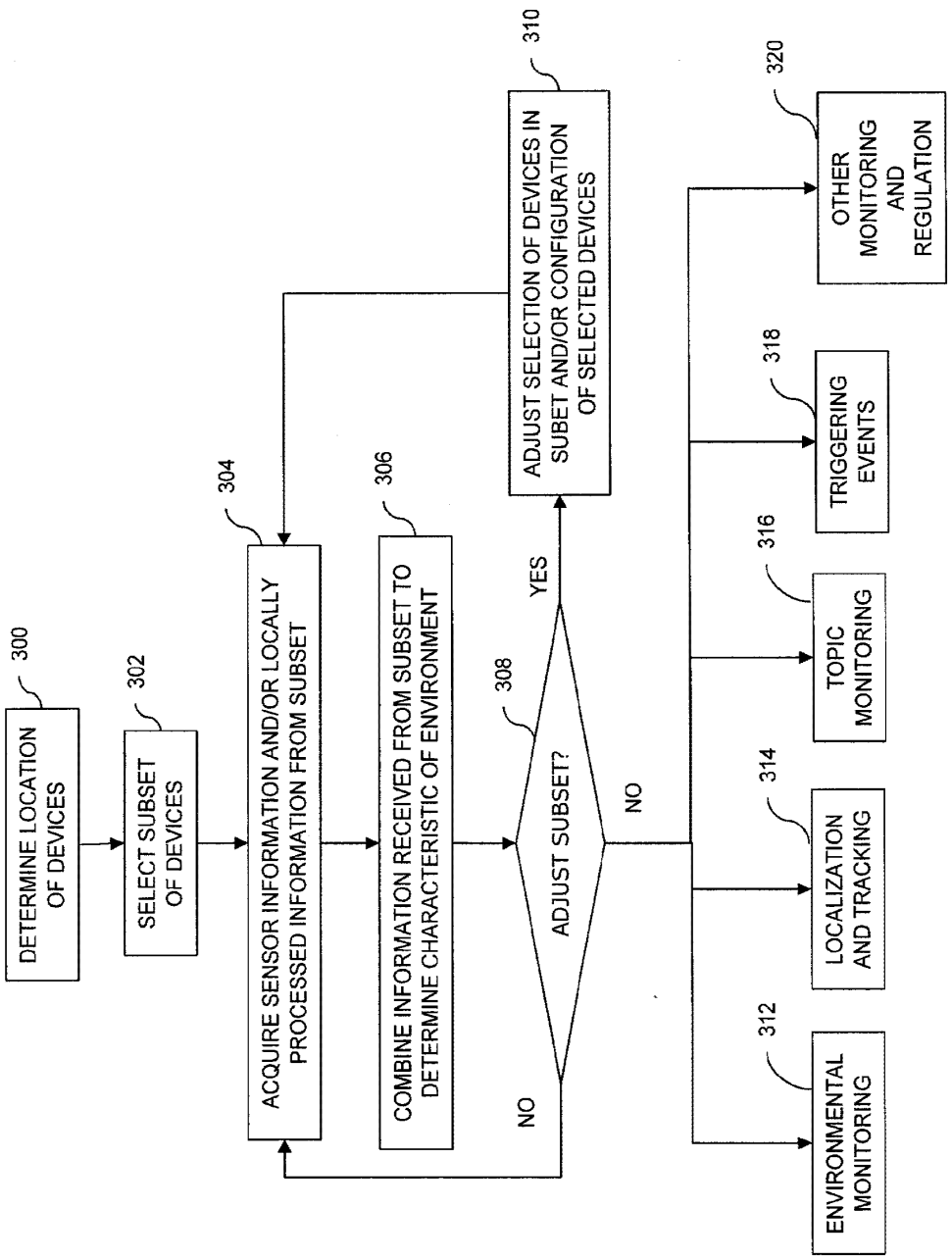

DETERMINE LOCATION OF DEVICES
300
SELECT SUBSET OF DEVICES
302
ACQUIRE SENSOR INFORMATION AND/OR LOCALLY PROCESSED INFORMATION FROM SUBSET
304
COMBINE INFORMATION RECEIVED FROM SUBSET TO DETERMINE CHARACTERISTIC OF ENVIRONMENT
306
ADJUST SUBSET?
308
YES
NO
NO
ADJUST SELECTION OF DEVICES IN SUBET AND/OR CONFIGURATION OF SELECTED DEVICES
310
ENVIRONMENTAL MONITORING
312
LOCALIZATION AND TRACKING
314
TOPIC MONITORING
316
TRIGGERING EVENTS
318
OTHER MONITORING AND REGULATION
320

FIG. 3

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 11/68103

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06F 11/00 (2012.01)
USPC - 702/188
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC: 702/188

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC: G06F11/00; USPC: 702/188; 702/127; 702/1; 709/201; 709/217 (keyword limited; terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST (USPT, PGPB, EPAB, JPAB); Google Scholar; Google Patents
Keywords: Mobile devices; sensors; audio; environment; server; interchanging; acoustic analysis; event

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | LANE, et al. 'Survey of Mobile Phone Sensing' IEEE Communications Magazine, September 2010, Retrieved online 18 April 2012 at: <http://nslab.kaist.ac.kr/courses/2011/cs710/paperlist/1-1.pdf>, entire document | 1 - 39 |
| X | SINGH, et al. 'Towards Environment-to-Environment (E2E) multimedia communication systems' Published online: 05 May 2009; Retrieved online 18 April 2012 at: <http://webhotel2.tut.fi/emmi/forum/sites/webhotel2.tut.fi.emmi.forum/files/2009a/entries/08%20E2E%20(Environment-to-Environment)%20Communication%20Systems/Article_with_technical_details_of_E2E_paradigm.pdf> | 1 - 39 |
| P/X | US 2011/0065451 A1 (DANADO et al.) 17 March 2011 (17.03.2011), entire document | 1 - 39 |
| A | US 2010/0299615 A1 (MILUZZO et al.) 25 November 2010 (25.11.2010), entire document | 1 - 39 |
| A | US 2009/0327478 A1 (KRAUSE et al.) 31 December 2009 (31.12.2009), entire document | 1 - 39 |

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 18 April 2012 (18.04.2012) | 03 MAY 2012 |
| Name and mailing address of the ISA/US<br>Mail Stop PCT, Attn: ISA/US, Commissioner for Patents<br>P.O. Box 1450, Alexandria, Virginia 22313-1450<br>Facsimile No. 571-273-3201 | Authorized officer:<br>Lee W. Young<br>PCT Helpdesk: 571-272-4300<br>PCT OSP: 571-272-7774 |

Form PCT/ISA/210 (second sheet) (July 2009)

# INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

## CROSS REFERENCE TO RELATED APPLICATIONS

**[0001]** This application claims priority to PCT International Application No. PCT/US2011/068103, filed December 30, 2011, entitled "INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES" and claims the benefit of U.S. Provisional Application No. 61/431,507 entitled "INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES" filed on January 11, 2011 and claims the benefit of U.S. Provisional Application No. 61/428,369 entitled "INFORMATION PROCESSING USING A POPULATION OF DATA AQUISTION DEVICES" filed on December 30, 2010, the contents of which are incorporated herein by reference.

## FIELD OF THE INVENTION

**[0002]** The present invention relates to processing of information from a population of data acquisition devices, and in some examples, relates to processing of audio or multimedia data acquired from an adaptively selectable population of personal wireless devices.

## BACKGROUND OF THE INVENTION

**[0003]** Devices that are capable of acquiring, and in some cases locally processing, audio or multimedia information from their local environment have become ubiquitous over the past several years, and there is little reason to expect that such a trend will not continue. For example, "smart" cellular telephones (e.g., Apple iPhone®, Android™-operating system based phones) have significant local processing capabilities as well as audio and video acquisition devices.

## SUMMARY OF THE INVENTION

**[0004]** In one aspect of the present invention, in general, the audio and multimedia acquisition capabilities of a set of devices may be exploited to aggregate acquired content and fuse the information in that content, for instance, for audio scene analysis. In some example embodiments, devices from a large population may be adaptively selected and/or configured according to triggering events detected at the devices or by the network. Relating to the audio scene, the information sensed and acquired from one or more devices may be processed, customized and personalized to consumers to mitigate, amplify or pass-through acoustic and other

information to users, based on factors such as models of users' requirements and users' past information consumption behavior. Thus an exemplary system of the present invention may mediate ambient and explicitly supplied information, especially audio information, and may act as an arbiter of information for the user. Some of the system actions may be based on information from one device, while other actions may be based on information from multiple devices. The information filtered to users may be utilized to form virtual communities based on shared interests and common information, and to ensure that relevant information including alerts, marketing information, and news reaches these communities.

**[0005]** According to another aspect of the present invention, in general, a distributed system may include a plurality of distributed devices, with at least one of a communication system or one or more of the distributed devices configured as a controller. Each device has at least a communication capability for interchanging information with other of the devices and/or with the communication system. At least one of the devices may include one or more sensors for acquiring sensor data related to the environment of the device. The controller is configured to perform functions including: determining locations of at least some of the devices, selecting devices from among the plurality of devices and receiving information based on the sensor data acquired at the selected devices, and combining the information received from multiple of the selected devices to determine one or more characteristics of the environment of one or more of the devices.

**[0006]** In other aspects of the present invention, the distributed system may include devices that mediate all audio information sensed at the device to mitigate, amplify or pass-through information. In some examples, such information is optionally logged and analyzed to determine trend-related information.

**[0007]** Other features and advantages of the invention are apparent from the following description, and from the claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]** The invention may be understood from the following detailed description when read in connection with the accompanying drawing. It is emphasized, according to common practice, that various features of the drawings may not be drawn to scale. On the contrary, the dimensions of the various features may be arbitrarily expanded

or reduced for clarity. Moreover, in the drawing, common numerical references are used to represent like features. Included in the drawing are the following figures:

**[0009]** FIG. 1 is a functional block diagram of an information processing system, according to an exemplary embodiment of the present invention;

**[0010]** FIG. 2A is a functional block diagram of a distributed device of the system shown in FIG. 1, according to an exemplary embodiment of the present invention;

**[0011]** FIG. 2B is a functional block diagram of a controller of the system shown in FIG. 1, according to an exemplary embodiment of the present invention; and

**[0012]** FIG. 3 is a flowchart diagram of an exemplary method for processing information from a plurality of distributed devices, according to an exemplary embodiment of the present invention.

## DETAILED DESCRIPTION OF THE INVENTION

### 1 System overview

**[0013]** Personal wireless devices, as well as other types of computing or communication devices, have become ubiquitous in our environment. Generally, such devices have a number of sensors, which may include, for instance, microphones, cameras, accelerometers, and in some cases may even have sensors for biometric information, such as heart rate. Such devices also generally include one or more communication systems, for example, a cellular telephone radio system (e.g., Code Division Multiple access (CDMA) or Global System for Mobile Communications (GSM)), a wireless local area network system (e.g., Wi-Fi, IEEE 802.11), wired computer network connections (e.g., data network connections via USB cradles, possibly via desktop computer applications) and in some cases other systems based on radio frequency (e.g., Bluetooth®) or optical (e.g., infra-red) transmission. Finally, such devices generally are "location aware" and/or locatable by the infrastructure in which they operate. For example, such devices may have global positioning system (GPS) receivers, enhanced GPS (which operates in conjunction with cellular telephone infrastructure), and/or Wi-Fi based maps (which use a map of Wi-Fi access points to locate the device). The cellular infrastructure may, for example, be able to locate the device based on cellular signal strength and/or triangulation approaches.

**[0014]** In some aspects of the present invention, the combination of characteristics of these devices provides a potentially rich source of information that may be combined in a way that generates valuable information that is not necessarily

available to any individual device. As an illustrative example, audio processed locally at many different devices may be combined to identify geographic or social group trends based on keywords spoken or other acoustic events (e.g., coughs) that are detected at the devices.

**[0015]** Detection of coughs is an example where detection of non-speech acoustic events may be useful. Because a cough is often a sudden and often repetitively occurring reflex, frequent coughing may indicate the presence of a disease (e.g., many viruses and bacteria benefit evolutionarily by causing the host to cough, which helps to spread the disease to new hosts). Most of the time, coughing is caused by a respiratory tract infection but can be triggered by choking, smoking, air pollution, asthma, gastro-esophageal reflux disease, post-nasal drip, chronic bronchitis, lung tumors, heart failure and medications such as ACE inhibitors. Detection of such events in the vicinity of the devices may provide significant information.

**[0016]** In other aspects of the present invention, the rich sensor capabilities of the devices may provide a way to track activity of a user (e.g., owner) of the device, to enhance the user's experience with various computing applications (such as searching or personalization). As an illustrative example, topics of conversation in the vicinity of the device may affect the ranking of search results or the ordering of presentation of news stories on the device.

**[0017]** In some aspects of the present invention, the rich source of information over many devices and the tracking of individual activity may be combined, to benefit from their synergy.

**[0018]** Referring to FIG. 1, a functional block diagram of an exemplary information processing system, designated generally as system 100, is shown. System 100 may include one or more distributed devices 120 (also referred to herein as devices 120) and device 120′ (also referred to as controller 120′) in an environment. One or more of devices 120 and device 120′ may be configured to acquire information relating to audio scene 130. Device 120′ may be the same as device 120, except that device 120′ may be configured to act as a controller for selectively acquiring sensor information from among devices 120 and for determining a characteristic of audio scene 130. Although one device 120′ is illustrated as being a controller, it is understood that multiple devices 120′ may act as controllers.

**[0019]** Although device 120′ is illustrated as a controller for gathering sensor information and determining a characteristic of audio scene 130, it is understood that communication system 150 and/or server 140 may also be configured to act as a controller. Communication system 150 or server 140 may collect at least one of sensor information from devices 120, 120′, local data analysis information from devices 120, 120′ or scene analysis information from device 120′.

**[0020]** Devices 120 and device 120′ may be capable of direct communication with each other, via communication link 154. Devices 120 and device 120′ may also be capable of communication with communication system 150, via communication link 152. Devices 120 and device 120′ may also be in communication with central server 140, via communication system 150 and communication link 152. Devices 120, 120′ may include wired or wireless devices. As discussed further below, devices 120, 120′ may be at fixed positions or may be mobile devices.

**[0021]** In one exemplary embodiment, a number of devices 120 are present in an environment. In some examples, the devices 120 (and device 120′) are cellular telephones (e.g., "smartphones"). The environment represented by audio scene 130 may be an urban environment, for example, with the devices 120, 120′ being present on city streets, in office buildings, or in homes of the users. Generally, the devices 120, 120′ may be personal to the users/owners (of the devices), and may be mobile devices, carried with the user throughout the day.

**[0022]** In FIG. 1, a small number of representative devices 120, 120′ are illustrated. As discussed further below, the potentially enabled devices 120, 120′ may be part of a large population of devices (e.g., a large fraction of the telephones in a metropolitan area) and system 100 may adaptively enable particular subsets of the devices 120 and/or selectively configure enabled devices 120. For instance, device 120′ (or server 140) may enable and/or configure the devices 120 according to triggering events detected at one or more devices 120, 120′.

**[0023]** It should be understood that the description below focuses on smartphones as an example, and other types of fixed or mobile devices may be used in conjunction with or instead of smartphones. Also, the description below focuses on aggregation or combination of audio information as an example, but aggregation and processing of other forms of information, including video and biometric information may be performed in conjunction with or instead of the audio data examples described below.

**[0024]** As introduced above, any particular device 120, 120′ is able to sense some aspect of an overall audio "scene" in its environment. Such a scene may include, for example, the device owner's own speech even when not carrying out a telephone call, other sounds made by the owner (such as coughing), the speech of others in proximity to the user and environmental sounds in proximity to the user (such as sirens, gunshots, etc.).

**[0025]** Generally, system 100 makes use of the audio acquisition capabilities of one or more of the devices 120, 120′ in order to extract information related to the views of the audio scene 130 by the one or more devices 120, 120′. In one exemplary approach to acquisition of the raw content, every device 120 could continually transmit its acquired signals over communication system 150 to a central server 140 (via communication link 152). For example, the communication system 150 may comprise a cellular telephone system and/or a wireless data network. However, such continual transmission may not be feasible due to the sheer volume given the large number of devices 120, 120′ that are fielded, and may raise other issues regarding privacy of those in the environments of the devices 120, 120′.

**[0026]** Another exemplary approach to extracting information is for each device 120, 120′ to perform a local signal analysis based on the signals acquired by that device. However, such an approach may have limitations due to the computational limitations of the devices 120, 120′. Also, a purely local processing may lose advantages that could be gained by fusing of information from multiple devices 120, 120′.

**[0027]** An exemplary approach describe below addresses some of the limitations of a purely local or a purely centralized approach using a combination of one or more of the following features:

1) Local processing of acquired signals (on devices 120), at least to identify occurrences of events that may be of interest;

2) Local buffering of audio for selective transmission to device 120′ or central server 140, for example, on an ongoing basis or based on a request from device 120′ or server 140, or based on local identification of a local event (at one or more of devices 120); and

3) Selective enabling of acquisition and/or processing (or specification of the type of processing) at particular devices 120, 120′, for example, based on their

geographic location and/or other proximity metrics (e.g., a social network rather than a geographic distance metric).

**[0028]** Note that the locations of the devices 120, 120′ (e.g., three-dimensional coordinates) are generally known by the devices 120, 120′ and/or central server 140. As an example, a positioning system 180 makes use of units having known locations, such as GPS satellites 182, fixed cellular transmission towers, Wi-Fi access points, etc. to maintain an estimate of the positions of the devices.

**[0029]** Referring to FIG. 2A, a functional block diagram of exemplary device 120 is shown. Device 120 may include one or more of sensor module 202, local data analysis module 204, communication module 206, controller 208, media/state storage 210, position module 212, user interface 214, display 216, warning indicator 218, speaker 220 and privacy module 236.

**[0030]** A typical device 120 includes communication module 206, which provides a communication link 152 through the communication system 150 to sever 140 and/or a communication link 154 to other devices 120, 120′. Communication module 206 may also serve a role in acquiring positioning signals (e.g., GPS signals, Wi-Fi signal strengths, etc.), and may also provide a way to communicate directly with other devices 120.

**[0031]** Device 120 may include sensor module 202 for the acquisition of sensor information. Sensor module 202 may include one or more microphones 222 for collecting acoustic information regarding audio scene 130 (FIG. 1). Sensor module 202 may also include one or more environmental sensors (such as a temperature sensor, a motion sensor such as an accelerometer) for collecting environmental information associated with device 120. Sensor module 202 may also include one or more biometric sensors 226 (such as heart rate) for sensing biometric information regarding a user of device 120. Sensor module 202 may also include camera 228 (i.e., an image sensor) for capturing still images and/or video of the surrounding environment of device 120. Sensor module 202 may also include a compass for providing location information. In general, sensor module 202 may include any sensor capable of measuring a physical quantity and converting it into a signal that may be used by system 100. For example, sensors in sensor module 202 may also include, without limitation, one or more of light detection sensors, proximity sensors, gravity detection sensors, a magnetic field detection sensors, electrical field detection

sensors, vibration sensors, pressure sensors, humidity sensors, moisture sensors, toxin detection sensors, nutrient detection sensors or pheromone detection sensors.

**[0032]** User interface 214 may include any suitable user interface capable of providing parameters for one or more of sensor module 202, local data analysis module 204, communication module 206, media/state storage 210, position module 212, display 216, warning indicator 218, speaker 220 and privacy module 236. User interface 214 may include, for example, a pointing device, a keyboard and/or a display device.

**[0033]** Device 120 may include display 216, warning indicator 218 and/or speaker 220 for presenting information to a user of device 120. Display 216 may include any suitable display device capable of presenting information on device 120. Warning indicator 218 may include any suitable visual indicator for presenting a warning on device 120. The warning may include, for example, an indication that audio information is being recorded. It is understood that speaker 220 may also audibly present a warning indication. Although user interface 214 and display 216 are illustrated as separate devices, it is understood that the functions of user interface 214 and display 216 may be combined into one device. According to an exemplary embodiment, device 120 may receive acoustic and/or other information (via display 216, warning indicator 218 and/or speaker 220) that has been mitigated, amplified and/or passed to device 120 from device 120′ (FIG. 1) based on information acquired from one or more devices 120.

**[0034]** Device 120 may include position module 212, to maintain a position estimate for device 120. For example, position module 212 may use positioning system 180 (FIG. 1) to obtain the position estimate.

**[0035]** Media/state storage 210 may store at least one of raw sensor information (from sensor module 202), locally analyzed information (from local data analysis module 204) or location information (from position module 212). Media/state storage 210 may include, for example, a magnetic disk, an optical disk, flash memory or a hard drive.

**[0036]** Controller 208 may be coupled, for example, via a data and control bus (not shown) to one or more of sensor module 202, local data analysis module 204, communication module 206, media/state storage 210, position module 212, user interface 214, display 216, warning indicator 218, speaker 220 and privacy module

236. Controller 208 may be configured to control acquisition of sensor information, local analysis of sensor information, transmission and/or receipt of sensor information, transmission and/or receipt of local analysis information, as well as any presentation of information by device 120 (such as via display 216, warning indicator 218 and/or speaker 220). Controller 208 may include, for example, a logic circuit, a digital signal processor or a microprocessor. It is understood that one or more functions of local data analysis module 204 may be performed by controller 208.

**[0037]** Local data analysis module 204 may be configured to analyze information collected locally by sensor module 202 for device 120. Local data analysis module 204 may include acoustic analysis module 230 for analyzing audio information (such as from one or more microphones 222). The audio information may include speech, music as well as environmental sounds (such as an approaching train). The speech may be generated by a user of device 120, as well as by other individuals proximate to device 120. Local data analysis module 204 may perform the analysis either locally or with the aid of backend server architecture or similar mechanisms.

**[0038]** Local data analysis module 204 may also include other sensor analysis module 232 for analyzing information from other sensors of sensor module 202. For example, other sensor analysis module 232 may analyze information from one or more of environmental sensor(s) 224, biometric sensor(s) 226 and/or camera 228. Local data analysis module 204 may combine results from acoustic analysis module 230 (such as keywords, target sounds) and other sensor analysis module 232 to determine the occurrence of one or more particular events (and/or a characteristic of audio scene 130).

**[0039]** Acoustic analysis module 230 and/or other sensor module 232 may also pre-process the respective sensor information, for example, to substantially remove or reduce noise. Modules 230, 232 may also filter the noise-reduced sensor information to identify high value signals which may be indicative of the occurrence of particular events.

**[0040]** Local data analysis module 230 may include classifiers 234 associated with acoustic analysis module and/or other sensor analysis module. Classifiers 234 may be used to build profiles of audio information, environmental information, biometric information and/or image information.

**[0041]** In an exemplary embodiment, acoustic analysis module 230 may preprocess the audio information to recognize speech, perform keyword spotting on speech information, and in addition build voice models of various speakers within the auditory range of the device. The models may, for example, use classifiers 234 and machine learning methods to identify gender, probable age range, nationality and other demographic features from the speech signals.

**[0042]** In addition, there may be classifiers 234, for instance, to recognize any slurring due to the influence of alcohol or similar substances, accent classifiers to detect and identify accent patterns belonging to specific language groups, and emotion classifiers to classify speakers and speech into happy, sad, stressed, angry or other emotional states. Thus, given any audio input that includes any speech, individual devices 120 or system 100 (FIG. 1) as a whole may be able to build an acoustic profile of each speech participant in that input, where the profile not only includes the keywords spotted, but also other data such as demographic data about each speaker including gender, probable age, possible nationality etc., as well as classifier results about emotional state, and/or whether the speaker is under the influence.

**[0043]** The acquisition of keywords with demographic data may help advertisers target their sales, based on factors such as gender, age and potential levels of disposable income, and to track their sale cycle from users noticing their advertisements to those users who actually make a purchase. Emotion indicators may be used to take palliative or preventative steps to avoid customer dissatisfaction. Other information like slurring may be used as corroboratory information in situations such as accidents or may be used to prevent accidents.

**[0044]** Privacy module 236 may include mechanisms to implement privacy and/or security requirements and policies for applications relating to the acquisition and use of information of various kinds, including audio information, by one or more devices associated with a number of carriers. These policies and mechanisms may control the use of devices 120 (and device 120′ (FIG. 1)) including the ability to remotely switch on and switch off sensing (e.g., listening), the ownership of any audio information garnered by these devices 120 (and device 120′ (FIG. 1)), the users' ability to easily control sensing and information acquisition, mechanisms to opt-in and opt-out of applications, carrier-wide or network-wide data gathering, the protection of any audio

personally identifiable information (PII) that is gathered, and any aggregated data that is created from a number of devices 120 (device 120′ (FIG. 1) and networks. Policies or standard practices may also be established for private or semi-private situations where not all users present have opted-in for data acquisition. For example, when system 100 (FIG. 1) records speech from users that are not likely to be opted-in to the information acquisition, system 100 may provide a warning indication to all devices 120 in the immediate vicinity to indicate that audio information is being recorded. The warning indication may be provided on warning indicator 218.

**[0045]** Referring next to FIG. 2B, a functional block diagram of exemplary device 120′ is shown. Device 120′ is similar to device 120 (FIG. 2A), except that device 120′ may also include device selection/data acquisition module 240 and scene analysis module 242. Similarly to device 120 (FIG. 2A), components of device 120′ may be coupled together via a data and control bus (not shown).

**[0046]** Device selection/data acquisition module 240 (also referred to herein as module 240) may receive sensor information and/or locally analyzed information from selected devices 120 (FIG. 1). Scene analysis module 242 may combine the sensor information and/or locally analyzed information from among the selected devices, in order to determine at least one characteristic of audio scene 130 (or the environment, in general).

**[0047]** Module 240 may determine the locations of at least some of devices 120 (FIG. 1). Module 240 may select one or more devices 120 (FIG. 1) from among plural devices 120, for example, based on the location of these devices 120 as well as any characteristics (such as an event) determined by scene analysis module 242. Accordingly, as a characteristic is detected (by scene analysis module 242), module 240 may adaptively acquire information from selected devices 120 (FIG. 1), in order to better analyze audio scene 130. Module 240 may also configure selected devices 120 (FIG. 1) to acquire specific information, (for example one device 120 may acquire image data via camera 228 (FIG. 2A) whereas another sensor may be configured to acquire audio data via microphone 222 (FIG. 2A). As another example, module 240 may configure multiple devices 120 to acquire audio data via respective microphones 222 (FIG. 2A), so that the multiple microphones 222 form a beam forming array.

**[0048]** Referring generally to FIGs. 1, 2A and 2B, system 100 makes use of one or more of enabling and configuring of devices (via device selection/data acquisition module 240) for prospective monitoring, access to logged data for retrospective analysis, and real-time notification of events (such as by scene analysis module 242). This adaptation of system 100 may be based on detection of triggering events at the devices 120, 120′. For example, device 120′ may enable detection of certain acoustic events (e.g., words, spoken topics, music, and environmental sounds) and may adapt the configurations on selected devices 120 based on reports from other devices 120.

**[0049]** Device 120′ (and devices 120) may include software for coordinating the set of devices 120. The software may have centralized control, peer-to-peer control or a hybrid model involving centralized, peer-to-peer and other control mechanisms. Individual devices 120, 120′ may switch between being master devices controlling other devices, or slave devices under the temporary partial control of other devices. The network of devices 120, 120′ may so configure itself to optimize power consumption on individual devices 120 by distributing the sensing load across a number of devices 120, 120′, or by other mechanisms such as sharing bandwidth across devices 120, 120′. The networking used may be based on ideas related to mobile ad hoc networks (MANET), Scatternet or other mechanisms.

**[0050]** For example, system 100 may dynamically organize and reorganize its nodes into hierarchies or graphs, with some devices 120, 120′ chosen to be master nodes while other possibly geographically proximate devices to be slave nodes. Slave nodes may perform actions based on instructions from master nodes. They may preprocess information and convey processed information to master nodes, instead of conveying all information acquired, thus distributing computation among nodes and reducing the communication bandwidth. In addition, communication requirements may improve because only a few master nodes may communicate with each other, instead of all, say N devices trying to communicate with each other, which would require $(N^2/2)$ connections.

**[0051]** Because each node knows its location, depending on system requirements, the network may organize itself into one or more linear chains or local groups, where information is passed between physically proximate devices, very much like a bucket brigade conveying information. With a peer-to-peer architecture, individual devices 120, 120′– either just master nodes or both master nodes and slave nodes – may

record information about neighboring nodes and their capabilities and features, so that, for instance, connectivity between any pair of nodes can easily and effectively be established at low computational cost.

**[0052]** Other optimization techniques may also be adopted – for instance, when data logs are recorded, the system may determine if several devices are in the same audio or other sensor context. For example, if several phones 120, 120′ are located in the same context, not every phone 120, 120′ has to record all data – the system 100 may designate a scribe node which acts as a local repository for data and for ensuring the data gets stored to some centralized server 140 (or device 120′) in the cloud. This may save considerable logging effort on the part of the other nodes.

**[0053]** Alternatively or in addition, the system 100 may distribute sensor load among devices 120, 120′ so that not every node has to acquire information via all of its sensors in sensor module 202. Some sensor modules 202 may concentrate on acquiring audio information, while other devices 120, 120′ may acquire position information and still other sensor modules 202 may acquire temperature or altitude information, and so on. This may reduce power and communication bandwidth requirements for the entire system 100. Several such schemes may be devised to optimize the throughput and efficiency of the system as a whole. According to an exemplary embodiment, system 100 may also distribute processing of sensor information among devices 120, 120′, so that different individual tasks are performed by devices 120, 120′. This may reduce the computational burden on some devices 120 (or device 120′) which may not have suitable processing capabilities for a specific task.

**[0054]** The system 100 as a whole may use carrier-agnostic handlers in the cloud. Specifically, the networking may utilize services from a number of wireless telephony, Wi-Fi or other carriers, and suitable policies may be put in place to enable carrier-agnostic behaviors. Specifically, so that no user may be denied sharing of information because of association with specific carriers, and so that digital bridges exist to share information across carriers where desired. In a variant, some features may be made unique to a carrier for marketing reasons.

**[0055]** It is understood that devices 120, 120′ do not have to be phones. Devices 120, 120′ may be stand-alone devices, or may be an integral part of a GPS, hearing aid, mobile phone, TV remote, car key fob, portable game controller or similar device.

Device 120 (and/or device 120′) may be carried by the user on his person, or be installed in or on a vehicle such as a car.

**[0056]** For certain applications, devices 120 (and/or device 120′) may be fixed and installed at home, or be part of fixed telephones, desktop computers, TV sets or game consoles. Each device 120 (and/or device 120′) may include one or more sensors with associated software. Different kinds of devices 120, 120′ may include different sensors and/or different software. If device 120 or device 120′ is more like a smartphone, system 100 may have access to textual data including electronic mail, chat transcripts and documents, and audio data including phone conversations, music on the device or streamed to the device, ambient audio picked up by microphones, and user search logs. All of this data may be relevant to the user. This data, along with the user's context and environmental variables, may be used for personalization of information consumed by the user and then where appropriate repurposed for commercial applications to the user or the community at large.

**[0057]** Referring to FIG. 3, a flowchart diagram of an exemplary method for processing information from a plurality of distributed devices is shown. The steps illustrated in FIG. 3 represent an example embodiment of the present invention. It is understood that certain steps may be performed in an order different from what is shown. It is also understood that certain steps may be eliminated.

**[0058]** At step 300, the location of devices 120 (FIG. 1) may be determined, for example, by controller 120′ based on information previously received from devices 120. For example, controller 120′ (FIG. 1) may directly communicate with devices 120 to determine their locations. As another example, the location of devices 120 (FIG. 1) may be known from communication with communication system 150 and/or sever 140.

**[0059]** At step 302, a subset of devices 120 (FIG. 1) may be selected, for example by device selection/data acquisition module 240 (FIG. 2B) of controller 120′. For example, controller 120′ (FIG. 1) may select one or more devices 120 based on a predetermined characteristic of the environment and the location of devices 120.

**[0060]** At step 304, sensor information and/or locally processed information may be received by controller 120′ (FIG. 1) from the selected subset, for example, by device selection/data acquisition module 240 (FIG. 2B). For example, controller 120′ (FIG. 1) may receive raw sensor information from respective sensor modules 202

(FIG. 2A) and/or locally processed information from respective local data analysis modules 204 (FIG. 2A). Controller 120′ (FIG. 2B) may also acquire sensor information and/or locally processed information from its own sensor module 202 and local data analysis module 204. The information from at least one of the devices 120 may be received responsive to a confirmation indication from the respective device 120, to indicate an allowance by device 120 to release its respective information to the controller. For example, the confirmation indication may be provided manually by a user of the respective device 120, or may be provided automatically by the respective device 120, based on the privacy settings of the device 120.

**[0061]** At step 306, information received from the subset (as well as, optionally, from controller 120′ (FIG. 1)) is combined to determine a characteristic of the environment, for example, by scene analysis module 242 (FIG. 2B) of controller 120′.

**[0062]** At step 308, it is determined whether the subset should be adjusted, for example, by device selection/data acquisition module 240 (FIG. 2B) of controller 120′. For example, the subset may be adjusted based on an event detected by a local data analysis module 204 (FIG. 2A) of one or more devices 120, the characteristic of the environment, any context from the characteristic, the location of devices 120 (FIG. 1) (e.g., position, orientation in space), demographics from the characteristic, any social-graph membership among devices 120, etc. For example, if one device 120 (FIG. 1) detects a gunshot, device 120′ may expand the subset of devices 120 to additional devices (to triangulate the location of the gunshot) and/or to send a warning indication to all devices 120 in range.

**[0063]** If it is determined, at step 308, that the subset should be adjusted, step 308 proceeds to step 310. At step 310, selection of the devices in the subset may be adjusted and/or a configuration of selected devices of the subset may be adjusted, for example, by device selection/data acquisition module 240 (FIG. 2B). For example, different devices 120 (FIG. 1) may be switched on or off. As another example, different sensors of sensor modules 202 (FIG. 2A) may be configured to acquire sensor information.

**[0064]** If it is determined, at step 308, that the subset should not be adjusted, step 308 may proceed to step 304, to continually determine a characteristic of the environment.

**[0065]** Alternately, step 308 may proceed to step 312 (environmental monitoring), step 314 (localization and tracking), step 316 (topic monitoring), step 318 (triggering events) and/or step 320 (other monitoring and regulation). The characteristic of the environment may be used for a number of different applications, which are described further below.

**[0066]** Referring generally to FIG. 1, in an exemplary embodiment, a platform may be developed to enable users to develop applications that: harness a set of these devices 120; acquire signals from devices 120; switch subsets of devices 120 on or off (based on information about context, including position, orientation in space, social-graph membership, and demographics); process and analyze information obtained from sensors of devices 120; set triggers to enable or disable sensing, processing or analysis; and adapt system 100 to sensed, processed or analyzed information. The platform may allow individual devices 120, 120′ to be customized and personalized to users (consumers) to mitigate, amplify or pass-through acoustic and other information to users based on acoustic and other information acquired from one or more devices.

**[0067]** Once such a platform is developed, applications may be developed for many of the scenarios and use-cases described herein. The platform may specify minimum hardware requirements, such as minimal sensor numbers and configuration, minimal onboard computing resources in terms of hardware and software, and an application programming interface (API) to allow developers to access all the features and resources available on the device.

**[0068]** An example platform specification may include: one or more microphones or a microphone array; one or more accelerometers typically to cover two or three axes of motion or orientation; a compass; an on-board GPS system; zero or more other sensors such as contact or non-contact temperature sensors; cameras with a minimal required resolution, with Bluetooth®, Wi-Fi and other capabilities; software including classifiers to analyze speech, to analyze media including music, video, and still images; software to acquire environmental metrics and analyze them in various contexts such as urban vs. suburban, and residential vs. industrial; software to preprocess signals acquired to remove or reduce noise, filter the remaining signals to identify high value signals and to transmit them to a server 140 in a compressed form if desired; a database of sound signatures; and software to handle reactive

mechanical tasks in response to sensor data- all with enough power to provide a realistic and acceptable user experience.

## 2 Example use cases

**[0069]** In this section, a number of example use cases are provided to illustrate how an exemplary system 100 (FIG. 1), described above, may be used in practice.

### 2.1 Environmental monitoring

**[0070]** A number of uses relate to monitoring an environment of a set of smartphones. In a public health monitoring example, the on-board audio processor may be configured detect occurrences of coughs, typically by the owner of the device or by other people in the proximity of the device. Such detection may use, for example, statistical spotting techniques (e.g., Hidden Markov Model (HMM) techniques, Gaussian Mixture Model (GMM) techniques) trained on a corpus of recordings of coughs know as a Universal Background Model. Communication of locally aggregated results, for example, a number of coughs per hour, may be uploaded to the central server 140 or device 120′ on a schedule, or when the rate deviates from an expected or maximum value. In this way, the controller 120′ (or server 140) may be able to identify local "hot spots" of coughing.

**[0071]** Other educational and public health uses may be possible with epidemiological applications of such systems. For example, pertussis (whooping cough) is a highly contagious disease and one of the leading causes of deaths world-wide that is preventable with the use of vaccines. Exemplary system 100 may be used to provide information to parents of children with coughs or with other symptoms such as asthmatic symptoms to help them decide when to seek medical help, and to provide epidemiological data about pertussis, asthma and related illnesses.

**[0072]** In some scenarios of such monitoring, only a limited subset of devices may be initially configured to perform the local processing needed to detect the coughs. However, when controller 120′ determines that there is a possible hot spot of activity, controller 120′ may enable further devices in the geographic proximity of the hot spot to gain further information about the extent of the situation. In some examples, the controller 120′ may enable further devices based on a social proximity, for example, to account for the possible transmission of an illness to others that are close in a social sense. In addition to enabling further devices, the controller 120′ may disable devices and control the overall monitoring set for the task.

**[0073]** In a variant, the system 100 may use sensed information to alert patients to asthmatic attacks in children, along with information on the child's environment at the onset of the attack, to enable them to ensure that prompt remedial or palliative action is taken.

**[0074]** In yet another variant, the system may be used to alert patients of breathing disorders such as sleep apnea. Sleep apnea is a disorder that is characterized by abnormal low breathing or abnormal pauses in breathing during sleep, often accompanied by snoring. Often the snorer is not aware that they snore or that they could have a life threating medical issue, and they suffer from fatigue, daytime sleepiness and other symptoms, often for years and years. Diagnosis often requires an overnight sleep study in a special lab set up with sensors. Knowledge about snoring and having a record of snoring behavior can help in the diagnosis and remediation of this condition. System 100 may be trained to recognize snoring, and to distinguish it from other kinds of similar noises, and help in detecting and recording snoring behavior to help people with breathing disorders identify their problems and seek appropriate help.

**[0075]** In another monitoring use case, the devices 120 may be used to monitor environmental sound levels (e.g., sound pressure level), for example, for workers in a factory workplace. Devices 120 of workers monitor the noise level and maintain a record, for example, cumulative durations of various ranges of noise level. This locally-determined information may be provided on regular or locally triggered basis, for example, if the noise level exceeds certain prescribed limits (e.g., an absolute limit, a limit for accumulated time above a prescribed sound pressure level, etc.). The controller 120' (or server 140) may query further devices 120 to determine the location of high noise levels, for example, based on locally logged detailed information that correlate noise level and location within the workplace. Also, other characteristics of environmental sound, for instance, related to the source of the sound may be detected. For example, a machine type (e.g., whistle, engine, press, saw, drill etc.) may be discriminated, for instance using pattern matching techniques (e.g., HMM, GMM techniques).

**[0076]** A similar sound-level monitoring may be used to track environmental sounds levels, for example, in particular restaurants, on particular streets, etc. and such monitoring may also identify time-of-day variation of such levels. Ornithologists

may be interested in the ability to monitor the presence or absence of bird songs over time and space. Others might be interested in using sound arrays to monitor insect infestations. Exemplary system 100 may make it possible to compare treatment areas with controls to measure the effectiveness of proposed countermeasures. In some examples, if the device 120 is not connected to the communication system 150, information is logged, time stamped and stored in a non-volatile memory and then uploaded when the device 120 is once again connected or its memory is interrogated. This may be typical after an automobile accident or other fatal or non-fatal incidents.

**[0077]** If a large number of cars on the same highway suddenly decelerate at the same time, then the network could decide to issue a warning to cars a few miles behind the obstacle. In addition, the ability to measure traffic flow using an array of smartphones (equipped with communication networks and sensors such as accelerometers and microphones and GPS/location sensors) has the potential to improve traffic routing in the short term, and traffic planning in the long term. Many of the applications envisioned in the present invention may have both short-term and long-term benefits. Short-term benefits use networks with low latency (such as the radio stack), whereas long-term applications can make use of networks with longer latency (such as uploading information at the end of the day when the device is docked in a networked cradle).

**[0078]** In another monitoring use, phones may be enabled to "name that tune" in the environment, and both provide the owner to download that song to their device library and upload the location of the playing to the central controller, which monitors the aggregated presence of different songs. Consider a music festival with several stages, where different groups are playing. As the user walks around these stages, a network of systems may be continuously acquiring audio data, detecting and isolating, for instance, music, identifying the music and showing users the name of the piece being played, the album, the artistes playing etc. The system may provide a mechanism for users to purchase the music if it is of interest to them. There are stand-alone programs to identify music being played, but they require a single device to collect a good sample of music, send it to a server and then possibly identify the music. In contrast, by having a network of devices 120 collect data, data acquisition is more robust and distributed, and users are able to get their music identified faster.

**[0079]** Detection of particular music being played in the environment of devices may be aggregated to determine marketing related information. By monitoring what people hear as they go about their lives, the system may acquire considerable information about the media segment. The information captured on music played, the artiste/group being played, the volume of music purchased etc. is very valuable, especially when pivoted on various dimensions. In addition, in stores where music is sold, features such as the audio background and lingering behavior may also be valuable.

**[0080]** These devices may also be used to share information about what users listen to or see, or to find out what their friends are seeing or listening to. Currently users have to take the effort to tweet or post their music-playing or video-watching behavior. However, a few days of this can get tedious, and soon users may no longer post information on their listening or viewing habits. Exemplary devices 120 may automatically identify songs or TV programs, inform friends in the users' social graph or create virtual communities of users with similar listening or viewing interests.

2.2 Localization and Tracking

**[0081]** Some use cases take advantage of the multiple locations of the devices 120 to perform localization and/or tracking of audio sources. In one example, aircraft noise data may be obtained by having a "jet detector" implemented in the on-board audio processor of a set of devices 120. Upon detection of a loud jet noise, which is reported to the controller 120' (or server 140), other devices 120 in the proximity of the reporting device(s) 120 are enabled. Buffered time stamped audio and device location data is uploaded to the controller 120' (or server 140), where a triangulation approach may be used to determine a track of the detected audio source. Based on the track, further devices 120 may be enabled along the project track so that the audio source may continue to be tracked. If the source is lost (i.e., doesn't follow a predicted tract), more devices 120 over a larger area may be enabled to re-acquire the location of the audio source. In this way, an overall assessment of the audio tracks of loud aircraft may be determined based on the aggregated acquired audio data.

**[0082]** The selected set of devices 120 effectively acts as a configurable microphone mesh for acquiring audio data. In other examples, the devices 120 can

act as a configurable accelerometer mesh for acquiring spatially and/or temporally distributed motion-related data.

**[0083]** Similar tracking information may be used, for example, to track sirens in a city. Such tracking may be used, for example, to predict traffic flow in a city that may be affected by an emergency.

**[0084]** Another type of localization may be used in near real-time or in an after-the-fact forensic mode. For example, the devices 120 may be carried by police officers or bystanders near the scene of a shooting. After detection of a gunshot event by one or more of the devices 120 (e.g., the officers' devices), the controller 120' (or server 140) may upload locally buffered audio from the officers' devices 120 or other devices 120 in the environment, and perform a localization of the source of the shooter's location. In a near real-time example, this information may be provided to the police officers to aid in their police duties. A similar type of arrangement may be used in a military situation in which audio is buffered at devices 120 carried by multiple soldiers, and the combined information may be used to estimate the direction of a sniper location.

**[0085]** Note that a central server 140 is not necessarily required. For example, devices 120 may locally exchange information to perform aggregated analysis, such as localization. In one such example, each device 120 may include a detector for an event of interest (e.g., gunshot), and upon detection of the event may pass the raw audio or a partially processed version of the audio (e.g., an intensity time profile) to nearby devices 120 (e.g., using ad hoc wireless communication), which perform local assessments of shooter direction based on the information they obtain.

**[0086]** In yet another scenario, these devices 120 may be used for adaptive crowd control. In situations with high traffic, whether vehicular or pedestrian traffic, these devices 120 may be configured as a mobile ad hoc network to estimate traffic flow from noise, with no requirement for any fixed or embedded sensors. Using the dynamically acquired traffic pattern information, the system 100 may broadcast instructions though the devices 120 or through other means to direct people through paths of lower traffic density, open up different gates or paths, or use sonification or acoustic visualization to alert users to high traffic versus low traffic paths.

**[0087]** A related idea is to create mobile sound-based security systems where the system 100 is able to quickly learn about ambient conditions and sound trends, and use this to signal situations away from normal conditions.

**[0088]** In another use case, these devices 120 may use sentiment detection and emotion detection to identify centroids of trouble in large crowds. A variant of this system 100 can be used to detect user dissatisfaction in their language, or in non-speech audio to alert management to, for example, open more counters in stores.

**[0089]** When users try to meet up with friends in large auditoria or sports stadia, it is often impossible to use mobile phones or to hear conversations on phones. The system 100 may use knowledge of users' social graphs to indicate the presence of friends using directional sonic visualization or sonification, with some variation in tone or volume as users approach their friends. Using the peer to peer architecture of the system 100 along with the knowledge in each device 120 about its neighboring devices 120 and their features, the system 100 can quickly and effectively determine the possible locations of friends. By utilizing the position information, and the orientation information acquired from the user's device 120, the system 100 can provide differential tones, volumes or other signals to indicate whether the user is moving towards or away from their friends (and whether they are pointed towards or away from their friends), and provide an indication about how far away they are. The precision of this indication may go up with the number of peer devices 120 contributing information to the system 100.

**[0090]** In another localization use case, a number of devices 120 may be enabled to sense audio, for example, for a group conference call. The locally acquired audio may be used to identify the location of the speaker, and to control which device 120 (or devices 120) are used to generate the audio for the call. For example, a device 120 closest to the person speaking, or the device 120 providing the highest signal quality or intelligibility, may be selected, thereby providing an improved audio quality.

**[0091]** In another localization use case, devices 120 may be tracked during a shopping trip, for example, in a grocery store or at a mall. The track taken by the user with corresponding audio or video information may be used to identify areas of customer focus and interest, and provide user-specific information, for example, promotional information related to purchase opportunities in the vicinity of the device 120.

**[0092]** After-the-fact analysis of a track may be used to correlate movement with actual purchases made, or to possible interest in various classes of items. For example, a relatively high time spent in the vicinity of a product type may indicate an interest in that product type. Users may be interested in opting in to having their path tracked in exchange for receiving promotions.

2.3 Topic monitoring

**[0093]** In another use example, a device 120 may be enabled to monitor the owner's environment as they converse during the day, and as they listen to media broadcasts. Topic detection techniques, for instance, based on spotting topic-related keywords, may be used to assess topics of interest to the user. During the day, or in a periodic summary, the user is presented with collateral information related to the topics. For instance, if the user enters into a conversation about a particular topic, recent news or background material may be offered on the device 120. Such topic monitoring may also be useful to provide other targeted material to the user, for example, in the form of advertising that is relevant to the user's interests.

**[0094]** The configuration of other devices 120 may be adapted based on what is detected at the user's device 120. For example, other devices 120 in geographic or social proximity to the user's device 120 may be configured to detect the presence of similar topics. In this way, the other devices 120 may have a higher likelihood of correctly detecting the topics. Furthermore, the controller 120' or server 140 may be able to track the extent of interest in a topic.

**[0095]** Another topic-related monitoring use may be related to a third party requesting detection of audio signals, such as audio components of advertising to determine where these advertisements have been played. For example, an advertiser may have controller 120' or server 140 configure devices 120 to detect an advertisement, and then determine where the advertisement has been played and potentially heard.

**[0096]** In a related use case, the system 100 may use information garnered from the sensors of devices 120 and from other sources such as electronic program guides (EPG) to identify what programs users have been listening to or viewing, to get Nielsen-like viewership statistics or to acquire business intelligence. Current systems tend to rely on home systems or manually created diaries, both of which are prone to error. Using exemplary devices 120 and exemplary system 100 may allow for this

monitoring to be done wherever the user is, and whatever media device they use, and to use information from user activity to distinguish active listening or viewing from, for instance, a TV playing to an empty room.

2.4 Triggering events

**[0097]** Generally, use cases described above use various triggering events to begin local logging of audio and/or to initiate communication with the server 140, device 120' and/or other nearby devices 120. In addition to audio-based events (e.g., specific words, spoken topics, music, sounds, etc.), other events may trigger monitoring and/or communication. For instance, content of text communication (e.g., Short Message Service (SMS) messages) may initiate monitoring and/or configure what is to be searched for. Other data, such as accelerometer data, biometric data, and detection of a video image (such as change in luminance, etc.) that is available to the device may also be used in a trigger. For example, high acceleration may be associated with a vehicle accident or a fall, and this may initiate audio monitoring or communication with the server 140 (or device 120'), which may be able to determine if an accident has occurred based on the audio scene 130, in which case emergency help may be summoned.

**[0098]** The system 100 may also be used in the care of the elderly and the disabled. Currently senior citizens and the disabled can purchase a conventional device to signal when they need help, for example if they fall or feel dizzy. However, these conventional systems require the user to consciously make a decision and press a button on the device to ask for help. The problem is that there may be situations where the user cannot make the decision, may be too embarrassed to ask for help, may feel their problem is not critical enough to ask for help, or may not even be able to access the button to call for help. For instance when the user has a stroke or if they have a fall, it may be difficult for an elderly user to press the button. The system 100 described here may use data fusion ideas to combine speech and noise detection from one or more devices 120 along with other accelerometer data to detect calls for help, or sounds from falls, dropped objects, etc., distinguish between false alarms and real problems, and summon help when required as well. System 100 may also be able to turn on the speaker phone to have a dialog with the "help" side of the call.

**[0099]** In another form of triggering event, when a device 120 is removed from the direct acoustic environment, for example, by being put in a user's pocket, the change

in audio signal characteristics may trigger a message to the controller 120' or server 140 to indicate that the device 120 is no longer available for acquiring audio based on a poor signal-to-noise ratio (SNR) operating environment. Similarly, when the device 120 is taken out of the pocket, it may again start monitoring the environment and/of notify the controller 120' (or server 140) that it is once again available. In addition, when the device is no longer obtaining adequate SNR, the device 120 may be able to enable other devices 120 within its proximity to acquire the signal and thus improve the overall SNR. In addition, many devices are now manufactured with multiple microphones (primarily used for beam forming) as to obtain an improved SNR for the user. As the user may often carry the device 120 in their pocket or purse, system 100 may be able to select which microphone in the device 120 is desirably enabled or what beam forming array would be best evoked to obtain a maximum SNR.

**[00100]** In some examples, vehicle texting is disabled by the system 100. By detecting an acceleration signature consistent with being in a moving vehicle and/or by picking up the type of sounds picked up while driving, the device 120 can detect road noise, the engine noise, wheel bearing noise, breaking noise All of these sounds may be used to either disable or enable the user from utilizing their device 120 for texting while the car is in motion. The device 120 may query its proximity and determine if other devices 120 were present within the body of the automobile. Assuming the answer were yes, further analysis may be used to provide limitations on the driver's device 120 from texting while still allowing the balance of the individuals to text. Some cars also disable or limit select navigational controls for safety reasons when the car is in motion. If the device 120 is able to detect a front seat passenger, the system may choose not to limit navigational controls.

**[00101]** In some examples, key word spotting obtained from in-situ conversations is aggregated from both the sender and recipient. During the course of normal telephone conversations, the device 120 may identify specific sounds, words, etc being uttered by both parties of a conversation. The system 100 may interrogate these sounds and provide the user with information either thru a graphical user interface (GUI), or audio based or text based feedback. As an example, assuming a call was about a trip to Paris, the device 120 could render information about promotional pricing on an airline to Paris.

**[00102]** One or more of these devices 120 may be used to identify trends in audio and other information acquired by these devices 120, for example using keyword spotting in audio streams. Keyword trends may be used to adaptively mediate or modify information consumed by users. In one scenario, information sources such as news media, search engines and similar information outlets may acquire information on trends from individual users or groups of users, and show different items to different users based on keyword trending. Specifically such a system 100 may choose topics users have been known to prefer.

**[00103]** Trending on non-speech audio may be used to identify patterns of people flow or vehicular flow. Aggregated logs of speech and non-speech audio may be used for a number of diverse applications, including identifying less noisy apartments or houses to rent or buy and areas of hotels or theater halls that may be better soundproofed. Longer term trending and identification of trends and periodic variations may be used for soundproofing or weatherproofing offices and residences.

2.5 Other aspects and uses

**[00104]** The ability to aggregate information over many smartphones can be provided with or without the cooperation of the carriers. It could be done, for example, with a third party application, which doesn't need the approval of a particular carrier and communicates via Wi-Fi or Bluetooth®. In this way, information can be aggregated across phones serviced by multiple competing carriers.

**[00105]** In some exemplary embodiments of the system 100, the system 100 may trigger off key events such as rapid deceleration of several cars at the same time and place, sirens, keywords, etc. The ability to collect vast quantities of data may improve the triggering capability. Search companies are providing better search relevancy than ever before, largely because they are collecting more data than was possible before the popularity of modern search engines. But with the exemplary system 100, it may become possible to collect even more data. If every phone were collecting audio data for an hour a day, the aggregate data resource would be much larger and much more valuable than the data collections currently collected by even the largest search companies.

**[00106]** In some exemplary embodiments of the system 100, if a device 120 in the system 100 may detect certain important keywords and phrases like "fire," then the system 100 may respond appropriately. The importance and urgency of a term

depends both on the consequences of inaction as well as term weighting concepts that are well known in the field of Information Retrieval.

**[00107]** Similarly, if a system 100 hears an important term (such as a keyword like "fire" or a non-word like a cough or an event picked up on some other sensor of device 120 such as a rapid deceleration), then the system may turn on numerous other nearby sensors in the array to confirm the event, to improve the signal to noise ratio and/or to localize the event in time and space.

**[00108]** In some uses, trending analysis may use the large amount of data available through the system 100. Consider the cough example mentioned above. Aggregations of coughs over time and space may provide tracking of health over time and space. The approach is similar some approaches to prediction of the flu based on queries where they showed that they could predict flu a couple of weeks faster than the Centers for Disease Control and Prevention (CDC). But the proposed cough metric should have even better resolution over time and space since it is based on a larger quantity of sensed data.

**[00109]** Collection of large amounts of sensed data provides a way to systematically predict (e.g., according to a statistical model) sequences or sets of sensed events of other information. Such prediction may effectively be exploited based on principles related to Shannon's Noisy Channel Model, for example, to improve transmission capacity for such events. For example, such data can allow one to create a better "language model" for events, which will do a better job of predicting what sounds to expect to hear (the prior for the noisy channel model) as well as sounds that are anonymous (triggers that should sound alarms and start recording).

**[00110]** In some examples, workplace monitoring (and monitoring of the environment) may be enabled by the system 100. The system 100 may effectively provide "smartdust" on smartphones, which is able to monitor workplaces for health issues by measuring acoustical events like coughs. Moreover, in some uses, the system 100 may sense correlates of stress such as noise. Some call centers, for example, have more stress related illnesses because the call volume has relatively large numbers of unhappy customers. It may be possible to predict risk of certain types of illnesses well before symptoms develop, both at work as well as elsewhere.

**[00111]** An ad hoc network of devices 120 may be used to fine-tune a number of features. Consider concert-hall acoustics, for instance. Concert halls are typically

tuned for the major uses of their space. For example, a symphony hall may be tuned especially for a large group of artistes and their instruments, and may not be as well suited to, for example, solo vocalists. Sound quality in a hall is also dependent on the size of the audience, their ambient noise characteristics etc. The network of system 100 may enable data to be acquired from a large number of devices 120 in the audience, so that the hall management can adapt to the ambient noise levels and fine-tune sound levels for any performance, with any number of performers and instruments, and with different audiences.

**[00112]** The ad hoc network can also be used for monitoring and regulatory purposes. Sound pressure levels or similar measures of rock concerts, gym classes and other potentially noisy environments may be monitored against safe listening levels, and infractions reported to the appropriate management or regulatory agency.

**[00113]** A similar scheme may be used to fine-tune the temperature in large auditoria, rooms or halls, based on data acquired from a number of devices 120 and individual sensors in that space. Large spaces have their own airflow and heating and cooling patterns, based on placement of air ducts, windows, doors and other openings. Heating and cooling is typically based on measuring temperature in one and occasionally more sensing locations. If the sensor is near a sunny window or a draft caused by a constantly open door, the temperature in that space can be unsatisfactory. By measuring temperature in several locations using a set of devices 120 as described in this invention, it will be possible to have finer, more localized control of temperature.

**[00114]** Some exemplary embodiments of the system 100 may make predictions based on a small sample of "opt ins." The system 100 (e.g., "cloud") may be equipped with appropriate logic to determine how to make appropriate inferences based on information gathered from those phones 120 that choose to opt into the system 100. Many of these inferences are relatively straightforward, though care may need to be taken to account for the fact that the sample is not a random sample. The set of people that own a smartphone and choose to participate will be skewed toward certain demographics, at least in the near term.

3 Backup communication uses

**[00115]** In some versions of the system, the mesh-like features of the set of personal devices 120 may be exploited. Cell phones may be viewed as relatively

passive (receive only) devices, but there are times, such as during an emergency, where it could be desirable to be able to deploy an active communication network very quickly as an overlay to more traditional telephone and internet networks.

**[00116]** During an emergency such as a man-made event like 9/11 or a natural disaster such as a major hurricane, it is possible that parts of key communication infrastructures could be down. There was a time when telecommunication networks were much more protected than they are these days. The telephone network used to be more reliable than the power grid. Central offices are typically backed up with batteries and generators (and submarine doors in places like New Orleans that are subject to flooding). Plain old telephone service (POTS) handsets used to be powered from the central office, so the service could stay up even if the standard power grid was down.

**[00117]** These days, most handsets sold in popular stores depend on the power grid. Most phones have lots of features and a power cord. Some have battery backup, but there is little incentive to replace the battery. Soon, the battery backup feature may be a thing of the past because many people aren't willing to pay for such features. Engineers like to design bridges for the hundred years' flood, but it is hard to persuade customers to pay for features they probably won't use. Given these realities, it is desirable to develop a way to deploy a backup network just-in-time. Unlike batteries and generators, which are expensive whether we use them or not, a backup network based on phones typically won't cost the public much if any additional capital, because most of the equipment is already in place.

**[00118]** Key features of a backup network:

1. Two-way communication: Telephone receivers normally receive but they can also be used to store and forward information. Thus for example, if a phone was on a mobile platform (say in a pocket or in a car), then the phone could be used in sneakernet mode to store a signal in one place and repeat it from another place.
2. Damage Assessment (the ability to determine quickly and easily what is working and what is not): During 9/11, there were many outages (e.g., fiber cuts under #7 World Trade Center, cell towers on the rooftops, switches under both #1 and #2 World Trade Center, police and fire radio communication in certain places), but some things were working (e.g., cell towers in New Jersey,

BlackBerry™ email, systems based on satellites). A key requirement is to determine what is working and what is not, and to communicate workarounds to those that need them. An array of cell phones in a multitude of pockets and cars could determine fairly quickly what is working and what is not. Hopefully, some of these devices may be connected to something that is working (such as a satellite) or would eventually move out of the affected area so enough of them could report an accurate and timely damage assessment picture back to the cloud. Using this information, both digital and real world traffic may be adaptively rerouted.

3. Workarounds: Municipal vehicles such as buses have batteries and generators. Soon, such vehicles may also have Wi-Fi that is connected to satellites. The cloud could direct such resources where they are needed most.

**[00119]** An acoustical array, such as what is described herein, may also be used in damage assessment. For example, the acoustical array may determine both whether there is too much noise (e.g., explosions) as well as too little noise (e.g., absence of human activity), aggregated over time and space.

4 Authorization and privacy

**[00120]** In some exemplary embodiments of the system 100, privacy considerations may be addressed using one or more features, which may include the following. First, monitoring may be enabled on a device 120 only if the user explicitly "opts in" to permit particular monitoring options. A reason that a user may accept such monitoring is that he, in return, obtains information that is valuable to him, for example, by being provided more relevant search results or other information. Another feature relates to encryption of the monitored information. For example, audio may be encrypted in a manner than prevents interception during uploading and/or processing by a controller 120' or server 140. Furthermore, in systems 100 in which multiple central controllers are used (e.g., one controller 120' or server 140 per cellular telephone carrier), the user may explicitly permit sharing between or among controllers.

**[00121]** In some examples, devices 120 may have features that inhibit collection of audio environment data. Such features may be mechanical (for example, mechanically preventing audio pickup with a shutter mechanism) or can be electronic (for example, with an electronic slider switch on the device).

**[00122]** In some examples, sensors can be selectively turned on or off both at the edge of the network (in the smartphone), as well as in the network (in the cloud), as well as elsewhere. For example, the operator of a movie theatre may have the ability to turn off speakers that would annoy others in the movie theatre, and similarly the operator of an airplane should have the ability to turn off communication features that could jeopardize the safety of fellow passengers. Moreover, after an incident, such as a plane accident, the authorities should have the ability to probe (via a wired or wireless interface to the memory of the phone-could be non-volatile) the smartphones on the plane for information that could be helpful in the investigation. In other words, the array of smartphones on the plane could serve as a kind of "black box" to prevent similar such incidents in the future.

**[00123]** However, privacy is also important in at least some versions of the system 100. In some exemplary embodiments, the owner of the smartphone should have the ability to pull the curtain with confidence that the phone is not invading the user's privacy, even if the phone has been taken over by a virus. When the curtain is pulled, the user wants to be sure that the phone is not recording information that could be embarrassing or self-incriminating. The phone should not be recording information that could be subject to subpoena or a court order such as discovery. The user should have the ability to opt out in a way that cannot be overridden by the owner of the network, government authority, or anyone else (such as a malicious hacker). For example, privacy may be implemented by a switch, as described further below.

**[00124]** Feature interaction can be a tricky problem in a communication network. While it is desirable that many parties have the ability to turn on and off certain features in certain ways, as discussed above, it is also important that it be clear to all parties what happens when different parties issue commands that may conflict with one another in complicated and unanticipated ways.

**[00125]** In particular, in at least some exemplary embodiments of the system, the owner of the phone ought to be in charge. In such embodiments, the owner may have the ability to physically disconnect the sensors in a way that cannot be overruled by any other party. One such method may include a physical switch that would disconnect the sensors in a way that the user can verify by visual inspection of the phone. The physical switch may be operated manually by the user and cannot be overridden remotely under software control.

**[00126]** In addition to the physical switch, there may also be a software controlled switch that may empower authorized parties to turn on and off features such as recording of sensors, recognizing keywords and uploading appropriate information to the cloud where inferences can be made that aggregate over space and time. Policies may eventually be determined regarding who is allowed to do what, and what is appropriate and what is not.

5 Other devices

**[00127]** As introduced above, the exemplary approaches described above are not limited to smartphones. For example, in-vehicle systems (e.g., navigation devices), media devices (e.g., televisions, set-top boxes, desktop computers, laptop computers), and other fixed or mobile devices may be used in similar ways. For example, in the case of an in-vehicle navigation system, an in-vehicle conversation may be monitored and information about a location (e.g., a restaurant) that is being discussed may be provided on the device's display.

**[00128]** Another type of device that may be used in such a system is an earpiece that provides audio input and output for a telephone (device). An advantage of monitoring with the earpiece is that it is exposed to the acoustic environment even when the associated phone is not exposed to the environment, for example, when the phone is in a user's pocket, thereby providing an improved signal-to-noise ratio (SNR). Another embodiment may have the entire mobile communication (cell phone) being integrated into the earpiece.

**[00129]** Another type of device 120 that may be used in such a system 100 is a hearing aid. The hearing aid may allow the entire feature set thus described in herein to be made practical. The advantage of this is data which could be mined from this age population is thought to be very different for the generation of users who typically use headphones for their communication activities.

**[00130]** Use of earpieces as described above can be thought of as ownership or control of the "last inch," which is similar to the ownership of the "last mile," which has been strategically important in the telephone business. The same dynamic underlies the debate over net neutrality. So too, ownership over the last inch will become strategically important in the war over eyes and ears. The web is currently about eyeballs and mouse clicks, but soon the war will move to a struggle for access to ears as well as eyes. The hearing aid or earpiece could be viewed as a chief of

staff. It gets to decide what the user hears and what the user doesn't hear. The hearing aid could give the wife preferred access. It could also block spam, and filter out unwanted commercials. Alternatively, the hearing aid or earpiece could run an auction similar to a paid search, where the hearing aid is a market maker that attempts to find an equilibrium between the need of the user for relevance and utility to the advertiser.

**[00131]** These auctions typically use a Vickrey auction to encourage advertisers to bid their true utility. If the user chooses to follow up on an ad (with a mouse click), then the advertiser pays the second highest bid. The hearing aid or earpiece could work in a similar way though, perhaps, instead of clicking on an ad, it might be easier for the user to participate by some other means such as a spoken command.

**[00132]** Although the invention has been described in terms of systems and methods for processing information from a plurality of distributed devices, it is contemplated that one or more steps and/or components may be implemented in software for use with microprocessors/general purpose computers (not shown). In this embodiment, one or more of the functions of the various components and/or steps described above may be implemented in software that controls a computer. The software may be embodied in non-transitory tangible computer readable media (such as, by way of non-limiting example, a magnetic disk, optical disk, flash memory, hard drive, etc.) for execution by the computer.

**[00133]** For example, some of the software may include instructions for execution at the personal devices 120 and device 120'. This software may be stored on a non-transitory tangible computer readable medium at a central location, for example, at a server 140 for distribution to the devices 120, 120', may be transferred over a digital communication medium, and/or stored in a machine readable medium at the devices 120, 120' (e.g., as downloaded applications/applets). Some of the software may be hosted at central servers 140 (e.g., in a distributed "cloud" of processors) and made accessible by storing it on non-transitory tangible computer-readable media for execution on processors of the servers 140.

**[00134]** Although the invention is illustrated and described herein with reference to specific embodiments, the invention is not intended to be limited to the details shown. Rather, various modifications may be made in the details within the scope and range of equivalents of the claims and without departing from the invention.

What is claimed is:

1. A distributed system comprising:

a plurality of devices distributed in an environment,

each device having at least a communication capability for interchanging information with others of the devices and/or with a communication system, and

each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, and

wherein at least one of the communication system or one or more of the devices is configured as a controller, the controller being configured to: select a subset of devices from among the plurality of devices, receive information based on the acquired sensor data of the selected subset, and combine the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices.

2. The system of claim 1, wherein the distributed system includes a server hosted at the communication system.

3. The system of claim 1, wherein at least one of the devices includes at least one of a wireless device or a wired device.

4. The system of claim 1, wherein at least one of the devices includes at least one of a fixed device or a mobile device.

5. The system of claim 1, wherein at least one of the devices includes at least one of a mobile telephone device, an earpiece, a hearing aid, a navigation device, a computer a sensor module having at least one sensor.

6. The system of claim 1, wherein the one or more sensors includes at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

7. The system of claim 1, wherein at least one of the devices includes a position module for determining a position of the respective device.

8. The system of claim 1, wherein each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller for determining the characteristic of the environment.

9. The system of claim 8, wherein the local data analysis module includes an acoustic analysis module to process audio information.

10. The system of claim 8, wherein the local data analysis module includes a sensor analysis module to process non-audio related information.

11. The system of claim 1, wherein the controller is configured to determine locations for at least some of the devices.

12. The system of claim 11, wherein the controller is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

13. The system of claim 1, wherein the controller is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

14. The system of claim 13, wherein the configuration information includes data characterizing events to be detected in the sensor data.

15. The system of claim 1, wherein the environment includes an audio scene.

16. The system of claim 15, wherein the characteristic of the audio scene includes at least one of speech events or non-speech events.

17. The system of claim 16, wherein when the distributed system records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded.

18. The system of claim 1 wherein the distributed system further determines trend information across a population of users of the devices from the combined information.

19. The system of claim 1, wherein the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

20. The system of claim 1, wherein the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

21. The system of claim 20, wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

22. The system of claim 1, wherein at least one of the devices includes at least one of a user interface, a display, a warning indicator, a speaker or a privacy module.

23. The system of claim 1, wherein the controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

24. A controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices, the controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the controller comprising:

a selection/acquisition module configured to select a subset of devices from among the plurality of devices and for receiving information based on the acquired sensor data of the selected subset of devices; and

a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

25. The controller of claim 24, wherein the controller is configured to determine locations for at least some of the devices.

26. The controller of claim 25, wherein the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

27. The controller of claim 24, wherein the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

28. The controller of claim 24, wherein the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module.

29. The controller of claim 24, further comprising a sensor module including at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

30. The controller of claim 29, further comprising a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment.

31. The controller of claim 24, wherein the controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment.

32. A method for processing information from a plurality of devices distributed in an environment, the method comprising:

selecting a subset of devices from among the plurality of devices by a controller, the controller including at least one of a communication system or a device, each device having at least a communication capability for interchanging information with others of the devices and/or with the communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device;

acquiring sensor data by the selected subset of devices;

receiving information based on the acquired sensor data of the selected subset of devices; and

combining, by the controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

33. The method of claim 32, wherein the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the controller for the information.

34. The method of claim 32, wherein the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment.

35. The method of claim 32, the method further including determining trend information across a population of users of the devices from the combined information.

36. The method of claim 32, the method further including monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

37. The method of claim 32, the method further including determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

38. The method of claim 32, the method further including adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment.

39. The method of claim 32, wherein the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

Abstract

Distributed systems, controllers and methods for processing information from a plurality of devices are provided. A distributed system includes a plurality of devices distributed in an environment. Each device has at least a communication capability for interchanging information with others of the devices and/or with a communication system. Each of at least some of the devices has one or more sensors for acquiring sensor data related to the environment proximate to the device. At least one of the communication system or one or more of the devices is configured as a controller configured to: select a subset of devices from among the plurality of devices, receive information based on the acquired sensor data of the selected subset, and combine the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices.

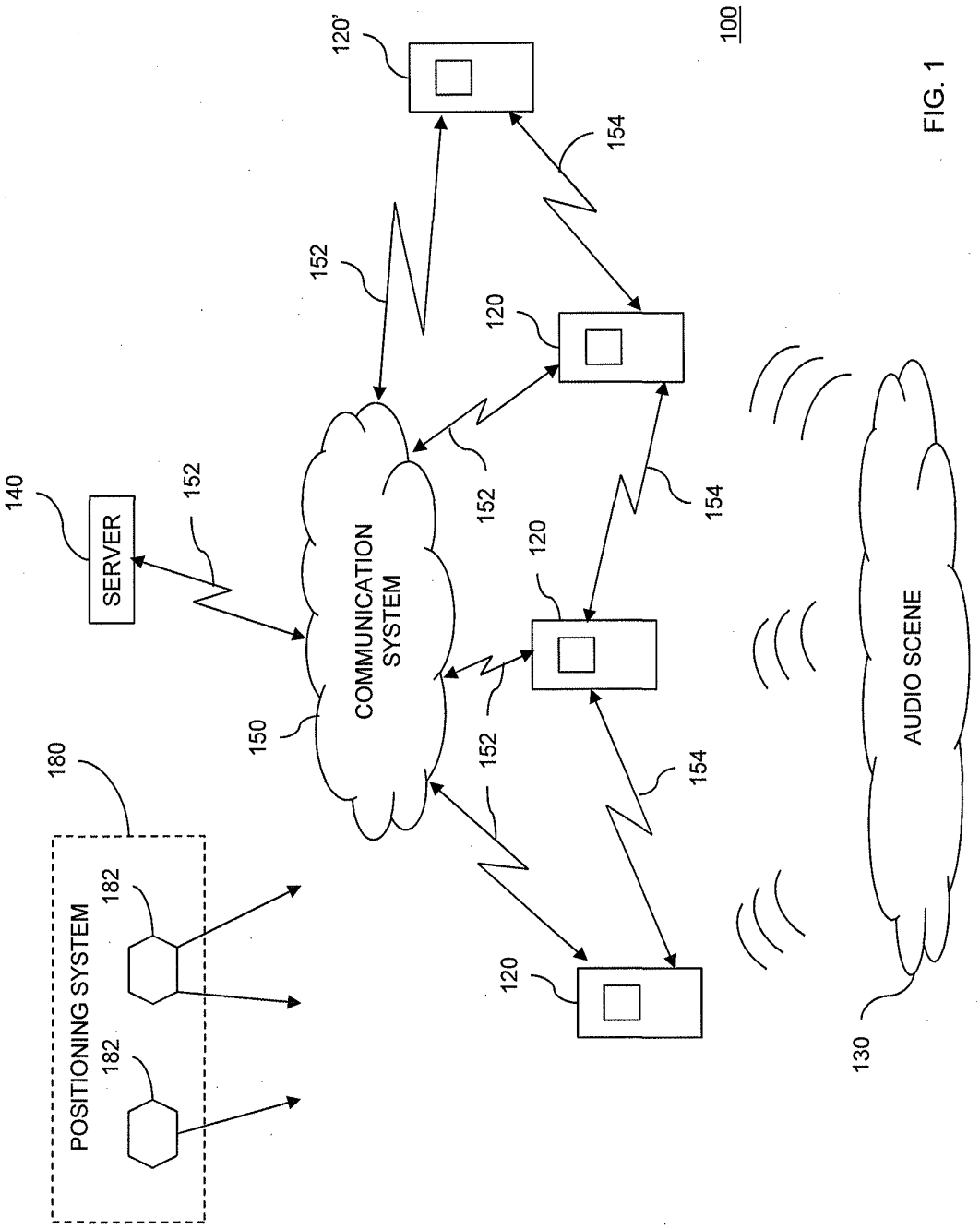

100
120'
154
152
120
152
154
140
SERVER
152
COMMUNICATION SYSTEM
120
150
152
154
180
POSITIONING SYSTEM
182
182
120
AUDIO SCENE
130

FIG. 1

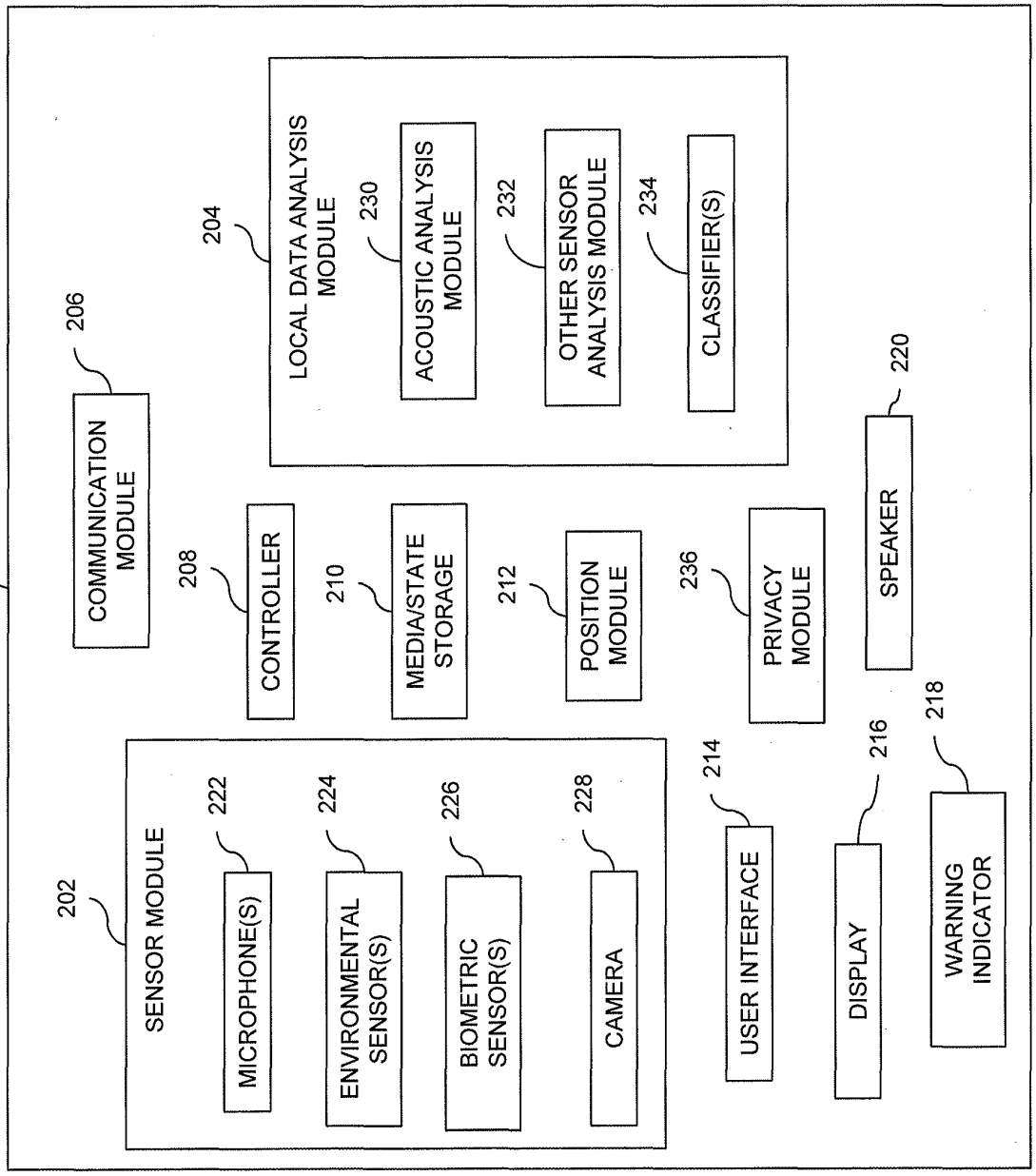

120
COMMUNICATION MODULE
206
LOCAL DATA ANALYSIS MODULE
204
ACOUSTIC ANALYSIS MODULE
230
OTHER SENSOR ANALYSIS MODULE
232
CLASSIFIER(S)
234
CONTROLLER
208
MEDIA/STATE STORAGE
210
POSITION MODULE
212
PRIVACY MODULE
236
SPEAKER
220
SENSOR MODULE
202
MICROPHONE(S)
222
ENVIRONMENTAL SENSOR(S)
224
BIOMETRIC SENSOR(S)
226
CAMERA
228
USER INTERFACE
214
DISPLAY
216
WARNING INDICATOR
218

FIG. 2A

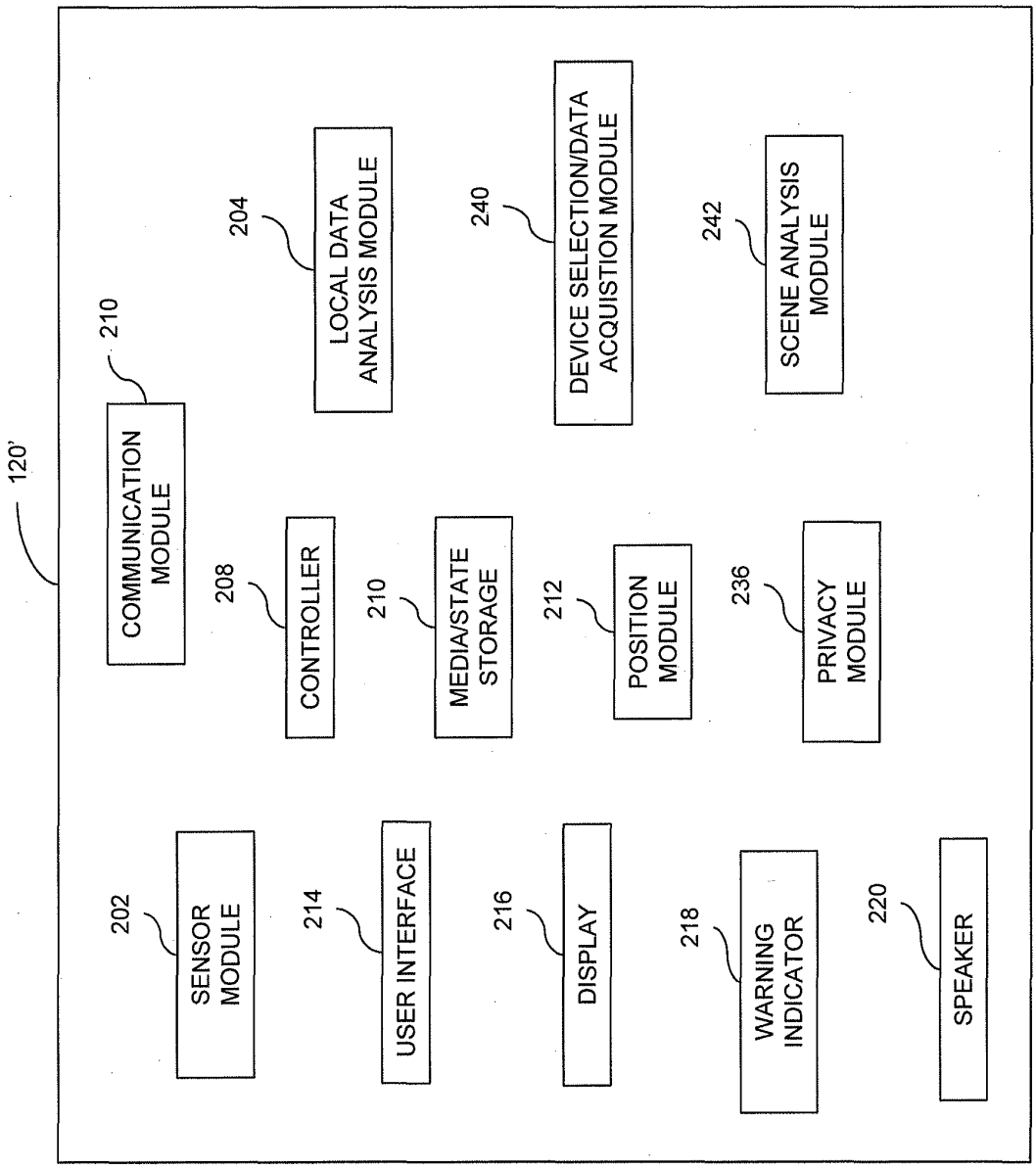

120'
COMMUNICATION MODULE
210
LOCAL DATA ANALYSIS MODULE
204
DEVICE SELECTION/DATA ACQUISTION MODULE
240
SCENE ANALYSIS MODULE
242
CONTROLLER
208
MEDIA/STATE STORAGE
210
POSITION MODULE
212
PRIVACY MODULE
236
SENSOR MODULE
202
USER INTERFACE
214
DISPLAY
216
WARNING INDICATOR
218
SPEAKER
220

FIG. 2B

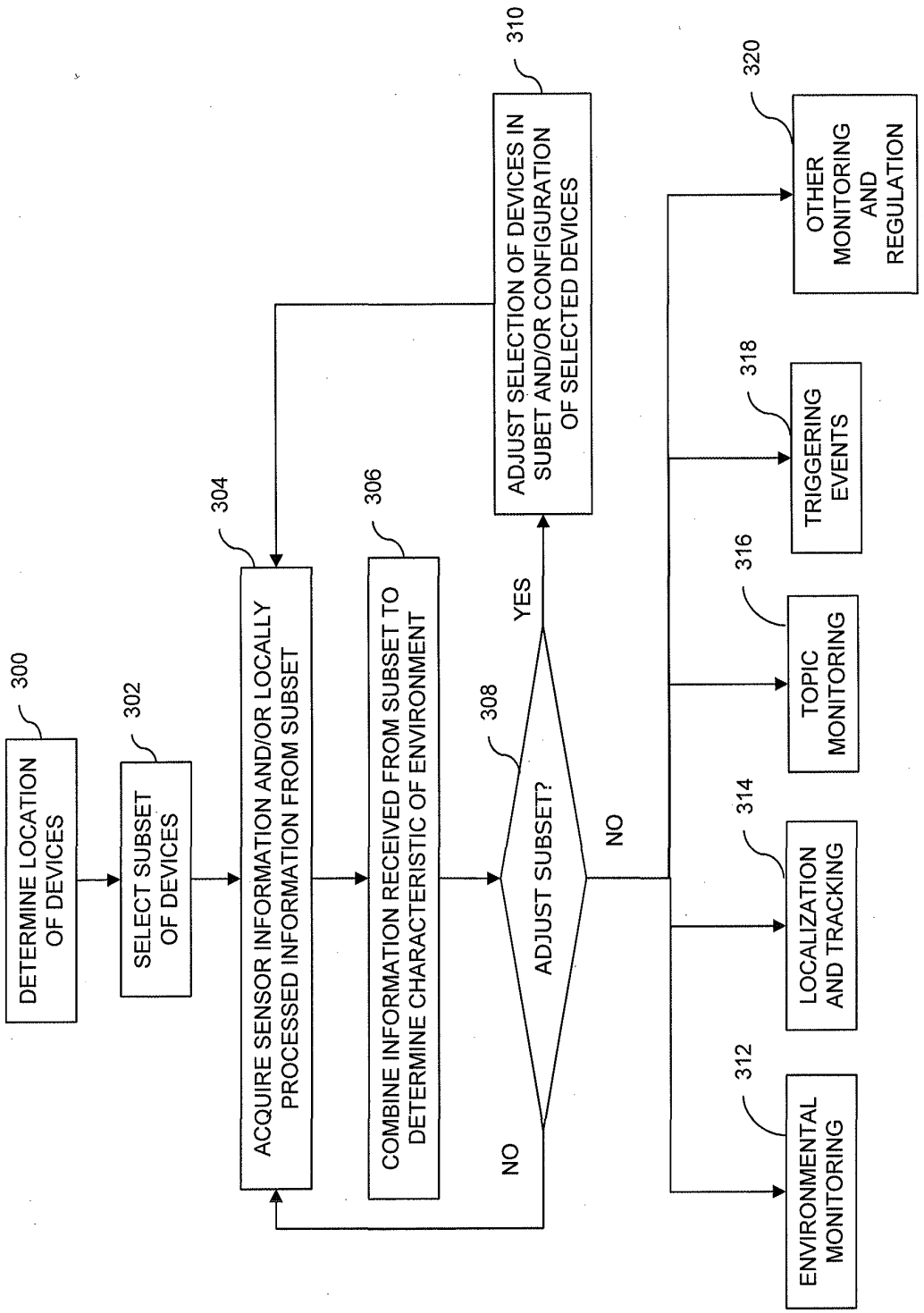

DETERMINE LOCATION OF DEVICES
300
SELECT SUBSET OF DEVICES
302
ACQUIRE SENSOR INFORMATION AND/OR LOCALLY PROCESSED INFORMATION FROM SUBSET
304
COMBINE INFORMATION RECEIVED FROM SUBSET TO DETERMINE CHARACTERISTIC OF ENVIRONMENT
306
ADJUST SUBSET?
308
YES
NO
ADJUST SELECTION OF DEVICES IN SUBET AND/OR CONFIGURATION OF SELECTED DEVICES
310
NO
ENVIRONMENTAL MONITORING
312
LOCALIZATION AND TRACKING
314
TOPIC MONITORING
316
TRIGGERING EVENTS
318
OTHER MONITORING AND REGULATION
320

FIG. 3

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appln. No: | TBD |
| Applicant: | Steven W. Goldstein |
| Filed: | Filed Herewith |
| Title: | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| TC/A.U.: | TBD |
| Examiner: | TBD |

**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents
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Sir:

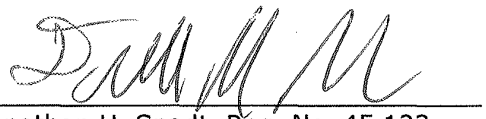
Pursuant to 37 C.F.R. §§ 1.97 and 1.98 and to the duty of disclosure set forth in 37 C.F.R. § 1.56, the Examiner in charge of the above-identified application is requested to consider and make of record the references listed on the PTO/SB/08a and PTO/SB/08b forms submitted herewith. A copy of each reference listed on the PTO/SB/08a and PTO/SB/08b forms, other than U.S. patents, is enclosed.

Although the information submitted herewith may be "material" to the Examiner's consideration of the subject application, this submission is not intended to constitute an admission that such information is "prior art" as to the claimed invention.

In accordance with 37 C.F.R. § 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made.

This Information Disclosure Statement is being filed concurrently with the above-referenced application.

Respectfully submitted,



Jonathan H. Spadt, Reg. No. 45,122
Attorney for Applicant
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Patent Agent for Applicant

JHS/DMG/emp

Enclosures: PTO/SB/08a and PTO/SB/08b
(2) References
(1) Search Report
(1) Written Opinion

Dated: June 27, 2013

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The Director is hereby authorized to charge or credit Deposit Account No. **18-0350** for any additional fees, or any underpayment or credit for overpayment in connection herewith.

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**APPLICATION NUMBER:** *61/431,507*
**FILING DATE:** *January 11, 2011*
**RELATED PCT APPLICATION NUMBER:** *PCT/US11/68103*

**THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS** *US61/431,507*

Certified by

David J. Kappos

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for Intellectual Property
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# PROVISIONAL APPLICATION FOR PATENT COVER SHEET – Page 1 of 2

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

**Express Mail Label No.** _____

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|---|---|---|
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| | | |
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*Additional inventors are being named on the* _____ *separately numbered sheets attached hereto*

**TITLE OF THE INVENTION (500 characters max):**

INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

*Direct all correspondence to:* **CORRESPONDENCE ADDRESS**

☒ The address corresponding to Customer Number: 69713

OR

☐ Firm or Individual Name

Address

| City | State | Zip |
|---|---|---|
| Country | Telephone | Email |

**ENCLOSED APPLICATION PARTS *(check all that apply)***

☒ Application Data Sheet. See 37 CFR 1.76 ☐ CD(s), Number of CDs _____

☒ Drawing(s) *Number of* Sheets 1 ☐ Other (specify) _____

☒ Specification (e.g. description of the invention) *Number of* Pages 30

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**METHOD OF PAYMENT OF THE FILING FEE AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT**

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fee and application size fee (if applicable).

☐ Payment by credit card. Form PTO-2038 is attached

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PTO/SB/16 (02-07)
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.
☐ Yes, the name of the U.S. Government agency and the Government contract number are:

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SIGNATURE J. Robin Rohlicek Date January 11, 2011

TYPED or PRINTED NAME J. Robin Rohlicek REGISTRATION NO. 43,349 (if appropriate)

TELEPHONE (617) 500-2502 Docket Number: 30084-002P02

Substitute PTO/SB/14 (06-07)
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| **Application Data Sheet 37 CFR 1.76** | Attorney Docket No. | 30084-002P02 |
|---|---|---|
| | Application No. | Not yet Assigned |
| Title of Invention | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | |

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

## Secrecy Order 37 CFR 5.2

☐ Portions of all of the application associated with the Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Applicant Information:

| **Applicant** | | | | | |
|---|---|---|---|---|---|
| **Applicant Authority** ☒ Inventor | | ☐ Legal Representative under 36 U.S.C. 117 | | ☐ Party of Interest under 36 U.S.C. 118 | |
| **Prefix** | **Given Name** | **Middle Name** | | **Family Name** | **Suffix** |
| | Steven | W. | | Goldstein | |
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| **Citizenship under 37 CFR 1.41(b)** | US | | | | |
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## Correspondence Information:

| **Customer Number** | 69713 |
|---|---|

## Application Information:

| **Title of the Invention** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | | |
|---|---|---|---|
| **Attorney Docket No.** | 30084-002P02 | **Small Entity Status Claimed** ☒ | |
| **Application Type** | Provisional | | |
| **Subject Matter** | | | |
| **Suggested Class (if any)** | | **Sub Class (if any)** | |
| **Suggested Technology Area (if any)** | | | |
| **Total Number of Drawing Sheets (if any)** | 1 | **Suggested Figure for Publication (if any)** | |



IPR2024-01300 Page 00103

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| **Application Data Sheet 37 CFR 1.76** | Attorney Docket No. | 30084-002P02 |
|---|---|---|
| | Application No. | Not yet Assigned |
| Title of Invention | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | |

## Publication Information:

| |
|---|
| ☐ **Request Early Publication** (Fee required at time of Request 37 CFR 1.219) |
| ☐ **Request NOT TO PUBLISH.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not been and will not be subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing. |

## Representative Information:

| Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). | |
|---|---|
| **Customer Number** | 69713 |

## Domestic Priority Information:

This section allows for the applicant to claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c). Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

| **Prior Application Status** | | | |
|---|---|---|---|
| **Application Number** | **Continuity Type** | **Prior Application Number** | **Filing Date (YYYY-MM-DD)** |
| | | | |
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## Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

| **Application Number** | **Country** | **Parent Filing Date (YYYY-MM-DD)** | **Priority Claimed** | |
|---|---|---|---|---|
| | | | ☐Yes | ☐No |
| | | | ☐Yes | ☐No |
| | | | ☐Yes | ☐No |

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| **Application Data Sheet 37 CFR 1.76** | Attorney Docket No. | 30084-002P02 |
|---|---|---|
| | Application No. | Not yet Assigned |
| Title of Invention | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | |

## Assignee Information:

| Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office. | | | |
|---|---|---|---|
| **Assignee** | | | |
| **If the Assignee is an Organization, check here.** ☒ | | | |
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| **Email Address** | | | |

## Signature:

| A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature. | | | |
|---|---|---|---|
| **Signature** | J. Robin Rohlicek | | |
| **First Name** | J. Robin | **Last Name** | Rohlicek |
| **Registration Number** | 43,349 | **Date (YYYY-MM-DD)** | 2011-01-11 |

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# INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

## Background

**[001]** This invention relates to processing of information from a population of data acquisition devices, and in some examples, relates to processing of audio or multimedia data acquired from an adaptively selectable population of personal wireless devices.

**[002]** Devices that are capable of acquiring, and in some cases locally processing, audio or multimedia information from their local environment have become ubiquitous over the past several years, and there is little reason to expect that such a trend will not continue. For example, "smart" cellular telephones (e.g., Apple iPhone, Android operating system based phones) have significant local processing capabilities as well as audio and video acquisition devices.

## Summary

**[003]** In one aspect, in general, the audio and multimedia acquisition capabilities of a set of devices are exploited to aggregate acquired content and fuse the information in that content, for instance, for audio scene analysis. In some examples, devices from a large population are adaptively selected and/or configured according to triggering events detected at the devices or by the network. Relating to the audio scene, the information sensed and gathered acquired from one or more devices is processed, customized and personalized to consumers to mitigate, amplify or pass-through acoustic and other information to users, based on factors such as models of users' requirements and users' past information consumption behavior. Thus the system mediates ambient and explicitly supplied information, especially audio information, acting as an arbiter of information for the user. Some of the system actions are based on information from one device while other actions may be based on information from multiple devices. The information filtered to users may be utilized to form virtual communities based on shared interests and common information, and to ensure that relevant information including alerts, marketing information, and news reaches these communities.

**[004]** In another aspect, in general, a distributed system includes a plurality of distributed devices and a controller. Each device has at least a communication capability for interchanging information with other of the devices and/or with a server system. Each of at least some of the devices has one or more sensors for acquiring sensor data related to the environment of the device. The controller is configured to perform functions including: determining locations of at least some of the devices, selecting devices from amount the plurality of devices and receiving information based on the sensor data acquired at the selected devices, and combining the information received from multiple of the selected devices to determine one or more characteristics of the environment of one or more of the devices.

**[005]** In other aspects, the distributed system includes devices that mediate all audio information sensed at the device to mitigate, amplify or pass-through information. In some examples, such information is optionally logged and analyzed to determine trend-related information.

**[006]** Other features and advantages of the invention are apparent from the following description, and from the claims.

## Description of Drawings

**[007]** FIG. 1 is a diagram of an audio aggregation system.

## Description

### 1 System overview

**[008]** Personal wireless devices, as well as other types of computing or communication devices, have become ubiquitous in our environment. Generally, such devices have a number of sensors, which may include, for instance, microphones, cameras, accelerometers, and in some cases may even have sensors for biometric information, such as heart rate. Such devices also generally include one or more communication systems, for example, a cellular telephone radio system (e.g., CDMA or GSM), a wireless local area network system (e.g., "Wi-Fi", IEEE 802.11), wired computer network connections (e.g., data network connections via USB cradles, possibly via desktop computer applications) and in some cases other systems based on radio frequency (e.g., Bluetooth) or optical (e.g., infra-red) transmission. Finally, such devices generally are "location aware" and/or locatable by the infrastructure in which

they operate. For example, such devices may have GPS receivers, enhanced GPS, which operates in conjunction with cellular telephone infrastructure, and/or WiFi based maps, which uses a map of WiFi access points to locate the device, and the cellular infrastructure may be able to locate the device based on cellular signal strength and/or triangulation approaches.

**[009]** In some aspects, the combination of characteristics of these devices provides a potentially rich source of information that may be combined in a way that generates valuable information that is not necessarily available to any individual device. As an illustrative example, audio processed locally at many different devices may be combined to identify geographic or social group trends based on keywords spoken or other acoustic events (e.g., coughs) that are detected at the devices.

**[010]** Detection of coughs is an example where detection on non-speech acoustic events may be useful. Because a cough is often a sudden and often repetitively occurring reflex, frequent coughing may indicate the presence of a disease (e.g., many viruses and bacteria benefit evolutionarily by causing the host to cough, which helps to spread the disease to new hosts). Most of the time, coughing is caused by a respiratory tract infection but can be triggered by choking, smoking, air pollution, asthma, gastro-esophageal reflux disease, post-nasal drip, chronic bronchitis, lung tumors, heart failure and medications such as ACE inhibitors. Detection of such events in the vicinity of the devices may provide significant information.

**[011]** In other aspects, the rich sensor capabilities of the devices provide a way to track activity of a user (e.g., owner) of the device to enhance the user's experience with various computing applications, such as search or personalization. As an illustrative example, topics of conversation in the vicinity of the device may affect the ranking of search results or the ordering of presentation of news stories on the device.

**[012]** In some aspects, the rich source of information over many devices and the tracking of individual activity are combined to benefit from their synergy.

**[013]** Referring to FIG. 1, in one exemplary embodiment, a number of devices 120 are present in an environment. In some examples, the devices 120 are cellular telephones ("smartphones"). The environment may be an urban environment, for example, with the devices being present on city streets, in office buildings, or in homes of the users. Generally, the devices are personal to the users/owners of the devices, and are mobile carried with the user throughout the day. In FIG. 1, a small number of representative

devices are illustrated. As discussed further below, the potentially enabled devices are part of a large population of devices (e.g., a large fraction of the telephones in a metropolitan area) and the system adaptively enables particular subsets of the devices and/or selectively configures enabled phones. For instance, the devices are enabled and/or configured according to triggering events detected at one or more devices.

**[014]** It should be understood that the description below focuses on smartphones as an example, and other types of fixed or mobile devices may be used in conjunction with or instead of smartphones. Also, the description below focuses on aggregation or combination of audio information as an example, but aggregation and processing of other forms of information, including video and biometric information may be performed in conjunction with or instead of the audio data examples described below.

**[015]** As introduced above, any particular device 120 is able to sense some aspect of an overall audio "scene" in its environment. Such a scene may include the device's owner's own speech even when not carrying out a telephone call, other sounds made by the owner, such as coughing, and speech of others and environmental sounds in proximity to the user, such as sirens, gunshots, etc.

**[016]** Generally, an information processing system 100 makes use of the audio acquisition capabilities of one or more of the devices 120 in order to extract information related to the views of the audio scene by the one or more devices. In one approach to acquisition of the raw content, every device 120 could continually transmit its acquired signals over a communication system 150 to a central controller 160. For example, the communication system may comprise a cellular telephone system and/or a wireless data network. However, such continual transmission may not be feasible due to the sheer volume given the large number of devices that are fielded, and may raise other issues regarding privacy of those in the environments of the devices.

**[017]** Another approach to extracting information is for each device to perform a local signal analysis based on the signals acquired by that device. However, such an approach may have limitations due to the computational limitations of the devices. Also, a purely local processing may loose advantages that could be gained by fusing of information from multiple devices.

**[018]** An approach describe below addresses some of the limitations of a purely local or a purely centralized approach using a combination of one or more of the following features:

**[019]** 1) Local processing of acquired signals, at least to identify occurrences of events that may be of interest;

**[020]** 2) Local buffering of audio for selective transmission to a central server or to other devices, for example, on an ongoing basis or based on request from the server or other device, or based on local identification of a local event; and

**[021]** 3) Selective enabling of acquisition and/or processing (or specification of the type of processing) at particular devices, for example, based on their geographic location and/or other proximity metrics (e.g., a social network rather than a geographic distance metric).

**[022]** Note that the locations of the devices (e.g., three-dimensional coordinates) are generally known by the devices 120 and/or a central server 160. As an example, a positioning system 180 makes use of fixed units, such as GPS satellites 182, fixed cellular transmission towers, WiFi access points, etc. to maintain an estimate of the positions of the devices.

**[023]** Continuing to refer to FIG. 1, a typical device 120 includes a communication module 128, which provide a communication link through the communication system 150 to the controller and/or to other devices 120, and may also serve a role in acquiring positioning signals (e.g., GPS signals, WiFi signal strengths, etc.), and may also provide a way to communicate directly with other devices 120. A local controller 126 coordinates the signal acquisition and processing process, and a positioning module 127 maintains a position estimate for the device. An on-board audio processor 124 processes audio acquired via a microphone 125. Processed or raw audio information, optionally combined with location information, may be stored in a media/state storage 122 in the device. In some examples, one or more additional sensors (e.g., camera, accelerometer) are part of the device.

**[024]** Generally, the system 100 makes use of one or more of enabling and configuring of devices for prospective monitoring, access to logged data for retrospective analysis, and real-time notification of events. This adaptation of the system can be based on detection of triggering events at the devices. For example, the central controller may enable detection of certain acoustic events (e.g., words, spoken topics, music, and environmental sounds) and may adapt the configurations on devices based on reports from other devices.

**[025]** In one embodiment, a platform will be developed to enable users to develop applications that: harness a set of these devices, acquire signals from them; switch subsets of these devices on or off, based on information about context, including position, orientation in space, social-graph membership, and demographics; process and analyze information obtained from sensors; set triggers to enable or disable sensing, processing or analysis; and adapt to sensed, processed or analyzed information. The platform will enable allow individual devices to be customized and personalized to users (consumers) to mitigate, amplify or pass-through acoustic and other information to users based on acoustic and other information acquired from one or more devices.

**[026]** Once such a platform is developed, applications may be developed for many of the scenarios and use cases described in this document. The platform will specify minimum hardware requirements, such as the minimal sensor numbers and configuration, the minimal onboard computing resources in terms of hardware and software, and an API to allow developers to access all the features and resources available on the device.

**[027]** A typical platform specification may require: one or more microphones or a microphone array; one or more accelerometers typically to cover 2 or 3 axes of motion or orientation; an on-board GPS system; zero or more of other sensors such as contact or non-contact temperature sensors; cameras with a minimal required resolution, with Bluetooth, Wi-Fi and other capabilities; software including classifiers to analyze speech, to analyze media including music, video, and still images; software to acquire environmental metrics and analyze them in various contexts such as urban vs. suburban, and residential vs. industrial; software to preprocess signals acquired to remove or reduce noise, filter the rest to identify high value signals and to transmit them to a server in compressed form if required; and software to handle reactive mechanical tasks in response to sensor data -- all with enough power to provide a realistic and acceptable user experience.

**[028]** The software coordinating the set of devices may have centralized control, peer-to-peer control or a hybrid model involving centralized, peer-to-peer and other control mechanisms. Individual devices may switch between being master devices controlling other devices, or slave devices under the temporary partial control of other devices. The network may so configure itself to optimize power consumption on individual devices by distributing sensing load across a number of devices, or by other mechanisms such

as sharing bandwidth across devices. The networking used may be based on ideas related to mobile ad hoc networks (MANET), Scatternet or other mechanisms.

**[029]** For example, the system may dynamically organize and reorganize its nodes into hierarchies or graphs, with some devices chosen to be master nodes while other possibly geographically proximate devices to be slave nodes. Slave nodes may perform actions based on instructions from master nodes. They may preprocess information and convey processed information to master nodes, instead of conveying all information acquired, thus distributing computation among nodes and reducing the communication bandwidth required. In addition, communication requirements improve since only a few master nodes need to communicate with each other, instead of all, say N devices trying to communicate with each other, which would require ((N^2/)2) connections. Because each node knows its location, depending on system requirements, the network may organize itself into one or more linear chains, where information is passed between physically proximate devices, very much like a bucket brigade conveying information. With a peer-to-peer architecture, individual devices – either just master nodes or both master nodes and slave nodes – can record information about neighboring nodes and their capabilities and features, so that, for instance, connectivity between any pair of nodes can easily and effectively be established at low computational cost. Other optimization techniques may also be adopted – for instance, when data logs have to be recorded, the system may determine if several devices are in the same audio or other sensor context. If several phones are located in the same context, not every phone has to record all data – the system may designate a scribe node which acts as a local repository for data and for ensuring the data gets stored to some centralized server in the cloud. This can save considerable logging effort on part of the other nodes. Alternatively or in addition, the system may distribute sensor load among devices so that not every node has to acquire information via all its sensors – some sensor may concentrate on acquiring audio information, while others may acquire position information and still others may acquire temperature or altitude information and so on. This may reduce power and communication bandwidth requirements for the entire system. Several such schemes may be devised to optimize the throughput and efficiency of the system as a whole.

**[030]** The system as a whole may make use of carrier-agnostic handlers in the cloud. Specifically, the networking may utilize services from a number of wireless telephony, Wi-Fi or other carriers, and suitable policies will have to be put in place to enable carrier-agnostic behaviors, specifically so that no user is denied sharing of information

because of association with specific carriers, and so that digital bridges exist to share information across carriers where required. In a variant, some features may be made unique to a carrier for marketing reasons.

**[031]** The software of the system, for example, the software executed on user devices, provides mechanisms to implement privacy and security requirements and policies for applications relating to the acquisition and use of information of various kinds, including audio information, by one or more devices associated with a number of carriers. These policies and mechanisms control the use of devices including the ability to remotely switch on and switch off sensing (listening), the ownership of any audio information garnered by these devices, users' ability to easily control sensing and information acquisition, mechanisms to opt-in and opt-out of applications, carrier-wide or network-wide data gathering, the protection of any audio personally identifiable information (PII) that is gathered, and any aggregated data that is created from a number of devices and networks. Policies or standard practices are also established for private or semi-private situations where not all people present have opted-in for data acquisition.

**[032]** In addition to acquiring audio, each device, either locally or with the aid of backend server architecture or similar mechanisms, preprocesses the audio information to recognize speech, perform keyword spotting on speech information, and in addition build voice models of various speakers within the auditory range of the device. The models may use classifiers and machine learning methods to identify gender, probable age range, nationality and other demographic features from the speech signals. In addition, there may be classifiers, for instance, to recognize any slurring due to the influence of alcohol or similar substances, accent classifiers to detect and identify accent patterns belonging to specific language groups, and emotion classifiers to classify speakers and speech into happy, sad, stressed, angry or other emotional states. Thus, given any audio input that includes any speech, individual devices or the system as a whole may be able to build an acoustic profile of each speech participant in that input, where the profile not only includes the keywords spotted, but also other data such as demographic data about each speaker including gender, probable age, possible nationality etc, and classifier results about emotional state, and whether the speaker was under the influence. The acquisition of keywords with demographic data can help advertisers target their sales, based on factors such as gender, age and potential levels of disposable income, and to track their sale cycle from users noticing their advertisements to actually making a purchase. Emotion indicators can be used to take

palliative or preventative steps to avoid customer dissatisfaction. Other information like slurring may be used as corroboratory information in situations such as accidents or may be used to prevent accidents.

**[033]** The primary consumer device does not have to be a phone. It may be stand-alone device, or it may be an integral part of a GPS, hearing aid, mobile phone, TV remote, car key fob, portable game controller or similar device. The device may be carried by the user on her person, or be installed in or on a vehicle such as a car. For certain applications, fixed devices may be installed at home, or be part of fixed telephones, desktop computers, TV sets or game consoles. Each device may include one or more sensors with associated software. Different kinds of devices may have different sensors and different software. If the device is more like a smartphone, the system may have access to textual data including electronic mail, chat transcripts and documents, and audio data including phone conversations, music on the device or streamed to the device ambient audio picked up by microphones, and user search logs. All this data relevant to the user, along with the user's context and environmental variables, may be used for personalization of information consumed by the user and then where appropriate repurposed for commercial applications to the user or the community at large.

## 2 Example use cases

**[034]** In this section, a number of example use cases are provided to illustrate how examples of a system such as that shown in FIG. 1 may be used in practice.

### 2.1 Environmental monitoring

**[035]** A number of uses relate to monitoring an environment of a set of smart phones. In a public health monitoring example, the on-board audio processor may be configured detect occurrences of coughs, typically by the owner of the device or by other people in the proximity of the device. Such detection may use, for example, statistical spotting techniques (e.g., Hidden Markov Model, HMM, GMM, techniques) trained on a corpus of recordings of coughs know as a Universal Background Model. Communication of locally aggregated results, for example, a number of coughs per hour, may be uploaded to the central controller 160 on a schedule, or when the rate deviates from an expected

or maximum value. In this way, the controller may be able to identify local "hot spots" of coughing.

**[036]** Other educational and Public Health uses may be possible with epidemiological applications of such systems. For example, pertussis (whooping cough) is a highly contagious disease and one of the leading causes of deaths world-wide that is preventable with the use of vaccines. The system proposed here could be used to provide information to parents of children with coughs or with other symptoms such as asthmatic symptoms to help them decide when to seek medical help, and to provide epidemiological data about pertussis, asthma and related illnesses.

**[037]** In some scenarios of such monitoring, only a limited subset of devices may be initially configured to perform the local processing needed to detect the coughs. However, when the central controller determines that there is a possible hot spot of activity, the central controller may enable further devices in the geographic proximity of the hot spot to gain further information about the extent of the situation. In some example, the central controller may enable further devices based on a social proximity, for example, to account for the possible transmission of an illness to others that are close in a social sense. In addition to enabling further devices, the central controller may disable devices and control the overall monitoring set for the task.

**[038]** In a variant, the system may use sensed information to alert patients to asthmatic attacks in children, along with information on the child's environment at the onset of the attack, to enable them to ensure that prompt remedial or palliative action is taken.

**[039]** In yet another variant, the system may be used to alert patients of breathing disorders such as sleep apnea. Sleep apnea is a disorder that is characterized by abnormal low breathing or abnormal pauses in breathing during sleep, often accompanied by snoring. Often the snorer is not aware that they snore or that they could have a life threating medical issue, and they suffer from fatigue, daytime sleepiness and other symptom, often for years and years. Diagnosis often requires an overnight sleep study in a special lab set up with sensors. Knowledge about snoring and having a record of snoring behavior can help in the diagnosis and remediation of this condition. The system we propose could be trained to recognize snoring, and to distinguish it from other kinds of similar noises, and help in detecting and recording snoring behavior to help people with breathing disorders identify their problems and seek appropriate help

**[040]** In another monitoring use case, the devices are used to monitor environmental sound levels (e.g., sound pressure level), for example, for workers in a factory workplace. Devices of workers monitor the noise level and maintain a record, for example, cumulative durations of various ranges of noise level. This locally-determined information may be provided on regular or locally triggered basis, for example, if the noise level exceeds certain prescribed limits (e.g., an absolute limit, a limit for accumulated time above a prescribed sound pressure level, etc.). The central controller may query further devices to determine the location of high noise levels, for example, based on locally logged detailed information that correlate noise level and location within the workplace. Also, other characteristics of environmental sound, for instance, related to the source of the sound may be detected. For example, a machine type (e.g., whistle, engine, press, saw, drill etc.) may be discriminated, for instance using pattern matching techniques (e.g., Hidden Markov Model (HMM), GMM, techniques.)

**[041]** A similar sound-level monitoring may be used to track environmental sounds levels, for example, in particular restaurants, on particular streets, etc. and such monitoring may also identify time-of-day variation of such levels. Ornithologists may be interested in the ability to monitor the presence or absence of bird songs over time and space. Others might be interested in using sound arrays to monitor insect infestations. This invention would make it possible to compare treatment areas with controls to measure the effectiveness of proposed countermeasures. In some examples, if the device is not connected to the communication system, information is logged, time stamped and stored in a non-volatile memory and then uploaded when the device is once again connected or its memory is interrogated. This may be typical after a automobile, place or other fatal or non-fatal incidents

**[042]** If a large number of cars on the same highway suddenly decelerate at the same time, then the network could decide to issue a warning to cars a few miles behind the obstacle. In addition, the ability to measure traffic flow using an array of smart phones (equipped with communication networks and sensors such as accelerometers and microphones and GPS/location sensors) has the potential to improve traffic routing in the short term, and traffic planning in the long term. Many of the applications envisioned in this invention have both short-term and long-term benefits. Short-term benefits require networks with low latency (such as the radio stack), whereas long-term applications can make use of networks with longer latency such as uploading information at the end of the day when the device is docked in a networked cradle.

**[043]** In another monitoring use, phones may be enabled to "name that tune" in the environment, and both provide the owner to download that song to their device library and upload the location of the playing to the central controller, which monitors the aggregated presence of different songs. Consider a music festival with several stages, where different groups are playing. As the user walks around these stages, a network of systems may be continuously acquiring audio data, detecting and isolating, for instance, music, identifying the music and showing users the name of the piece being played, the album, the artistes playing etc. The system may provide a mechanism for users to purchase the music if it is of interest to them. There are stand-alone programs to identify music being played, but they require a single device to collect a good sample of music, send it to a server and then possibly identify the music. In contrast, by having a network of devices collect data, data acquisition is more robust and distributed, and users are able to get their music identified faster.

**[044]** Detection of particular music being played in the environment of devices may be aggregated to determine marketing related information. By monitoring what people hear as they go about their lives, the system may acquire considerable information about the media segment. The information captured on music played, the artiste/group being played, the volume of music purchased etc. is very valuable, especially when pivoted on various dimensions. In addition, in stores where music is sold, features such as the audio background and lingering behavior are also valuable.

**[045]** These devices may also be used to share information about what users listen to or see, or to find out what their friends are seeing or listening to. Currently users have to take the effort to tweet or post their music-playing or video-watching behavior. However, a few days of this can get tedious, and soon users may no longer post information on their listening or viewing habits. The devices we propose may automatically identify songs or TV programs, inform friends in the users' social graph or create virtual communities of users with similar listening or viewing interests.

## 2.2 Localization and Tracking

**[046]** Some use cases take advantage of the multiple locations of the devices to perform localization and/or tracking of audio sources. In one example, aircraft noise data may be obtained by having a "jet detector" implemented in the on-board audio processor of a set of devices. Upon detection of a loud jet noise, which is reported to

the central controller, other devices in the proximity of the reporting device(s) are enabled. Buffered time stamped audio and device location data is uploaded to the controller, where a triangulation approach is used to determine a track of the detected audio source. Based on the track, further devices may be enabled along the project track so that the audio source may continue to be tracked. If the source is lost (i.e., doesn't follow a predicted tract), more devices over a larger area may be enabled to re-acquire the location of the audio source. In this way, an overall assessment of the audio tracks of loud aircraft may be determined based on the aggregated acquired audio data.

**[047]** The selected set of devices effectively acts as a configurable microphone mesh for acquiring audio data. In other example, the devices can act as a configurable accelerometer mesh for acquiring spatially and/or temporally distributed motion-related data.

**[048]** Similar tracking information may be used, for example, to track sirens in a city. Such tracking may be used, for example, to predict traffic flow in a city that may be affected by an emergency.

**[049]** Another type of localization may be used in a near real-time or in an after-the-fact forensic mode. For example, the devices may be carried by police officers or bystanders near the scene of a shooting. After detection of a gunshot event by one or more of the devices (e.g., the officers' devices), the central controller may upload locally buffered audio from the officers' devices or other devices in the environment, and perform a localization of the source of the shooter's location. In a near real-time example, this information may be provided to the police officers to aid in their police duties. A similar type of arrangement may be used in a military situation in which audio is buffered at devices carried by multiple soldiers, and the combined information in used to estimate the direction of a sniper location.

**[050]** Note that a central server is not necessarily required. For example, devices may locally exchange information to perform aggregated analysis, such as localization. In one such example, each device may include a detector for an event of interest (e.g., gunshot), and upon detection of the event may pass the raw audio or a partially processed version of the audio (e.g., an intensity time profile) to nearby devices (e.g., using ad hoc wireless communication), which perform local assessments of shooter direction based on the information they obtain.

**[051]** In yet another scenario, these devices may be used for adaptive crowd control. In situations with high traffic, whether vehicular or pedestrian traffic, these devices may be configured as a mobile ad hoc network to estimate traffic flow from noise, with no requirement for any fixed or embedded sensors. Using the dynamically acquired traffic pattern information, the system may broadcast instructions though the devices or through other means to direct people through paths of lower traffic density, open up different gates or paths, or use sonification or acoustic visualization to alert users to high traffic versus low traffic paths.

**[052]** A related idea is to create mobile sound-based security systems where the system is able to quickly learn about ambient conditions and sound trends, and use this to signal situations away from the normal.

**[053]** In another use case, these devices may use sentiment detection and emotion detection to identify centroids of trouble in large crowds. A variant of this system can be used to detect user dissatisfaction in their language, or in non-speech audio to alert management to, for example, open more counters in stores.

**[054]** When users try to meet up with friends in large auditoria or sports stadia, it is often impossible to use mobile phones or to hear conversations on phones. The system may use knowledge of users' social graphs to indicate the presence of friends using directional sonic visualization or sonification, with some variation in tone or volume as users approach their friends. Using the peer to peer architecture of the system along with the knowledge in each device about its neighboring devices and their features, the system can quickly and effectively determine the possible locations of friends. By utilizing the position information, and the orientation information acquired from the user's device, the system can provide differential tones, volumes or other signals to indicate whether the user is moving towards or away from their friends and whether they are pointed towards or away from their friends, and provide an indication about how far away they are. The precision of this indication may go up with the number of peer devices contributing information to the system.

**[055]** In another localization use case, a number of devices are enabled to sense audio, for example, for a group conference call. The locally acquired audio is used to identify the location of the speaker, and to control which device (or devices) are used to generate the audio for the call. For example, a device closest to the person speaking, or the device providing the highest signal quality or intelligibility, may be selected, thereby providing an improved audio quality. In another localization use case, devices

are tracked during a shopping trip, for example, in a grocery store or at a mall. The track taken by the user with corresponding audio or video information is used to identify areas of customer focus and interest, and provide user-specific information, for example, promotional information related to purchase opportunities in the vicinity of the device. After-the-fact analysis of a track may be used to correlate movement with actual purchases made, or to possible interest in various classes of items. For example, a relatively high time spent in the vicinity of a product type may indicate an interest in that product type. Users may be interested in opting in to having their path tracked in exchange for receiving promotions.

2.3 Topic monitoring

**[056]** In another use example, a device is enabled to monitor the owner's environment as they converse during the day, and as they listen to media broadcasts. Topic detection techniques, for instance, based on spotting topic-related keywords, is used to assess topics of interest to the user. During the day, or in a periodic summary, the user is presented with collateral information related to the topics. For instance, if the user enters into a conversation about a particular topic, recent news or background material may be offered on the device. Such topic monitoring may also be useful to provide other targeted material to the user, for example, in the form of advertising that is relevant to the user's interests.

**[057]** The configuration of other devices may be adapted based on what is detected at the user's device. For example, other devices in geographic or social proximity to the user's device may be configured to detect the presence of similar topics. In this way, the other devices may have a higher likelihood of correctly detecting the topics. Furthermore, the central controller may be able to track the extent of interest in a topic.

**[058]** Another topic-related monitoring use may related to a third party requesting detection of audio signals, such as audio components of advertising to determine where these advertisements have been played. For example, and advertiser may have the central controller configure devices to detect an ad, and then determine where the ad have been played and potentially heard.

**[059]** In a related use case, the system may use information garnered from the sensors and from other sources such as electronic program guides (EPG) to identify what programs users have been listening to or viewing, to get Nielsen-like viewership statistics or to acquire business intelligence. Current systems tend to rely on home

systems or manually created diaries, both of which are prone to error. Using the devices and the system we describe will make it possible for this monitoring to be done where ever the user is, and whatever media device they use, and to use information from user activity to distinguish active listening or viewing from, for instance, a TV playing to an empty room.

2.4 Triggering events

**[060]** Generally, use cases described above use various triggering events to begin local logging of audio and/or to initiate communication with the central controller and/or other nearby devices. In addition to audio-based events (e.g., specific words, spoken topics, music, sounds, etc.), other events may trigger monitoring and/or communication. For instance, content of text communication (e.g., SMS messages) may initiate monitoring and/or configure what is to be searched for. Other data, such as accelerometer data, biometric data, and detection of video image such as change in luminence, etc. that is available to the device may also be used in a trigger. For example, high acceleration may be associated with a vehicle accident or a fall, and this may initiate audio monitoring or communication with the central controller, which may be able to determine if an accident has occurred based on the audio scene, in which case emergency help may be summoned.

**[061]** The system may also be used in the care of the elderly and the disabled. Currently senior citizens and the disabled can purchase a device to signal when they need help, for example if they fall or feel dizzy. However, these systems require the user to consciously take a decision and press a button on the device to ask for help. The problem is that there may be situations where the user cannot take the decision, may be too embarrassed to ask for help, may feel their problem is not critical enough to ask for help, or may not even be able to access the button to call for help. For instance when the user has a stroke or if they have a fall, it may be for an elderly user to press the button. The system described here may use data fusion ideas to combine speech and noise detection from one or more devices along with other accelerometer data to detect calls for help, or sounds from falls, dropped objects, etc, distinguish between false alarms and real problems, and summon help when required as well as turn on the speaker phone to have a dialog with the "help" side of the call.

**[062]** In another form of triggering event, when a device is removed for the direct acoustic environment, for example, by being put in a user's pocket, the change in audio

signal characteristics may trigger a message to the central controller to indicate that the device is no longer available for acquiring audio based on a poor SNR operating environment. Similarly, when the phone is taken out of the pocket, it may again start monitoring the environment and/of notify the central controller that is once again available. In addition, when the device is no longer obtainiong adequate SNR, the device would enable other devices within its proximity to acquire the signal and thus improve the overall SNR. In addition, many devices now are manufactured with multiple microphones primarily used for beam forming as to obtain an improved SNR for the user. As the user may often carry the device in their pocket or purse, the system would be able to select which microphone in the device we would need enabled or what beam forming array would be best to evoked as obtain the maximum SNR.

**[063]** In some examples, vehicle texting is disabled by the system. By picking up the type of sounds picked up while driving, the device can detect road noise, the engine noise, wheel bearing noise, breaking noise all of which may be used to either disable or enable the user from utilizing their device for texting while the car is in movement. The device would query its proximity and determine of other devices were present within the body of the automobile. Assuming the answer were yes, further analysis would need to be made to limit on the driver's device from texting while still allowing the balance of the individuals to text. Some cars also disable or limit select navigational controls for safety reasons when the car is in motion. If the device is able to detect a front seat passenger, the system may choose not to limit navigational controls.

**[064]** In some examples, key word spotting obtained from cell from in-situ conversations is aggregated from both the sender and recipient. During the course of normal telephone conversations, the device may identify specific sounds, words, etc being uttered by both parties of a conversation. The system would interrogate these sounds and provide the user with information either thru a GUI, or audio based or text based feedback. As an example, assuming the call was about a trip to Paris, the device could render information about promotional pricing on an airline to Paris.

**[065]** One or more of these devices may be used to identify trends in audio and other information acquired by these devices, for example using keyword spotting in audio streams. Keyword trends may be used to adaptively mediate or modify information consumed by users. In one scenario, information sources such as news media, search engines and similar information outlets may acquire information on trends from individual users or groups of users, and show different items to different users based on

keyword trending. Specifically such a system may choose to prefer topics users have been known to prefer.

**[066]** Trending on non-speech audio may be used to identify patterns of people flow or vehicular flow. Aggregated logs of speech and non-speech audio may be used for a number of diverse applications including identifying less noisy apartments or houses to rent or buy and areas of hotels or theater halls that may be better soundproofed. Longer term trending and identification of trends and periodic variations may be used for soundproofing or weatherproofing offices and residences.

2.5 Other aspects and uses

**[067]** The ability to aggregate information over many smart phones can be provided with or without the cooperation of the carriers. It could be done, for example, with a third party app installed on the user's device, which doesn't need the approval of a particular carrier. In this way, information can be aggregated across phones serviced by multiple competing carriers.

**[068]** In some version of the system, the system triggers off key events such as rapid deceleration of lots of cars at the same time and place, sirens, keywords, etc. The ability to collect vast quantities of data improves the triggering capability. Search companies are providing better search relevancy than ever before, largely because they are collecting more data than was previously possible before the popularity of modern search engines. But with one or more of the proposed approaches, it will become possible to collect even more data. If every phone was collecting audio data for an hour a day, the aggregate data resource would be much larger and much more valuable than the data collections currently collected by even the largest search companies.

**[069]** In some versions of the system, if a device in the system hears certain important keywords and phrases like "fire," then the system should respond appropriately. The importance and urgency of a term depends both on the consequences of inaction as well as term weighting concepts that are well known in the field of Information Retrieval.

**[070]** Similarly, if a system hears an important term (such as a keyword like "fire" or a non-word like a cough or an event picked up on some other sensor such as a rapid deceleration), then the system may turn on numerous of other nearby sensors in the array to confirm the event and to improve the signal to noise ratio and to localize the event in time and space.

**[071]** In some uses, trending analysis make use of the large amount of data available through the system. Consider the cough example mentioned above. Aggregations of coughs over time and space will provide excellent tracking of health over time and space. The approach is similar some approaches to prediction of the flu based on queries where they showed that they could predict flu a couple of weeks faster than the Centers for Disease Control and Prevention (CDC). But the proposed cough metric should have even better resolution over time and space since it is based on much more sensed data.

**[072]** Collection of large amounts of sensed data provides a way to systematically predict (e.g., according to a statistical model) sequences or sets of sensed events of other information. Such prediction may effectively be exploited based on principles related to Shannon's Noisy Channel Model, for example, to improve transmission capacity for such events. For example, such data can allow one to create a better "language model" for events, which will do a better job of predicting what sounds we should expect to hear (the prior for the noisy channel model) as well as sounds that are anonymous (triggers that should sound alarms and start recording).

**[073]** In some example, workplace monitoring (and monitoring of the environment) is enabled by the system. The system effectively provides "smartdust" on smart phones, which is able to monitor workplaces for health issues by measuring acoustical events like coughs. Moreover, in some uses, the system senses correlates of stress such as noise. Some call centers, for example, have more stress related illnesses because the call volume has relatively large numbers of unhappy customers. It may be possible to predict risk of certain types of illnesses well before symptoms develop, both at work as well as elsewhere.

**[074]** An ad hoc network of devices may be used to fine-tune a number of features. Consider concert-hall acoustics, for instance. Concert halls are typically tuned for the major uses of their space. For example, a symphony hall may be tuned especially for a large group of artistes and their instruments, and may not be as well suited to, for example, solo vocalists. Sound quality in a hall is also dependent on the size of the audience, their ambient noise characteristics etc. The network we propose will enable data to be acquired from a large number of devices in the audience, so that the hall management can adapt to the ambient noise levels and fine-tune sound levels for any performance, with any number of performers and instruments, and with different audiences.

**[075]** The ad hoc network can also be used for monitoring and regulatory purposes. Sound pressure levels or similar measures of rock concerts, gym classes and other potentially noisy environments may be monitored against safe listening levels, and infractions reported to the appropriate management or regulatory agency.

**[076]** A similar scheme may be used to fine-tune the temperature in large auditoria, rooms or halls, based on data acquired from a number of devices and individual sensors in that space. Large spaces have their own airflow and heating and cooling patterns, based on placement of air ducts, windows, doors and other openings. Heating and cooling is typically based on measuring temperature in one and occasionally more sensing locations. If the sensor is near a sunny window or a draft caused by a constantly open door, the temperature in that space can be unsatisfactory. By measuring temperature in several locations using a set of devices as described in this invention, it will be possible to have finer, more localized control of temperature.

**[077]** Some versions of the system make predictions based on small sample of "opt ins." The system ("cloud") is equipped with appropriate logic to determine how to make appropriate inferences based on information gathered from those phones that choose to opt into the system. Many of these inferences are relatively straightforward, though care may need to be taken to account for the fact that the sample is not a random sample. The set of people that own a smart phone and choose to participate will be skewed toward certain demographics, at least in the near term.

3 Backup communication uses

**[078]** In some versions of the system, the mesh-like features of the set of personal devices is exploited. Cell phones may be viewed as relative passive (receive only) devices, but there are times, such as during an emergency, where it could be desirable to be able to deploy an active communication network very quickly as an overlay to more traditional telephone and internet networks. During an emergency such as a man-made event like 9/11 or a natural disaster such as a major hurricane, it is possible that parts of key communication infrastructures could be down. There was a time when telecommunication networks were much more protected than they are these days. The telephone network used to be more reliable than the power grid. Central offices were backed up with batteries and generators (and submarine doors in places like New Orleans that are subject to flooding). POTS (plain old telephone service) handsets used to be powered from the central office, so the service could stay up even if the standard

power grid was down. These days, most handsets sold in popular stores depend on the power grid. Most phones have lots of features and a power cord. Some have battery backup, but there is little incentive to replace the battery. Soon, the battery backup feature will be a thing of the past since most people aren't willing to pay for features like that. Engineers like to design bridges for the hundred years' flood, but it is hard to persuade customers to pay for features they probably won't use. Given these realities, it would great if there were a way to deploy a backup network just-in-time. Unlike batteries and generators, which are expensive whether we use them or not, a backup network based on phones won't cost the public much if any additional capital since we already bought most of that stuff for other reasons.

**[079]** Key features of a backup network:

1. Two-way communication: Telephone receivers normally receive but they can also be used to store and forward. Thus for example, if a phone was on a mobile platform (say in a pocket on in a car), then the phone could be used in sneakernet mode to store a signal in one place and repeat it from another place.

2. Damage Assessment (the ability to determine quickly and easily what's up and what's not): During 9/11, there were many outages (fiber cuts under #7 World Trade Center, cell towers on the rooftops, switches under both #1 and #2 World Trade Center, police and fire radio communication in certain places), but some things were working (e.g., cell towers in New Jersey, BlackBerry email, systems based on satellites). A key requirement is to determine what's working and what's not and to communicate workarounds to those that need them. An array of cell phones in a multitude of pockets and cars could determine fairly quickly what's working and what's not. Hopefully, some of these devices would be connected to something that is working such as a satellite or would eventually move out of the affected area so enough of them could report an accurate and timely damage assessment picture back to the cloud. Using this information, both digital and real world traffic may be adaptively rerouted.

3. Workarounds: Municipal vehicles such as buses have batteries and generators. Soon, such vehicles will also have WiFi that is connected to satellites. The cloud could direct such resources where they are needed most.

**[080]** An acoustical array, such as what is being proposed here, could also be used in damage assessment. We would be concerned about both too much noise (explosions) as well as too little (absence of human activity), aggregated over time and space.

4 Authorization and privacy

**[081]** In some versions of the system, privacy considerations are addressed using one or more features, which may include the following. First, monitoring may be enabled on a device only if the user explicitly "opts in" to permitting particular monitoring options. A reason that a user may accept such monitoring is that he in return obtains information that is valuable to him, for example, by being provided more relevant search results or other information. Another feature relates of encryption of the monitored information. For example, audio may be encrypted in a manner than prevents interception during uploading and/or processing by a central controller. Furthermore, in systems in which multiple central controllers are used (e.g., one controller per cellular telephone carrier), the user may explicitly permit sharing between controllers.

**[082]** In some examples, devices have features that inhibit collection of audio environment data. Such features may be mechanical, for example, mechanically preventing audio pickup with a shutter mechanism, or can be electronic, for example, with an electronic slider switch on the device.

**[083]** In some examples, sensors can be selectively turned on or off both at the edge of the network (in the smart phone), as well as in the network (in the cloud), as well as elsewhere. For example, the operator of a movie theatre may have the ability to turn off speakers that would annoy others in the movie theatre, and similarly the operator of an airplane should have the ability to turn off communication features that could jeopardize the safety of fellow passengers. Moreover, after an incident, such as a plane accident, the authorities should have the ability to probe (via a wired or wireless interface to the memory of the phone-could be non-volatile) the smart phones on the plane for information that could be helpful in the investigation. In other words, the array of smart phones on the plane could serve as a kind of "black box" to prevent similar such incidents in the future.

**[084]** However, privacy is also important in at least some versions of the system. In some versions, the owner of the smart phone should have the ability to pull the curtain with confidence that the phone is not invading the user's privacy, even if the phone has

been taken over by a virus. When the curtain is pulled, the user wants to be sure that the phone is not recording information that could be embarrassing or self-incriminating. The phone should not be recording information that could be subject to subpoena or a court order such as discovery. The user should have the ability to opt out in a way that cannot be overridden by the owner of the network, government authority, or anyone else (such as a malicious hacker).

**[085]** Feature interaction can be a tricky problem in a communication network. While it is desirable that many parties have the ability to turn on and off certain features in certain ways, as discussed above, it is also important that it be clear to all parties what happens when different parties issue commands that may conflict with one another in complicated and unanticipated ways.

**[086]** In particular, in at least some versions of the system, the owner of the phone ought to be in charge. In such versions, the owner should have the ability to physically disconnect the sensors in a way that cannot be overruled by any other party. One such method would be a physical switch that would disconnect the sensors in a way that the user can verify by visual inspection of the phone. The physical switch can be operated manually by the user and cannot be overridden remotely under software control.

**[087]** In addition to the physical switch, there should also be a software controlled switch that would empower authorized parties to turn on and off features such as recording of sensors, recognizing keywords and uploading appropriate information to the cloud where inferences can be made that aggregate over space and time. Society will need to come up with policies to determine who is allowed to do what, and what is appropriate and what is not.

5 Other devices

**[088]** As introduced above, the approaches described above are not limited to use smartphones. For example, in-vehicle systems (e.g., navigation devices), media devices (e.g., televisions, set-top boxes, desktop computers, laptop computers), and other fixed or mobile devices can be used in similar ways. For example, in the case of an in-vehicle navigation system, an in-vehicle conversation may be monitored and information about a location (e.g., a restaurant) that is being discussed may be provided on the device's display.

**[089]** Another type of device that may be used in such a system is an earpiece that provides audio input and output for a telephone (device). An advantage of monitoring with the earpiece is that it is exposed to the acoustic environment even when the associated phone is not exposed to the environment, for example, when the phone is in a user's pocket, thereby providing an improved signal-to-noise ratio (SNR). Another embodiment would have the entire mobile communication (cell phone) being integrated in to the earpiece.

**[090]** Another type of device that may be used in such a system is a hearing aid. The hearing aid would allow the entire feature set thus described in this document to be made practical. The advantage of this is data which could be mined from this age population is thought to be very different for the generation of users who typically use headphones for their communication activities.

**[091]** Use of earpieces as described above can be thought of as ownership or control of the "last inch," which is similar to the ownership of the "last mile," which has been strategically important in the telephone business. The same dynamic underlies the debate over net neutrality. So too, ownership over the last inch will become strategically important in the war over eyes and ears. The web is currently about eyeballs and mouse clicks, but soon the war will move to a struggle for access to ears as well as eyes. The hearing aid or earpiece could be viewed as a chief of staff. It gets to decide what the user hears and what the user doesn't hear. The hearing aid could give the wife preferred access. It could also block spam, and filter out unwanted commercials. Alternatively, the hearing aid or earpiece could run an auction similar to paid search, where the hearing aid is a market maker that attempts to find an equilibrium between the need of the user for relevance and utility to the advertiser.

**[092]** These auctions typically use a Vickrey auction to encourage advertisers to bid their true utility. If the user chooses to follow up on an ad (with a mouse click), then the advertiser pays the 2nd highest bid. The hearing aid or earpiece could work in a similar way though perhaps instead of clicking on an ad, it might be easier for the user to participate by some other means such as a spoken command.

**[093]** Implementations of the system may include software that includes instructions for controlling operation of one or more processors. For example, some of the software may include instructions for execution at the personal devices. This software may be stored on a computer readable medium at a central location, for example, at a server for distribution to the devices, may be transferred over a digital communication medium,

and/or stored in a machine readable medium at the devices (e.g., as downloaded applications/applets). Some of the software may be hosted at central servers (e.g., in a distributed "cloud" of processors) and made accessible by storing it on tangible computer-readable media for execution on processors of the servers.

**[094]** It is to be understood that the foregoing description is intended to illustrate and not to limit the scope of the invention, which is defined by the scope of the appended claims. Other embodiments are within the scope of the following claims.

What is claimed is:

1. A distributed system comprising:

a plurality of distributed devices,

each device having at least a communication capability for interchanging information with other of the devices and/or with a server system, and

each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment of the device;

a controller configured to perform functions including

determining locations of at least some of the devices,

selecting devices from amount the plurality of devices and receiving information based on the sensor data acquired at the selected devices, and

combining the information received from multiple of the selected devices to determine a characteristic of the environment of one or more of the devices.

2. The system of claim 1 wherein the controller is hosted at the server system.

3. The system of claim 1 wherein the devices comprise personal wireless devices.

4. The system of claim 3 wherein the personal wireless devices comprise mobile telephone devices.

5. The system of claim 1 wherein the sensors of at least some of the devices comprise audio and/or video sensors.

6. The system of claim 1 wherein the sensors of at least some of the devices comprise motion-related sensors for sensing motion related characteristics of the devices.

7. The system of claim 6 wherein the motion-related sensors comprise accelerometers.

8. The system of claim 1 wherein receiving information based on the sensor data acquired at the selected devices includes receiving information buffered at the devices prior to receiving a request from the controller for the information.

9. The system of claim 1 wherein each of at least some of the devices includes a local data analysis module for processing the acquired sensor data to determine information for providing to the controller.

10. The system of claim 9 wherein the data analysis module comprises an acoustic analysis module.

11. The system of claim 10 wherein the acoustic analysis module comprises a speech analysis module.

12. The system of claim 10 wherein the acoustic analysis module comprises an environmental sound analysis module.

13. The system of claim 1 wherein the controller is further configured to selected the devices according to the determined locations.

14. The system of claim 1 wherein the controller is further configured to selected the devices according to the received information from at least some other of the devices.

15. The system of claim 1 wherein the controller is further configured to pass configuration information to devices for processing of sensor data received at the devices.

16. The system of claim 15 wherein the configuration information includes data characterizing events to be detected in the sensor data.

17. The system of claim 1 wherein combining the information received from multiple of the selected devices comprises determining characteristics of an audio scene.

18. The system of claim 17 wherein the characteristics of the audio scene comprise words spoken in the audio scene.

19. The system of claim 17 wherein the characteristics of the audio scene comprise presence of non-speech events in the audio scene.

20. The system of claim 17 wherein when the system records voices that are not likely to be opted-in to the acquisition, a warning indicator is emitted or transmitted to all devices in the immediate vicinity of the audio-acquiring device to indicate audio information is being recorded.

21. The system of claim 1 wherein combining the information received from multiple of the selected devices comprises determining trend information across a population of users of the devices.

22. The system of claim 1 wherein combining the information received from multiple of the selected devices comprises determining aggregated motion-related characteristics related to multiple of the devices.

23. The system of claim 22 wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

24. A controller for interacting with a plurality of distributed devices, each device having at least a communication capability for interchanging information with other of the devices and/or with a server system, and each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment of the device, the controller being configured to perform functions comprising:

determining locations of at least some of the devices;

selecting devices from amount the plurality of devices for receiving information based on the sensor data acquired at the devices; and

combining the information received from multiple of the selected devices to determine a characteristic of the environment of one or more of the devices.

25. A device for interacting with a controller configured to select the device from among a plurality of devices, the device comprising:

a communication module for interchanging information with other of the devices and/or with a server system; and

one or more sensors for acquiring sensor data related to the environment of the device;

wherein the device is configured to be selected by the controller for providing information based on sensor data acquired at the device to the controller.

26. The device of claim 25 wherein the device comprises a buffer for holding information and/or sensor data prior to a request for said information and/or data from the controller.

27. The device of claim 25 wherein the device comprises a data analysis module for determining information from the sensor data for providing to the controller.

28. The device of claim 25 wherein the device is configurable to detect events in the sensor data, and to report occurrences of said events to the controller.

Attorney Docket No. 30084-002P02

# **INFORMATION PROCESSING** USING A POPULATION OF DATA ACQUISITION DEVICES


## Abstract

In one aspect, in general, the audio and multimedia acquisition capabilities of a set of devices are exploited to aggregate acquired content and fuse the information in that content, for instance, for audio scene analysis. In some examples, devices from a large population are adaptively selected and/or configured according to triggering events detected at the devices or by the network. The information sensed and gathered acquired from one or more devices is processed, customized and personalized to consumers to mitigate, amplify or pass-through acoustic and other information to users, based on factors such as models of users' requirements and users' past information consumption behavior.

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 9205480 |
| **Application Number:** | 61431507 |
| **International Application Number:** | |
| **Confirmation Number:** | 9920 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 69713 |
| **Filer:** | J. Robin Rohlicek/Kristin Skelton |
| **Filer Authorized By:** | J. Robin Rohlicek |
| **Attorney Docket Number:** | 30084-002P02 |
| **Receipt Date:** | 11-JAN-2011 |
| **Filing Date:** | |
| **Time Stamp:** | 11:52:10 |
| **Application Type:** | Provisional |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | $110 |
| RAM confirmation Number | 8735 |
| Deposit Account | 504189 |
| Authorized User | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 1 | Provisional Cover Sheet (SB16) | ProvCS.pdf | 101154<br>b3173b03281f7e20294b2d4327095716371de43f | no | 2 |
| **Warnings:** | | | | | |
| This is not a USPTO supplied Provisional Cover Sheet SB16 form. | | | | | |
| **Information:** | | | | | |
| 2 | Application Data Sheet | ADS.pdf | 162419<br>66c5ffb47a0813ccbd894946a4bcd62548143a52 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| This is not an USPTO supplied ADS fillable form | | | | | |
| 3 | | Appln.pdf | 1622806<br>492df3499f9c7c750d627dcdd1882c0d7417b749 | yes | 30 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Specification | 1 | 25 |
| | Claims | 26 | 29 |
| | Abstract | 30 | 30 |

| | | | | | |
|---|---|---|---|---|---|
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 4 | Drawings-only black and white line drawings | Figs.pdf | 24373<br>ad4eefdecd4d8011d2777d9cbbb263e8ba3ef8b1 | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 5 | Fee Worksheet (PTO-875) | fee-info.pdf | 29912<br>40c6d15209e7be31241a7bebd28d6d51a1e003b6 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | | **Total Files Size (in bytes):** | 1940664 | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

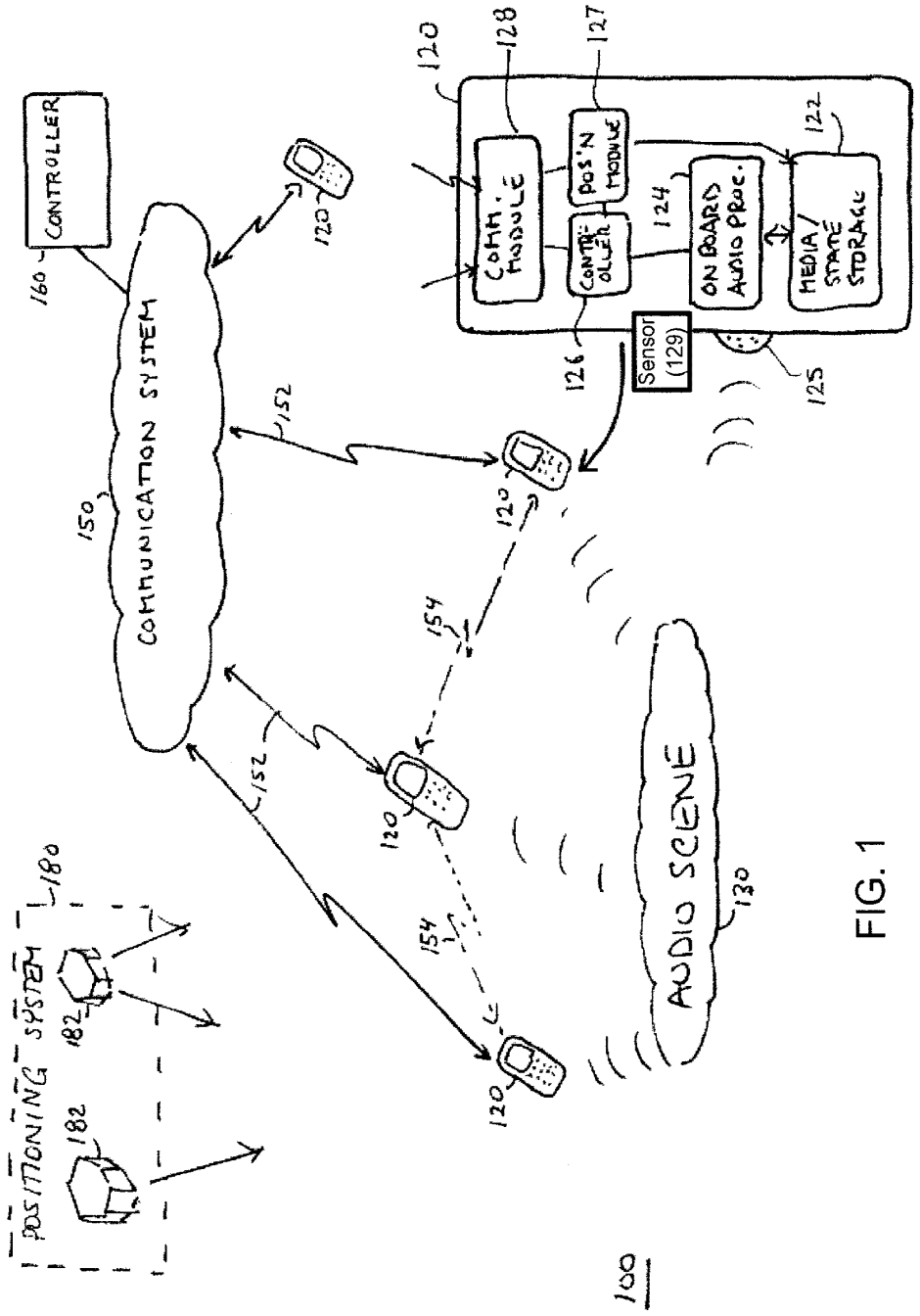

CONTROLLER
160
COMMUNICATION SYSTEM
150
120
128
127
COMM. MODULE
POS'N MODULE
CONTROLLER
124
ON BOARD AUDIO PROC.
122
MEDIA/ STATE STORAGE
Sensor (129)
126
125
152
154
AUDIO SCENE
130
POSITIONING SYSTEM
180
182
100

FIG. 1

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# DOCUMENT MADE AVAILABLE UNDER THE PATENT COOPERATION TREATY (PCT)

| | | |
|---|---|---|
| International application number: | | **PCT/US2011/068103** |
| International filing date: | | **30 December 2011 (30.12.2011)** |
| Document type: | | **Certified copy of priority document** |
| Document details: | Country/Office: | **US** |
| | Number: | **61/431,507** |
| | Filing date: | **11 January 2011 (11.01.2011)** |
| Date of receipt at the International Bureau: | | **23 January 2012 (23.01.2012)** |

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a),(b) or (b-*bis*)

34, chemin des Colombettes
1211 Geneva 20, Switzerland
www.wipo.int

# PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

PCT/US11/68103

International Application No.

(30.12.11) 30 DECEMBER 2011

International Filing Date

PCT INTERNATIONAL APPLICATION RO/US

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference *(if desired) (12 characters maximum)* AMBZ-101WO

**Box No. I TITLE OF INVENTION**

INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

**Box No. II APPLICANT** ☐ This person is also inventor

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

Ambientz
4800 North Federal Highway
Suite A 205
Boca Raton, Florida 33431
United States of America

Telephone No.
561.368.7800

Facsimile No.

Applicant's registration No. with the Office

**E-mail authorization**: Marking one of the check-boxes below authorizes the receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority to use the e-mail address indicated in this Box to send, notifications issued in respect of this international application to that e-mail address if those offices are willing to do so.

☐ as advance copies followed by paper notifications; or ☐ exclusively in electronic form (no paper notifications will be sent).

E-mail address:

State *(that is, country)* of nationality: US

State *(that is, country)* of residence: US

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

**Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)**

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

**Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

SPADT, Jonathan H.
RatnerPrestia
P. O. Box 980
Valley Forge, Pennsylvania 19482
United States of America

Telephone No.
610.407.0700

Facsimile No.
610.407.0701

Agent's registration No. with the Office
45,122

**E-mail authorization**: Marking one of the check-boxes below authorizes the receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority to use the e-mail address indicated in this Box to send, notifications issued in respect of this international application to that e-mail address if those offices are willing to do so.

☐ as advance copies followed by paper notifications; or ☐ exclusively in electronic form (no paper notifications will be sent).

E-mail address:

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

**Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)**

*If none of the following sub-boxes is used, this sheet should not be included in the request.*

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

GOLDSTEIN, Steven W.
6390 Maddalena Place
Delray Beach, Florida 33446
United States of America

This person is:
- ☐ applicant only
- ☒ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality: US

State *(that is, country)* of residence: US

This person is applicant for the purposes of:
- ☐ all designated States
- ☐ all designated States except the United States of America
- ☒ the United States of America only
- ☐ the States indicated in the Supplemental Box

---

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- ☐ applicant only
- ☐ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- ☐ all designated States
- ☐ all designated States except the United States of America
- ☐ the United States of America only
- ☐ the States indicated in the Supplemental Box

---

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- ☐ applicant only
- ☐ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- ☐ all designated States
- ☐ all designated States except the United States of America
- ☐ the United States of America only
- ☐ the States indicated in the Supplemental Box

---

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- ☐ applicant only
- ☐ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- ☐ all designated States
- ☐ all designated States except the United States of America
- ☐ the United States of America only
- ☐ the States indicated in the Supplemental Box

---

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

**Supplemental Box** *If the Supplemental Box is not used, this sheet should not be included in the request.*

1. *If, in any of the Boxes, except Boxes Nos. VIII(i) to (v) for which a special continuation box is provided,* ***the space is insufficient*** *to furnish all the information: in such case, write "Continuation of Box No...." (indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:*

(i) ***if more than one person is to be indicated as applicant and/or inventor*** *and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;*

(ii) *if, in Box No. II or in any of the sub-boxes of Box No. III, the indication* ***"the States indicated in the Supplemental Box"*** *is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;*

(iii) *if, in Box No. II or in any of the sub-boxes of Box No. III,* ***the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America****: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;*

(iv) *if, in addition to the agent(s) indicated in Box No. IV, there are* ***further agents****: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;*

(v) *if, in Box No. VI, there are* ***more than three earlier applications whose priority is claimed****: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI.*

2. *If the applicant intends to make an indication of the wish that the international application be treated, in certain designated States, as an application for a patent of addition, certificate of addition, inventor's certificate of addition or utility certificate of addition: in such case, write the name or two-letter code of each designated State concerned and the indication "****patent of addition,****" "****certificate of addition,****" "****inventor's certificate of addition****" or "****utility certificate of addition,****" the number of the parent application or parent patent or other parent grant and the date of grant of the parent patent or other parent grant or the date of filing of the parent application (Rules 4.11(a)(i) and 49bis.1(a) or (b)).*

3. *If the applicant intends to make an indication of the wish that the international application be treated, in the United States of America, as a continuation or continuation-in-part of an earlier application: in such case, write "United States of America" or "US" and the indication "****continuation****" or "****continuation-in-part****" and the number and the filing date of the parent application (Rules 4.11(a)(ii) and 49bis.1(d)).*

4. *If the applicant wishes to request the receiving Office or the International Bureau to obtain a priority document from a digital library but* ***that document is only held in a digital library in connection with another application*** *which also relied upon that priority document to support a priority claim (and unless that digital library is to be accessed through the Digital Access Service for Priority Documents), in such cases write "Continuation of Box No. VI", indicate for each earlier application concerned the same type of information as required in Box No. VI and indicate the number under which the application is stored (and, if known, the digital library concerned) (Section 716(a)(ii)).*

Continuation of Box No. IV

NIGON, Kenneth N.
RatnerPrestia
P.O. Box 980
Valley Forge, Pennsylvania 19482
United States of America
Telephone No. 610.407.0700
Facsimile No. 610.407.0701
Reg. No. 31,549

**Box No. V DESIGNATIONS**

The filing of this request **constitutes under Rule 4.9(a) the designation** of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.

However,

☐ DE Germany **is not designated** for any kind of national protection

☐ JP Japan **is not designated** for any kind of national protection

☐ KR Republic of Korea **is not designated** for any kind of national protection

*(The check-boxes above may only be used to exclude (irrevocably) the designations concerned if, at the time of filing or subsequently under Rule 26bis.1, the international application contains in Box No. VI a priority claim to an earlier national application filed in the particular State concerned, in order to avoid the ceasing of the effect, under the national law, of this earlier national application.)*

**Box No. VI PRIORITY CLAIM**

The priority of the following earlier application(s) is hereby claimed:

| Filing date of earlier application *(day/month/year)* | Number of earlier application | Where earlier application is: | | |
|---|---|---|---|---|
| | | national application: country or Member of WTO | regional application: regional Office | international application: receiving Office |
| item (1) 30 DEC 2010 (30.12.2010) | 61/428,369 | US | | |
| item (2) 11 JAN 2011 (11.01.2011) | 61/431,507 | US | | |
| item (3) | | | | |

☐ Further priority claims are indicated in the Supplemental Box.

☐ The **International Bureau** is requested to obtain from a digital library, a certified copy of the earlier application(s) *(if the earlier application(s) is available to it from a digital library)* identified above as:*

☐ all items ☐ item (1) ☐ item (2) ☐ item (3) ☐ other, see Supplemental Box

☒ The **receiving Office** is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(if the earlier application(s) was filed with the Office which for the purposes of this international application is the receiving Office)* or to obtain a certified copy of the earlier application(s) from a digital library and transmit a copy of it to the International Bureau *(if the earlier application(s) is available to the receiving Office from a digital library)*, identified above as:*

☒ all items ☐ item (1) ☐ item (2) ☐ item (3) ☐ other, see Supplemental Box

* Where the certified copy of the earlier application(s) is not stored in a digital library under the number of the earlier application indicated above but under the application number of another application which also claims priority from it, indicate that number in the supplemental sheet (item 4).

**Restore the right of priority:** the receiving Office is requested to restore the right of priority for the earlier application(s) identified above or in the Supplemental Box as item(s) (_____). *(See also the Notes to Box No. VI; further information **must** be provided to support a request to restore the right of priority.)*

**Incorporation by reference:** where an element of the international application referred to in Article 11(1)(iii)(d) or (e) or a part of the description, claims or drawings referred to in Rule 20.5(a) is not otherwise contained in this international application but is completely contained in an earlier application whose priority is claimed on the date on which one or more elements referred to in Article 11(1)(iii) were first received by the receiving Office, that element or part is, subject to confirmation under Rule 20.6, incorporated by reference in this international application for the purposes of Rule 20.6.

**Box No. VII INTERNATIONAL SEARCHING AUTHORITY**

**Choice of International Searching Authority (ISA)** *(if more than one International Searching Authority is competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used)*:

ISA/ US

**Continuation of Box No. VII USE OF RESULTS OF EARLIER SEARCH, REFERENCE TO THAT SEARCH**

☐ The ISA indicated in Box No. VII is requested to take into account the results of the earlier search(es) indicated below (*see also Notes to Box VII; use of results of more than one earlier search*).

| Filing date *(day/month/year)* | Application Number | Country *(or regional Office)* |
|---|---|---|

☐ **Statement (Rule 4.12(ii))**: this international application is the same, or substantially the same, as the application in respect of which the earlier search was carried out except, where applicable, that it is filed in a different language.

☐ **Availability of documents**: the following documents are available to the ISA in a form and manner acceptable to it and therefore do not need to be submitted by the applicant to the ISA (Rule 12*bis*.1(f)):

- ☐ a copy of the results of the earlier search,*
- ☐ a copy of the earlier application,
- ☐ a translation of the earlier application into a language which is accepted by the ISA,
- ☐ a translation of the results of the earlier search into a language which is accepted by the ISA,
- ☐ a copy of any document cited in the results of the earlier search. *(If known, please indicate below the document(s) available to the ISA):*

☐ **Transmit copy of results of earlier search and other documents** *(where the earlier search **was not** carried out by the ISA indicated above but by the same Office as that which is acting as the receiving Office)*: the **receiving Office** is requested to prepare and transmit to the ISA (Rule 12*bis*.1(c)):

- ☐ a copy of the results of the earlier search,*
- ☐ a copy of the earlier application,
- ☐ a copy of any document cited in the results of the earlier search.

* Where the results of the earlier search are neither available from a digital library nor transmitted by the receiving Office, the applicant is required to submit them to the receiving Office (Rule 12*bis*.1(a)) (*See item 11. in the check-list and also Notes to Box No. VII*).

| Filing date *(day/month/year)* | Application Number | Country *(or regional Office)* |
|---|---|---|

☐ **Statement (Rule 4.12(ii))**: this international application is the same, or substantially the same, as the application in respect of which the earlier search was carried out except, where applicable, that it is filed in a different language.

☐ **Availability of documents**: the following documents are available to the ISA in a form and manner acceptable to it and therefore do not need to be submitted by the applicant to the ISA (Rule 12*bis*.1(f)):

- ☐ a copy of the results of the earlier search,*
- ☐ a copy of the earlier application,
- ☐ a translation of the earlier application into a language which is accepted by the ISA,
- ☐ a translation of the results of the earlier search into a language which is accepted by the ISA,
- ☐ a copy of any document cited in the results of the earlier search. *(If known, please indicate below the document(s) available to the ISA):*

☐ **Transmit copy of results of earlier search and other documents** *(where the earlier search **was not** carried out by the ISA indicated above but by the same Office as that which is acting as the receiving Office)*: the **receiving Office** is requested to prepare and transmit to the ISA (Rule 12*bis*.1(c)):

- ☐ a copy of the results of the earlier search,*
- ☐ a copy of the earlier application,
- ☐ a copy of any document cited in the results of the earlier search.

* Where the results of the earlier search are neither available from a digital library nor transmitted by the receiving Office, the applicant is required to submit them to the receiving Office (Rule 12*bis*.1(a)) (*See item 11. in the check-list and also Notes to Box No. VII*).

☐ Further earlier searches are indicated on a continuation sheet.

**Box No. VIII DECLARATIONS**

The following **declarations** are contained in Boxes Nos. VIII (i) to (v) *(mark the applicable check-boxes below and indicate in the right column the number of each type of declaration)*:

| | | | Number of declarations |
|---|---|---|---|
| ☐ | Box No. VIII (i) | Declaration as to the identity of the inventor | : |
| ☐ | Box No. VIII (ii) | Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent | : |
| ☐ | Box No. VIII (iii) | Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application | : |
| ☐ | Box No. VIII (iv) | Declaration of inventorship (only for the purposes of the designation of the United States of America) | : |
| ☐ | Box No. VIII (v) | Declaration as to non-prejudicial disclosures or exceptions to lack of novelty | : |

Sheet No. 6

**Box No. IX CHECK LIST for EFS-Web filings** - this sheet is only to be used when filing an international application with RO/US via **EFS-Web**

| This international application **contains** the following: | Number of sheets |
|---|---|
| (a) request form PCT/RO/101 (including any declarations and supplemental sheets) | 6 |
| (b) description (excluding any sequence listing part of the description, see (f), below) | 28 |
| (c) claims | 4 |
| (d) abstract | 1 |
| (e) drawings (if any) | 4 |
| (f) sequence listing part of the description in the form of an **image file** (e.g. PDF) | |
| **Total number of sheets** (including the sequence listing part of the description if **filed as an image file**) | 43 |

(g) sequence listing part of the description

- ☐ filed in the form of an **Annex C/ST.25 text file**
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| This international application is **accompanied by** the following item(s) *(mark the applicable check-boxes below and indicate in right column the number of each item)*: | Number of items |
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| 1. ☐ fee calculation sheet | |
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| 12. ☒ other *(specify)*: Transmittal Form PTO-1382 | 1 |

| **Figure of the drawings** which should accompany the abstract: | 1 | **Language of filing** of the international application: | English |
|---|---|---|---|

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*Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).*

RatnerPrestia

Kenneth N. Nigon — 12/30/11 Date

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| | |
|---|---|
| 1. Date of actual receipt of the purported international application: 30 DECEMBER 2011 | 2. Drawings: ☐ received: |
| 3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application: | ☐ not received: |
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**APPLICATION NUMBER:** *61/428,369*
**FILING DATE:** *December 30, 2010*
**RELATED PCT APPLICATION NUMBER:** *PCT/US11/68103*

**THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS** *US61/428,369*

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# PROVISIONAL APPLICATION FOR PATENT COVER SHEET – Page 1 of 2

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

**Express Mail Label No.** _____

| INVENTOR(S) | | |
|---|---|---|
| Given Name (first and middle [if any]) | Family Name or Surname | Residence (City and either State or Foreign Country) |
| Steven W. | Goldstein | Delray Beach, Florida |
| | | |
| | | |
| | | |
| | | |

*Additional inventors are being named on the* _____ *separately numbered sheets attached hereto*

**TITLE OF THE INVENTION (500 characters max):**

INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

*Direct all correspondence to:* **CORRESPONDENCE ADDRESS**

☒ The address corresponding to Customer Number: 69713

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**ENCLOSED APPLICATION PARTS *(check all that apply)***

☒ Application Data Sheet. See 37 CFR 1.76 ☐ CD(s), Number of CDs _____

☒ Drawing(s) *Number of* Sheets 1 ☐ Other (specify) _____

☒ Specification (e.g. description of the invention) *Number of* Pages 21

**Fees Due:** Filing Fee of $220 ($110 for small entity). If the specification and drawings exceed 100 sheets of paper, an application size fee is also due, which is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

**METHOD OF PAYMENT OF THE FILING FEE AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT**

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SIGNATURE J. Robin Rohlicek Date December 30, 2010

TYPED or PRINTED NAME J. Robin Rohlicek REGISTRATION NO. 43,349 (if appropriate)

TELEPHONE (617) 500-2502 Docket Number: 30084-002P01

# INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

## Background

**[001]** This invention relates to processing of information from a population of data acquisition devices, and in some examples, relates to processing of audio or multimedia data acquired from an adaptively selectable population of personal wireless devices.

**[002]** Devices that are capable of acquiring, and in some cases locally processing, audio or multimedia information from their local environment have become ubiquitous over the past several years, and there is little reason to expect that such a trend will not continue. For example, "smart" cellular telephones (e.g., Apple iPhone, Android operating system based phones) have significant local processing capabilities as well as audio and video acquisition devices.

## Summary

**[003]** In one aspect, in general, the audio and multimedia acquisition capabilities of a set of devices are exploited to aggregate acquired content and fuse the information in that content, for instance, for audio scene analysis. In some examples, devices from a large population are adaptively selected and/or configured according to triggering events detected at the devices or by the network.

**[004]** In another aspect, in general, a distributed system includes a plurality of distributed devices and a controller. Each device has at least a communication capability for interchanging information with other of the devices and/or with a server system. Each of at least some of the devices has one or more sensors for acquiring sensor data related to the environment of the device. The controller is configured to perform functions including: determining locations of at least some of the devices, selecting devices from amount the plurality of devices and receiving information based on the sensor data acquired at the selected devices, and combining the information received from multiple of the selected devices to determine a characteristic of the environment of one or more of the devices.

**[005]** Other features and advantages of the invention are apparent from the following description, and from the claims.

## Description of Drawings

**[006]** FIG. 1 is a diagram of an audio aggregation system.

## Description

### 1 System overview

**[007]** Personal wireless devices, as well as other types of computing or communication devices, have become ubiquitous in our environment. Generally, such devices have a number of sensors, which may include, for instance, microphones, cameras, accelerometers, and in some cases may even have sensors for biometric information, such as heart rate. Such devices also generally include one or more communication systems, for example, a cellular telephone radio system (e.g., CDMA or GSM), a wireless local area network system (e.g., "WiFi", IEEE 802.11), wired computer network connections (e.g., data network connections via USB cradles, possibly via desktop computer applications) and in some cases other systems based on radio frequency (e.g., Bluetooth) or optical (e.g., infra-red) transmission. Finally, such devices generally are "location aware" and/or locatable by the infrastructure in which they operate. For example, such devices may have GPS receivers, enhanced GPS, which operates in conjunction with cellular telephone infrastructure, and/or WiFi based maps, which uses a map of WiFi access points to locate the device, and the cellular infrastructure may be able to locate the device based on cellular signal strength and/or triangulation approaches.

**[008]** In some aspects, the combination of characteristics of these devices provides a potentially rich source of information that may be combined in a way that generates valuable information that is not necessarily available to any individual device. As an illustrative example, audio processed locally at many different devices may be combined to identify geographic or social group trends based on keywords spoken or other acoustic events (e.g., coughs) that are detected at the devices.

**[009]** Detection of coughs is an example where detection on non-speech acoustic events may be useful. Because a cough is often a sudden and often repetitively occurring reflex, frequent coughing may indicate the presence of a disease (e.g., many viruses and bacteria benefit evolutionarily by causing the host to cough, which helps to spread the disease to new hosts. Most of the time, coughing is caused by a respiratory tract infection but can be triggered by choking, smoking, air pollution, asthma, gastroesophageal reflux disease, post-nasal drip, chronic bronchitis, lung tumors, heart failure and medications

such as ACE inhibitors) detection of such events in the vicinity of the devices may provide significant information.

**[010]** In other aspects, the rich sensor capabilities of the devices provide a way to track activity of a user (e.g., owner) of the device to enhance the user's experience with various computing applications, such as search or personalization. As an illustrative example, topics of conversation in the vicinity of the device may affect the ranking of search results or the ordering of presentation of news stories on the device.

**[011]** In some aspects, the rich source of information over many devices and the tracking of individual activity are combined to benefit from their synergy.

**[012]** Referring to FIG. 1, in one exemplary embodiment, a number of devices 120 are present in an environment. In some examples, the devices 120 are cellular telephones ("smartphones"). The environment may be an urban environment, for example, with the devices being present on city streets, in office buildings, or in homes of the users. Generally, the devices are personal to the users/owners of the devices, and are mobile carried with the user throughout the day. In FIG. 1, a small number of representative devices are illustrated. As discussed further below, the potentially enabled devices are part of a large population of devices (e.g., a large fraction of the telephones in a metropolitan area) and the system adaptively enables particular subsets of the devices and/or selectively configures enabled phones. For instance, the devices are enabled and/or configured according to triggering events detected at one or more devices.

**[013]** It should be understood that the description below focuses on smartphones as an example, and other types of fixed or mobile devices may be used in conjunction with or instead of smartphones. Also, the description below focuses on aggregation or combination of audio information as an example, but aggregation and processing of other forms of information, including video and biometric information may be performed in conjunction with or instead of the audio data examples described below.

**[014]** As introduced above, any particular device 120 is able to sense some aspect of an overall audio "scene" in its environment. Such a scene may include the device's owner's own speech even when not carrying out a telephone call, other sounds made by the owner, such as coughing, and speech of others and environmental sounds in proximity to the user, such as sirens, gunshots, etc.

**[015]** Generally, an information processing system 100 makes use of the audio acquisition capabilities of one or more of the devices 120 in order to extract information

related to the views of the audio scene by the one or more devices. In one approach to acquisition of the raw content, every device 120 could continually transmit its acquired signals over a communication system 150 to a central controller 160. For example, the communication system may comprise a cellular telephone system and/or a wireless data network. However, such continual transmission may not be feasible due to the sheer volume given the large number of devices that are fielded, and may raise other issues regarding privacy of those in the environments of the devices.

**[016]** Another approach to extracting information is for each device to perform a local signal analysis based on the signals acquired by that device. However, such an approach may have limitations due to the computational limitations of the devices. Also, a purely local processing may loose advantages that could be gained by fusing of information from multiple devices.

**[017]** An approach describe below addresses some of the limitations of a purely local or a purely centralized approach using a combination of one or more of the following features:

**[018]** 1) Local processing of acquired signals, at least to identify occurrences of events that may be of interest;

**[019]** 2) Local buffering of audio for selective transmission to a central server or to other devices, for example, on an ongoing basis or based on request from the server or other device, or based on local identification of a local event; and

**[020]** 3) Selective enabling of acquisition and/or processing (or specification of the type of processing) at particular devices, for example, based on their geographic location and/or other proximity metrics (e.g., a social network rather than a geographic distance metric).

**[021]** Note that the locations of the devices (e.g., three-dimensional coordinates) are generally known by the devices 120 and/or a central server 160. As an example, a positioning system 180 makes use of fixed units, such as GPS satellites 182, fixed cellular transmission towers, WiFi access points, etc. to maintain an estimate of the positions of the devices.

**[022]** Continuing to refer to FIG. 1, a typical device 120 includes a communication module 128, which provide a communication link through the communication system 150 to the controller and/or to other devices 120, and may also serve a role in acquiring

positioning signals (e.g., GPS signals, WiFi signal strengths, etc.), and may also provide a way to communicate directly with other devices 120. A local controller 126 coordinates the signal acquisition and processing process, and a positioning module 127 maintains a position estimate for the device. An on-board audio processor 124 processes audio acquired via a microphone 125. Processed or raw audio information, optionally combined with location information, may be stored in a media/state storage 122 in the device.

**[023]** Generally, the system 100 makes use of one or more of enabling and configuring of devices for prospective monitoring, access to logged data for retrospective analysis, and real-time notification of events. This adaptation of the system can be based on detection of triggering events at the devices. For example, the central controller may enable detection of certain acoustic events (e.g., words, spoken topics, music, and environmental sounds) and may adapt the configurations on devices based on reports from other devices.

## 2 Example use cases

**[024]** In this section, a number of example use cases are provided to illustrate how examples of a system such as that shown in FIG. 1 may be used in practice.

### 2.1 Environmental monitoring

**[025]** A number of uses relate to monitoring an environment of a set of smart phones. In a public health monitoring example, the on-board audio processor may be configured detect occurrences of coughs, typically by the owner of the device or by other people in the proximity of the device. Such detection may use, for example, statistical spotting techniques (e.g., Hidden Markov Model, HMM, GMM, techniques) trained on a corpus of recordings of coughs know as a Universal Background Model . Communication of locally aggregated results, for example, a number of coughs per hour, may be uploaded to the central controller 160 on a schedule, or when the rate deviates from an expected or maximum value. In this way, the controller may be able to identify local "hot spots" of coughing.

**[026]** In some scenarios of such monitoring, only a limited subset of devices may be initially configured to perform the local processing needed to detect the coughs. However, when the central controller determines that there is a possible hot spot of activity, the central controller may enable further devices in the geographic proximity of

the hot spot to gain further information about the extent of the situation. In some example, the central controller may enable further devices based on a social proximity, for example, to account for the possible transmission of an illness to others that are close in a social sense. In addition to enabling further devices, the central controller may disable devices and control the overall monitoring set for the task.

**[027]** In another monitoring use case, the devices are used to monitor environmental sound levels (e.g., sound pressure level), for example, for workers in a factory workplace. Devices of workers monitor the noise level and maintain a record, for example, cumulative durations of various ranges of noise level. This locally-determined information may be provided on regular or locally triggered basis, for example, if the noise level exceeds certain prescribed limits (e.g., an absolute limit, a limit for accumulated time above a prescribed sound pressure level, etc.). The central controller may query further devices to determine the location of high noise levels, for example, based on locally logged detailed information that correlate noise level and location within the workplace. Also, other characteristics of environmental sound, for instance, related to the source of the sound may be detected. For example, a machine type (e.g., whistle, engine, press, saw, drill etc.) may be discriminated, for instance using pattern matching techniques (e.g., Hidden Markov Model, HMM, GMM, techniques.)

**[028]** A similar sound-level monitoring may be used to track environmental sounds levels, for example, in particular restaurants, on particular streets, etc. and such monitoring may also identify time-of-day variation of such levels. Environmentalists may be interested in the ability to monitor the presence or absence of bird songs over time and space. Others might be interested in using sound arrays to monitor insect infestations. This invention would make it possible to compare treatment areas with controls to measure the effectiveness of proposed countermeasures. In some examples, if the device is not connected to the communication system, information is logged, time stamped and stored in a non-volatile memory and then uploaded when the device is once again connected or its memory is interrogated. This may be typical after a automobile, place or other fatal or non-fatal incidents

**[029]** If a large number of cars on the same highway suddenly decelerate at the same time, then the network could decide to issue a warning to cars a few miles behind the obstacle. In addition, the ability to measure traffic flow using an array of smart phones (equipped with communication networks and sensors such as accelerometers and microphones and GPS/location sensors) has the potential to improve traffic routing in the

short term, and traffic planning in the long term. Many of the applications envisioned in this invention have both short-term and long-term benefits. Short-term benefits require networks with low latency (such as the radio stack), whereas long-term applications can make use of networks with longer latency such as uploading information at the end of the day when the device is docked in a networked cradle.

**[030]** In another monitoring use, detection of particular music being played in the environment of devices may be aggregated to determine marketing related information. For example, phones may be enabled to "name that tune" in the environment, and both provide the owner to download that song to their device library and upload the location of the playing to the central controller, which monitors the aggregated presence of different songs.

2.2 Localization and Tracking

**[031]** Some use cases take advantage of the multiple locations of the devices to perform localization and/or tracking of audio sources. In one example, aircraft noise data may be obtained by having a "jet detector" implemented in the on-board audio processor of a set of devices. Upon detection of a loud jet noise, which is reported to the central controller, other devices in the proximity of the reporting device(s) are enabled. Buffered time stamped audio and device location data is uploaded to the controller, where a triangulation approach is used to determine a track of the detected audio source. Based on the track, further devices may be enabled along the project track so that the audio source may continue to be tracked. If the source is lost (i.e., doesn't follow a predicted tract), more devices over a larger area may be enabled to re-acquire the location of the audio source. In this way, an overall assessment of the audio tracks of loud aircraft may be determined based on the aggregated acquired audio data.

**[032]** The selected set of devices effectively acts as a configurable microphone mesh for acquiring audio data. In other example, the devices can act as a configurable accelerometer mesh for for acquiring spatially and/or temporally distributed motion-related data.

**[033]** Similar tracking information may be used, for example, to track sirens in a city. Such tracking may be used, for example, to predict traffic flow in a city that may be affected by an emergency.

**[034]** Another type of localization may be used in near real-time or in an after-the-fact forensic mode. For example, the devices may be carried by police officers or bystanders near the scene of a shooting. After detection of a gunshot event by one or more of the devices (e.g., the officers' devices), the central controller may upload locally buffered audio from the officers' devices or other devices in the environment, and perform a localization of the source of the shooter's location. In a near real-time example, this information may be provided to the police officers to aid in their police duties. A similar type of arrangement may be used in a military situation in which audio is buffered at devices carried by multiple soldiers, and the combined information in used to estimate the direction of a sniper location.

**[035]** Note that a central server is not necessarily required. For example, devices may locally exchange information to perform aggregated analysis, such as localization. In one such example, each device may include a detector for an event of interest (e.g., gunshot), and upon detection of the event may pass the raw audio or a partially processed version of the audio (e.g., an intensity time profile) to nearby devices (e.g., using ad hoc wireless communication), which perform local assessments of shooter direction based on the information they obtain.

**[036]** In another localization use case, a number of devices are enabled to sense audio, for example, for a group conference call. The locally acquired audio is used to identify the location of the speaker, and to control which device (or devices) are used to generate the audio for the call. For example, a device closest to the person speaking, or the device providing the highest signal quality or intelligibility, may be selected, thereby providing an improved audio quality.

**[037]** In another localization use case, devices are tracked during a shopping trip, for example, in a grocery store or at a mall. The track taken by the user is used to provide user-specific information, for example, promotional information related to purchase opportunities in the vicinity of the device. After-the-fact analysis of a track may be used to correlate movement with actual purchases made, or to possible interest in various classes of items. For example, a relatively high time spent in the vicinity of a product type may indicate an interest in that product type. Users may be interested in opting in to having their path tracked in exchange for receiving promotions.

2.3 Topic monitoring

**[038]** In another use example, a device is enabled to monitor the owner's environment as they converse during the day, and as they listen to media broadcasts. Topic detection techniques, for instance, based on spotting topic-related keywords, is used to assess topics of interest to the user. During the day, or in a periodic summary, the user is presented with collateral information related to the topics. For instance, if the user enters into a conversation about a particular topic, recent news or background material may be offered on the device. Such topic monitoring may also be useful to provide other targeted material to the user, for example, in the form of advertising that is relevant to the user's interests.

**[039]** The configuration of other devices may be adapted based on what is detected at the user's device. For example, other devices in geographic or social proximity to the user's device may be configured to detect the presence of similar topics. In this way, the other devices may have a higher likelihood of correctly detecting the topics. Furthermore, the central controller may be able to track the extent of interest in a topic.

**[040]** Another topic-related monitoring use may related to a third party requesting detection of audio signals, such as audio components of advertising to determine where is have been played. For example, and advertiser may have the central controller configure devices to detect an ad, and then determine where the ad have been played and potentially heard.

2.4 Triggering events

**[041]** Generally, use cases described above use various triggering events to begin local logging of audio and/or to initiate communication with the central controller and/or other nearby devices. In addition to audio-based events (e.g., specific words, spoken topics, music, sounds, etc.), other events may trigger monitoring and/or communication. For instance, content of text communication (e.g., SMS messages) may initiate monitoring and/or configure what is to be searched for. Other data, such as accelerometer data, biometric data, and detection of video image such as change in lummence, etc. that is available to the device may also be used in a trigger. For example, high acceleration may be associated with a vehicle accident or a fall, and this may initiate audio monitoring or communication with the central controller, which may be able to determine if an accident has occurred based on the audio scene, in which case emergency help may be summoned.

**[042]** In another form of triggering event, when a device is removed for the direct acoustic environment, for example, by being put in a user's pocket, the change in audio signal characteristics may trigger a message to the central controller to indicate that the device is no longer available for acquiring audio based on a poor SNR operating environment. Similarly, when the phone is taken out of the pocket, it may again start monitoring the environment and/of notify the central controller that is once again available. In addition, when the device is no longer obtainiong adequate SNR, the device would enable other devices within its proximity to acquire the signal and thus improve the overall SNR. In addition, many devices now are manufactured with multiple microphones primarily used for beam forming as to obtain an improved SNR for the user. As the user may often carry the device in their pocket or purse, we would be able to select which microphone in the device we would need enabled or what beam forming array would be best to evoked as obtain the maximum SNR.

**[043]** In some examples, vehicle texting is disabled by the system. By picking up the type of sounds picked up while driving, the device can detect road noise, the engine noise, wheel bearing noise, breaking noise all of which may be used to either disable or enable the user from utilizing their device for texting while the car is in movement. The device would query its proximity and determine of other devices were present within the body of the automobile. Assuming the answer were yes, further analysis would need to be made to limit on the driver's device from texting while still allowing the balance of the individuals to text.

**[044]** In some examples, key word spotting obtained from cell from in-situ conversations is aggregated from both the sender and recipient. During the course of normal telephone conversations, the device may identify specific sounds, words, etc being uttered by both parties of a conversation. The system would interrogate these sounds and provide the user with information either thru a GUI, or audio based or text based feedback. As an example, assuming the call was about a trip to Paris, the device could render information about promotional pricing on an airline to Paris.

2.5 Other aspects and uses

**[045]** The ability to aggregate information over many smart phones can be provided with or without the cooperation of the carriers. It could be done, for example, with a third party app, which doesn't need the approval of a particular carrier. In this way, information can be aggregated across phones serviced by multiple competing carriers.

**[046]** In some version of the system, the system triggers off key events such as rapid deceleration of lots of cars at the same time and place, sirens, keywords, etc. The ability to collect vast quantities of data will improve the triggering capability. Search companies are providing better search relevancy than ever before, largely because they are collecting more data than was previously possible before the popularity of modern search engines. But with the proposed invention, it will become possible to collect even more data. If every phone was collecting audio data for an hour a day, the aggregate data resource would be much larger and much more valuable than the data collections currently collected by even the largest search companies.

**[047]** In some versions of the system, if a device in the system hears certain important keywords and phrases like "fire," then the system should respond appropriately. The importance and urgency of a term depends both on the consequences of inaction as well as term weighting concepts that are well known in the field of Information Retrieval.

**[048]** Similarly, if a system hears an important term (such as a keyword like "fire" or a non-word like a cough or an event picked up on some other sensor such as a rapid deceleration), then the system may turn on numerous of other nearby sensors in the array to confirm the event and to improve the signal to noise ratio and to localize the event in time and space.

**[049]** In some uses, trending analysis make use of the large amount of data available through the system. Consider the cough example mentioned above. Aggregations of coughs over time and space will provide excellent tracking of health over time and space. The approach is similar some approaches to prediction of the flu based on queries where they showed that they could predict flu a couple of weeks faster than the CDD. But the proposed cough metric should have even better resolution over time and space since it is based on much more sensed data.

**[050]** Collection of large amounts of sensed data provides a way to systematically predict (e.g., according to a statistical model) sequences or sets of sensed events of other information. Such prediction may effectively be exploited based on principles related to Shannon's Noisy Channel Model, for example, to improve transmission capacity for such events. For example, such data can allow one to create a better "language model" for events, which will do a better job of predicting what sounds we should expect to hear (the prior for the noisy channel model) as well as sounds that are anonymous (triggers that should sound alarms and start recording).

**[051]** In some example, workplace monitoring (and monitoring of the environment) is enabled by the system. The system effectively provides "smartdust" on smart phones, which is able to monitor workplaces for health issues by measuring acoustical events like coughs. Moreover, in some uses, the system correlates of stress such as noise. Some call centers, for example, have more stress related illnesses because the call volume has relatively large numbers of unhappy customers. It may be possible to predict risk of certain types of illnesses well before symptoms develop, both at work as well as elsewhere.

**[052]** Some versions of the system make predictions based on small sample of "opt ins." The system ("cloud") is equipped with appropriate logic to determine how to make appropriate inferences based on information gathered from those phones that choose to opt into the system. Many of these inferences are relatively straightforward, though care may need to be taken to account for the fact that the sample is not a random sample. The set of people that own a smart phone and choose to participate will be skewed toward certain demographics, at least in the near term.

3 Backup communication uses

**[053]** In some versions of the system, the mesh-like features of the set of personal devices is exploited. Cell phones may be viewed as relative passive (receive only) devices, but there are times, such as during an emergency, where it could be desirable to be able to deploy an active communication network very quickly as an overlay to more traditional telephone and internet networks. During an emergency such as a man-made event like 9/11 or a natural disaster such as a major hurricane, it is possible that parts of key communication infrastructures could be down. There was a time when telecommunication networks were much more protected than they are these days. The telephone network used to be more reliable than the power grid. Central offices were backed up with batteries and generators (and submarine doors in places like New Orleans that are subject to flooding). POTS (plain old telephone service) handsets used to be powered from the central office, so the service could stay up even if the standard power grid was down. These days, most handsets sold in popular stores depend on the power grid. Most phones have lots of features and a power cord. Some have battery backup, but there is little incentive to replace the battery. Soon, the battery backup feature will be a thing of the past since most people aren't willing to pay for features like that. Engineers like to design bridges for the hundred years' flood, but it is hard to persuade customers to pay for features they probably won't use. Given these realities, it would

great if there were a way to deploy a backup network just-in-time. Unlike batteries and generators, which are expensive whether we use them or not, a backup network based on phones won't cost the public much if any additional capital since we already bought most of that stuff for other reasons.

**[054]** Key features of a backup network:

1. Two-way communication: Telephone receivers normally receive but they can also be used to store and forward. Thus for example, if a phone was on a mobile platform (say in a pocket on in a car), then the phone could be used in sneakernet mode to store a signal in one place and repeat it from another place.

2. Damage Assessment (the ability to determine quickly and easily what's up and what's not): During 9/11, there were many outages (fiber cuts under #7 World Trade Center, cell towers on the rooftops, switches under both #1 and #2 World Trade Center, police and fire radio communication in certain places), but some things were working (cell towers in New Jersey and BlackBerry email which is based on satellites). A key requirement is to determine what's working and what's not and to communicate workarounds to those that need them. An array of cell phones in a multitude of pockets and cars could determine fairly quickly what's working and what's not. Hopefully, some of these devices would be connected to something that is working such as a satellite or would eventually move out of the affected area so enough of them could report an accurate and timely damage assessment picture back to the cloud.

3. Workarounds: Municipal vehicles such as buses have batteries and generators. Soon, such vehicles will also have WiFi that is connected to satellites. The cloud could direct such resources where they are needed most.

**[055]** An acoustical array, such as what is being proposed here, could also be used in damage assessment. We would be concerned about both too much noise (explosions) as well as too little (absence of human activity), aggregated over time and space.

4 Authorization and privacy

**[056]** In some versions of the system, privacy considerations are addressed using one or more features, which may include the following. First, monitoring may be enabled on a device only if the user explicitly "opts in" to permitting particular monitoring options. A reason that a user may accept such monitoring is that he in return obtains information that

is valuable to him, for example, by being provided more relevant search results or other information. Another feature relates of encryption of the monitored information. For example, audio may be encrypted in a manner than prevents interception during uploading and/or processing by a central controller. Furthermore, in systems in which multiple central controllers are used (e.g., one controller per cellular telephone carrier), the user may explicitly permit sharing between controllers.

**[057]** In some examples, devices have features that inhibit collection of audio environment data. Such features may be mechanical, for example, mechanically preventing audio pickup with a shutter mechanism, or can be electronic, for example, with an electronic slider switch on the device.

**[058]** In some examples, sensors can be selectively turned on or off both at the edge of the network (in the smart phone), as well as in the network (in the cloud), as well as elsewhere. For example, the operator of a movie theatre may have the ability to turn off speakers that would annoy others in the movie theatre, and similarly the operator of an airplane should have the ability to turn off communication features that could jeopardize the safety of fellow passengers. Moreover, after an incident, such as a plane accident, the authorities should have the ability to probe (via a wired or wireless interface to the memory of the phone-could be non-volatile) the smart phones on the plane for information that could be helpful in the investigation. In other words, the array of smart phones on the plane could serve as a kind of "black box" to prevent similar such incidents in the future.

**[059]** However, privacy is also important in at least some versions of the system. In some versions, the owner of the smart phone should have the ability to pull the curtain with confidence that the phone is not invading the user's privacy, even if the phone has been taken over by a virus. When the curtain is pulled, the user wants to be sure that the phone is not recording information that could be embarrassing or self-incriminating. The phone should not be recording information that could be subject to subpoena or a court order such as discovery. The user should have the ability to opt out in a way that cannot be overridden by the owner of the network, government authority, or anyone else (such as a malicious hacker).

**[060]** Feature interaction can be a tricky problem in a communication network. While it is desirable that many parties have the ability to turn on and off certain features in certain ways, as discussed above, it is also important that it be clear to all parties what happens

when different parties issue commands that may conflict with one another in complicated and unanticipated ways.

**[061]** In particular, in at least some versions of the system, the owner of the phone ought to be in charge. In such versions, the owner should have the ability to physically disconnect the sensors in a way that cannot be overruled by any other party. One such method would be a physical switch that would disconnect the sensors in a way that the user can verify by visual inspection of the phone. The physical switch can be operated manually by the user and cannot be overridden remotely under software control.

**[062]** In addition to the physical switch, there should also be a software controlled switch that would empower authorized parties to turn on and off features such as recording of sensors, recognizing keywords and uploading appropriate information to the cloud where inferences can be made that aggregate over space and time. Society will need to come up with policies to determine who is allowed to do what, and what is appropriate and what is not.

5 Other devices

**[063]** As introduced above, the approaches described above are not limited to use smartphones. For example, in-vehicle systems (e.g., navigation devices), media devices (e.g., televisions, set-top boxes, desktop computers, laptop computers), and other fixed or mobile devices can be used in similar ways. For example, in the case of an in-vehicle navigation system, an in-vehicle conversation may be monitored and information about a location (e.g., a restaurant) that is being discussed may be provided on the device's display.

**[064]** Another type of device that may be used in such a system is an earpiece that provides audio input and output for a telephone (device). An advantage of monitoring with the earpiece is that it is exposed to the acoustic environment even when the associated phone is not exposed to the environment, for example, when the phone is in a user's pocket, thereby providing an improved signal-to-noise ratio (SNR). Another embodiment would have the entire mobile communication (cell phone) being integrated in to the earpiece.

**[065]** Another type of device that may be used in such a system is a hearing aid. The hearing aid would allow the entire feature set thus described in this document to be made practical. The advantage of this is data which could be mined from this age population is

thought to be very different for the generation of users who typically use headphone for their communication activities.

**[066]** Use of earpieces as described above can be thought of as ownership or control of the the "last inch," which is similar to the ownership of the "last mile," which has been strategically important in the telephone business. The same dynamic underlies the debate over net neutrality. So too, ownership over the last inch will become strategically important in the war over eyes and ears. The web is currently all about eyeballs and mouse clicks, but soon the war will move to a struggle for access to ears as well as eyes. The hearing aid or earpiece could be viewed as a chief of staff. It gets to decide what the user hears and what the user doesn't hear. The hearing aid could give the wife preferred access. It could also block spam, and filter out unwanted commercials. Alternatively, the hearing aid or earpiece could run an auction similar to paid search, where the hearing aid is a market maker that attempts to find an equilibrium between the need of the user for relevance and utility to the advertiser.

**[067]** These auctions typically use a Vickrey auction to encourage advertisers to bid their true utility. If the user chooses to follow up on an ad (with a mouse click), then the advertiser pays the 2nd highest bid. The hearing aid or earpiece could work in a similar way though perhaps instead of clicking on an ad, it might be easier for the user to participate by some other means such as a spoken command.

**[068]** Implementations of the system may include software that includes instructions for controlling operation of one or more processors. For example, some of the software may include instructions for execution at the personal devices. This software may be stored on a computer readable medium at a central location, for example, at a server for distribution to the devices, may me transferred over a digital communication medium, and/or stored in a machine readable medium at the devices (e.g., as downloaded applications/applets). Some of the software may be hosted at central servers (e.g., in a distributed "cloud" of processors) and made accessible by storing it on tangible computer-readable media for execution on processors of the servers.

**[069]** It is to be understood that the foregoing description is intended to illustrate and not to limit the scope of the invention, which is defined by the scope of the appended claims. Other embodiments are within the scope of the following claims.

What is claimed is:

1. A distributed system comprising:

a plurality of distributed devices,

each device having at least a communication capability for interchanging information with other of the devices and/or with a server system, and

each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment of the device;

a controller configured to perform functions including

determining locations of at least some of the devices,

selecting devices from amount the plurality of devices and receiving information based on the sensor data acquired at the selected devices, and

combining the information received from multiple of the selected devices to determine a characteristic of the environment of one or more of the devices.

2. The system of claim 1 wherein the controller is hosted at the server system.

3. The system of claim 1 wherein the devices comprise personal wireless devices.

4. The system of claim 3 wherein the personal wireless devices comprise mobile telephone devices.

5. The system of claim 1 wherein the sensors of at least some of the devices comprise audio and/or video sensors.

6. The system of claim 1 wherein the sensors of at least some of the devices comprise motion-related sensors for sensing motion related characteristics of the devices.

7. The system of claim 6 wherein the motion-related sensors comprise accelerometers.

8. The system of claim 1 wherein receiving information based on the sensor data acquired at the selected devices includes receiving information buffered at the devices prior to receiving a request from the controller for the information.

9. The system of claim 1 wherein each of at least some of the devices includes a local data analysis module for processing the acquired sensor data to determine information for providing to the controller.

10. The system of claim 9 wherein the data analysis module comprises an acoustic analysis module.

11. The system of claim 10 wherein the acoustic analysis module comprises a speech analysis module.

12. The system of claim 10 wherein the acoustic analysis module comprises an environmental sound analysis module.

13. The system of claim 1 wherein the controller is further configured to selected the devices according to the determined locations.

14. The system of claim 1 wherein the controller is further configured to selected the devices according to the received information from at least some other of the devices.

15. The system of claim 1 wherein the controller is further configured to pass configuration information to devices for processing of sensor data received at the devices.

16. The system of claim 15 wherein the configuration information includes data characterizing events to be detected in the sensor data.

17. The system of claim 1 wherein combining the information received from multiple of the selected devices comprises determining characteristics of an audio scene.

18. The system of claim 17 wherein the characteristics of the audio scene comprise words spoken in the audio scene.

19. The system of claim 17 wherein the characteristics of the audio scene comprise presence of non-speech events in the audio scene.

20. The system of claim 1 wherein combining the information received from multiple of the selected devices comprises determining trend information across a population of users of the devices.

21. The system of claim 1 wherein combining the information received from multiple of the selected devices comprises determining aggregated motion-related characteristics related to multiple of the devices.

22. The system of claim 21 wherein the aggregated motion-related characteristics comprise vehicle traffic flow characteristics.

23. A controller for interacting with a plurality of distributed devices, each device having at least a communication capability for interchanging information with other of the devices and/or with a server system, and each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment of the device, the controller being configured to perform functions comprising:

determining locations of at least some of the devices;

selecting devices from amount the plurality of devices for receiving information based on the sensor data acquired at the devices; and

combining the information received from multiple of the selected devices to determine a characteristic of the environment of one or more of the devices.

24. A device for interacting with a controller configured to select the device from among a plurality of devices, the device comprising:

a communication module for interchanging information with other of the devices and/or with a server system; and

one or more sensors for acquiring sensor data related to the environment of the device;

wherein the device is configured to be selected by the controller for providing information based on sensor data acquired at the device to the controller.

25. The device of claim 24 wherein the device comprises a buffer for holding information and/or sensor data prior to a request for said information and/or data from the controller.

26. The device of claim 24 wherein the device comprises a data analysis module for determining information from the sensor data for providing to the controller.

27. The device of claim 24 wherein the device is configurable to detect events in the sensor data, and to report occurrences of said events to the controller.

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Attorney Docket No. 30084-002P01

# INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES


## Abstract

In one aspect, in general, the audio and multimedia acquisition capabilities of a set of devices are exploited to aggregate acquired content and fuse the information in that content, for instance, for audio scene analysis. In some examples, devices from a large population are adaptively selected and/or configured according to triggering events detected at the devices or by the network.


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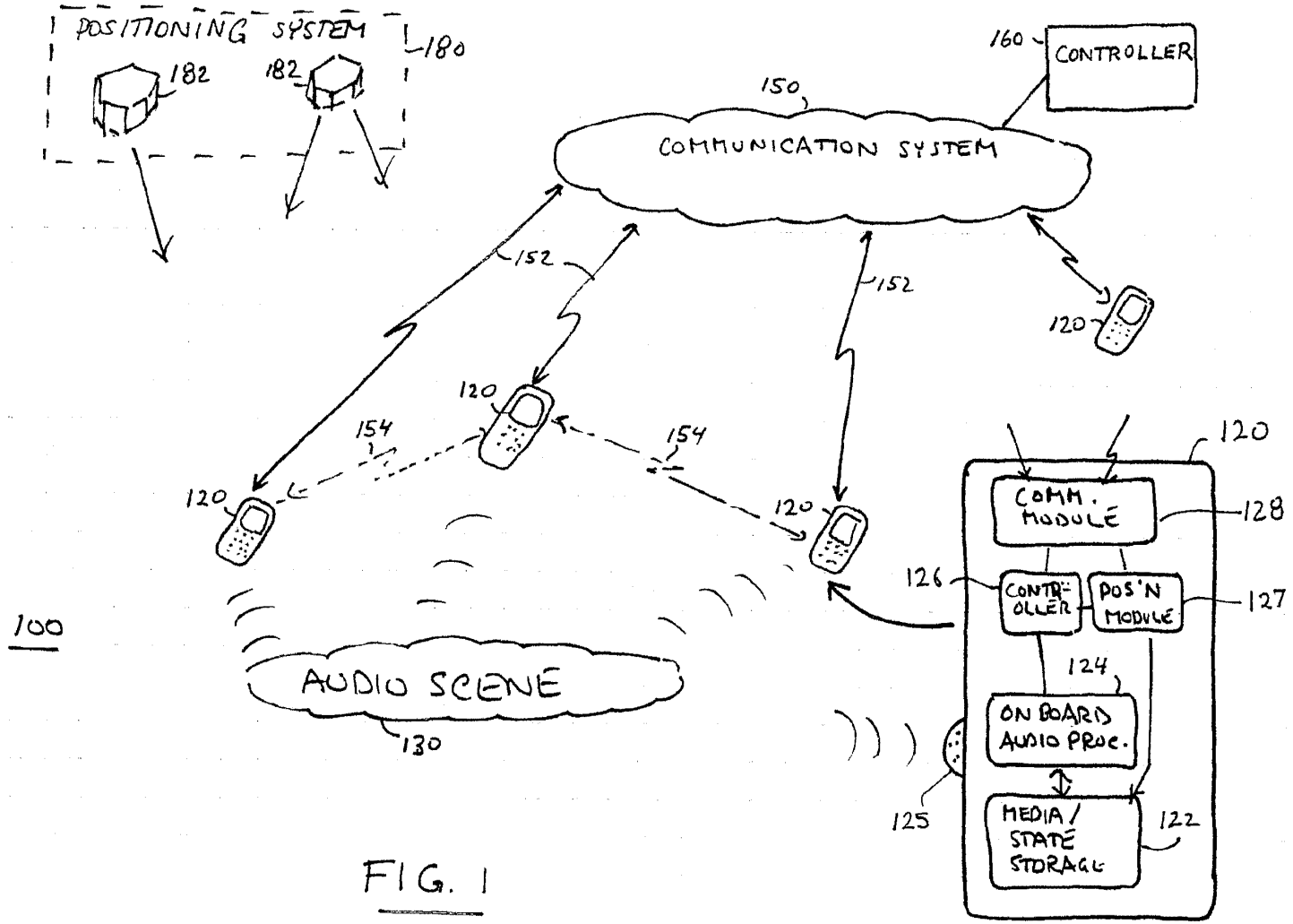



FIG. 1

IPR2024-01300 Page 00171

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 9140339 |
| **Application Number:** | 61428369 |
| **International Application Number:** | |
| **Confirmation Number:** | 7327 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 69713 |
| **Filer:** | J. Robin Rohlicek/Kristin Skelton |
| **Filer Authorized By:** | J. Robin Rohlicek |
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| 1 | Provisional Cover Sheet (SB16) | ProvCS.pdf | 102547<br>2327fd076de9193be6819e86ffe1c2bb38d12160 | no | 2 |
| **Warnings:** | | | | | |
| This is not a USPTO supplied Provisional Cover Sheet SB16 form. | | | | | |
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| 2 | | Appln.pdf | 1073845<br>d5f1df99ccdb39cc5174367924f884d9c3c8b70f | yes | 21 |
| | **Multipart Description/PDF files in .zip description** | | | | |
| | **Document Description** | | **Start** | **End** | |
| | Specification | | 1 | 16 | |
| | Claims | | 17 | 20 | |
| | Abstract | | 21 | 21 | |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Drawings-only black and white line drawings | DWGS.pdf | 21565<br>b0182ed58a44ddf12d8b69d07069799274443609 | no | 1 |
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| **Information:** | | | | | |
| 4 | Application Data Sheet | ADS.pdf | 159862<br>2ede3caf8b01911d74c63a2a5b5b1b11c10503b4 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| This is not an USPTO supplied ADS fillable form | | | | | |
| 5 | Fee Worksheet (PTO-875) | fee-info.pdf | 29913<br>53af15a5b065c9936eaf297a4b9c4c373c546025 | no | 2 |
| **Warnings:** | | | | | |
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| | | **Total Files Size (in bytes):** | 1387732 | | |

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**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Substitute PTO/SB/14 (06-07)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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| **Application Data Sheet 37 CFR 1.76** | Attorney Docket No. | 30084-002P01 |
|---|---|---|
| | Application No. | Not yet Assigned |
| Title of Invention | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | |

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

## Secrecy Order 37 CFR 5.2

☐ Portions of all of the application associated with the Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Applicant Information:

| **Applicant** | | | | | |
|---|---|---|---|---|---|
| **Applicant Authority** ☒ Inventor | | ☐ Legal Representative under 36 U.S.C. 117 | | ☐ Party of Interest under 36 U.S.C. 118 | |
| **Prefix** | **Given Name** | **Middle Name** | **Family Name** | | **Suffix** |
| | Steven | W. | Goldstein | | |
| **Residence Information (Select One)** | ☒ US Residency ☐ Non US Residency ☐ Active US Military Service | | | | |
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| **Citizenship under 37 CFR 1.41(b)** | US | | | | |
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| **Postal Code** | 33446 | **Country** | US | | |

## Correspondence Information:

| **Customer Number** | 69713 |
|---|---|

## Application Information:

| **Title of the Invention** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | | |
|---|---|---|---|
| **Attorney Docket No.** | 30084-002P01 | **Small Entity Status Claimed** ☒ | |
| **Application Type** | Provisional | | |
| **Subject Matter** | | | |
| **Suggested Class (if any)** | | **Sub Class (if any)** | |
| **Suggested Technology Area (if any)** | | | |
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| **Application Data Sheet 37 CFR 1.76** | Attorney Docket No. | 30084-002P01 |
|---|---|---|
| | Application No. | Not yet Assigned |
| Title of Invention | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | |

## Publication Information:

☐ **Request Early Publication** (Fee required at time of Request 37 CFR 1.219)

☐ **Request NOT TO PUBLISH.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not been and will not be subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing.

## Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).

| **Customer Number** | 69713 |
|---|---|

## Domestic Priority Information:

This section allows for the applicant to claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c). Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

**Prior Application Status**

| **Application Number** | **Continuity Type** | **Prior Application Number** | **Filing Date (YYYY-MM-DD)** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

## Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

| **Application Number** | **Country** | **Parent Filing Date (YYYY-MM-DD)** | **Priority Claimed** | |
|---|---|---|---|---|
| | | | ☐Yes | ☐No |
| | | | ☐Yes | ☐No |
| | | | ☐Yes | ☐No |

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| **Application Data Sheet 37 CFR 1.76** | Attorney Docket No. | 30084-002P01 |
|---|---|---|
| | Application No. | Not yet Assigned |
| Title of Invention | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | |

## Assignee Information:

| Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office. | | | |
|---|---|---|---|
| **Assignee** | | | |
| **If the Assignee is an Organization, check here.** ☒ | | | |
| **Organization Name** | **Personics Holdings, Inc.** | | |
| **Mailing Address Information:** | | | |
| **Address 1** | 6111 Broken Sound Parkway NW | | |
| **Address 2** | | | |
| **City** | Boca Raton | **State/Province** | Florida |
| **Country** | US | **Postal Code** | 33487 |
| **Phone Number** | | **Fax Number** | |
| **Email Address** | | | |

## Signature:

| A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature. | | | |
|---|---|---|---|
| **Signature** | Jan Robin Rohlicek | | |
| **First Name** | J. Robin | **Last Name** | Rohlicek |
| **Registration Number** | 43,349 | **Date (YYYY-MM-DD)** | 2010-12-30 |

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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(54) **Title**: INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

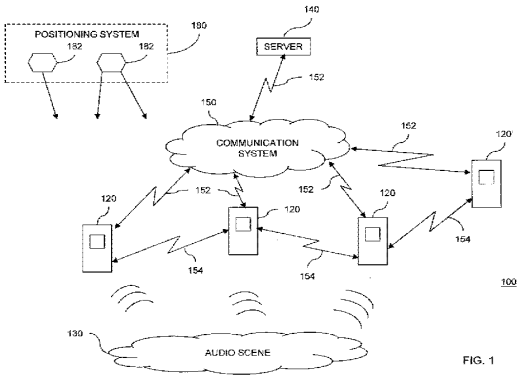



FIG. 1

(57) **Abstract**: Distributed systems, controllers and methods for processing information from a plurality of devices are provided. A distributed system includes a plurality of devices distributed in an environment. Each device has at least a communication capability for interchanging information with others of the devices and/or with a communication system. Each of at least some of the devices has one or more sensors for acquiring sensor data related to the environment proximate to the device. At least one of the communication system or one or more of the devices is configured as a controller configured to: select a subset of devices from among the plurality of devices, receive information based on the acquired sensor data of the selected subset, and combine the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices.

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# INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

## CROSS REFERENCE TO RELATED APPLICATIONS

**[0001]** This application is related to and claims the benefit of U.S. Provisional Application No. 61/431,507 entitled "INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES" filed on January 11, 2011 and claims the benefit of U.S. Provisional Application No. 61/428,369 entitled "INFORMATION PROCESSING USING A POPULATION OF DATA AQUISTION DEVICES" filed on December 30, 2010, the contents of which are incorporated herein by reference.

## FIELD OF THE INVENTION

**[0002]** The present invention relates to processing of information from a population of data acquisition devices, and in some examples, relates to processing of audio or multimedia data acquired from an adaptively selectable population of personal wireless devices.

## BACKGROUND OF THE INVENTION

**[0003]** Devices that are capable of acquiring, and in some cases locally processing, audio or multimedia information from their local environment have become ubiquitous over the past several years, and there is little reason to expect that such a trend will not continue. For example, "smart" cellular telephones (e.g., Apple iPhone®, Android™-operating system based phones) have significant local processing capabilities as well as audio and video acquisition devices.

## SUMMARY OF THE INVENTION

**[0004]** In one aspect of the present invention, in general, the audio and multimedia acquisition capabilities of a set of devices may be exploited to aggregate acquired content and fuse the information in that content, for instance, for audio scene analysis. In some example embodiments, devices from a large population may be adaptively selected and/or configured according to triggering events detected at the devices or by the network. Relating to the audio scene, the information sensed and acquired from one or more devices may be processed, customized and personalized to consumers to mitigate, amplify or pass-through acoustic and other information to users, based on factors such as models of users' requirements and users' past information consumption behavior. Thus an exemplary system of the present invention may mediate ambient and explicitly supplied information, especially audio information, and may act as an arbiter of information for the user. Some of the system actions may be based on information from one device, while other actions may be based on information from multiple devices. The information filtered to users may be utilized to form virtual communities based on shared interests and common information, and to ensure that

relevant information including alerts, marketing information, and news reaches these communities.

**[0005]** According to another aspect of the present invention, in general, a distributed system may include a plurality of distributed devices, with at least one of a communication system or one or more of the distributed devices configured as a controller. Each device has at least a communication capability for interchanging information with other of the devices and/or with the communication system. At least one of the devices may include one or more sensors for acquiring sensor data related to the environment of the device. The controller is configured to perform functions including: determining locations of at least some of the devices, selecting devices from among the plurality of devices and receiving information based on the sensor data acquired at the selected devices, and combining the information received from multiple of the selected devices to determine one or more characteristics of the environment of one or more of the devices.

**[0006]** In other aspects of the present invention, the distributed system may include devices that mediate all audio information sensed at the device to mitigate, amplify or pass-through information. In some examples, such information is optionally logged and analyzed to determine trend-related information.

**[0007]** Other features and advantages of the invention are apparent from the following description, and from the claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]** The invention may be understood from the following detailed description when read in connection with the accompanying drawing. It is emphasized, according to common practice, that various features of the drawings may not be drawn to scale. On the contrary, the dimensions of the various features may be arbitrarily expanded or reduced for clarity. Moreover, in the drawing, common numerical references are used to represent like features. Included in the drawing are the following figures:

**[0009]** FIG. 1 is a functional block diagram of an information processing system, according to an exemplary embodiment of the present invention;

**[0010]** FIG. 2A is a functional block diagram of a distributed device of the system shown in FIG. 1, according to an exemplary embodiment of the present invention;

**[0011]** FIG. 2B is a functional block diagram of a controller of the system shown in FIG. 1, according to an exemplary embodiment of the present invention; and

**[0012]** FIG. 3 is a flowchart diagram of an exemplary method for processing information from a plurality of distributed devices, according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

1 System overview

**[0013]** Personal wireless devices, as well as other types of computing or communication devices, have become ubiquitous in our environment. Generally, such devices have a number of sensors, which may include, for instance, microphones, cameras, accelerometers, and in some cases may even have sensors for biometric information, such as heart rate. Such devices also generally include one or more communication systems, for example, a cellular telephone radio system (e.g., Code Division Multiple access (CDMA) or Global System for Mobile Communications (GSM)), a wireless local area network system (e.g., Wi-Fi, IEEE 802.11), wired computer network connections (e.g., data network connections via USB cradles, possibly via desktop computer applications) and in some cases other systems based on radio frequency (e.g., Bluetooth®) or optical (e.g., infra-red) transmission. Finally, such devices generally are "location aware" and/or locatable by the infrastructure in which they operate. For example, such devices may have global positioning system (GPS) receivers, enhanced GPS (which operates in conjunction with cellular telephone infrastructure), and/or Wi-Fi based maps (which use a map of Wi-Fi access points to locate the device). The cellular infrastructure may, for example, be able to locate the device based on cellular signal strength and/or triangulation approaches.

**[0014]** In some aspects of the present invention, the combination of characteristics of these devices provides a potentially rich source of information that may be combined in a way that generates valuable information that is not necessarily available to any individual device. As an illustrative example, audio processed locally at many different devices may be combined to identify geographic or social group trends based on keywords spoken or other acoustic events (e.g., coughs) that are detected at the devices.

**[0015]** Detection of coughs is an example where detection of non-speech acoustic events may be useful. Because a cough is often a sudden and often repetitively occurring reflex, frequent coughing may indicate the presence of a disease (e.g., many viruses and bacteria benefit evolutionarily by causing the host to cough, which helps to spread the disease to new hosts). Most of the time, coughing is caused by a respiratory tract infection but can be triggered by choking, smoking, air pollution, asthma, gastro-esophageal reflux disease, post-nasal drip, chronic bronchitis, lung tumors, heart failure and medications such as ACE inhibitors. Detection of such events in the vicinity of the devices may provide significant information.

**[0016]** In other aspects of the present invention, the rich sensor capabilities of the devices may provide a way to track activity of a user (e.g., owner) of the device, to enhance the user's experience with various computing applications (such as searching or

personalization). As an illustrative example, topics of conversation in the vicinity of the device may affect the ranking of search results or the ordering of presentation of news stories on the device.

**[0017]** In some aspects of the present invention, the rich source of information over many devices and the tracking of individual activity may be combined, to benefit from their synergy.

**[0018]** Referring to FIG. 1, a functional block diagram of an exemplary information processing system, designated generally as system 100, is shown. System 100 may include one or more distributed devices 120 (also referred to herein as devices 120) and device 120' (also referred to as controller 120') in an environment. One or more of devices 120 and device 120' may be configured to acquire information relating to audio scene 130. Device 120' may be the same as device 120, except that device 120' may be configured to act as a controller for selectively acquiring sensor information from among devices 120 and for determining a characteristic of audio scene 130. Although one device 120' is illustrated as being a controller, it is understood that multiple devices 120' may act as controllers.

**[0019]** Although device 120' is illustrated as a controller for gathering sensor information and determining a characteristic of audio scene 130, it is understood that communication system 150 and/or server 140 may also be configured to act as a controller. Communication system 150 or server 140 may collect at least one of sensor information from devices 120, 120', local data analysis information from devices 120, 120' or scene analysis information from device 120'.

**[0020]** Devices 120 and device 120' may be capable of direct communication with each other, via communication link 154. Devices 120 and device 120' may also be capable of communication with communication system 150, via communication link 152. Devices 120 and device 120' may also be in communication with central server 140, via communication system 150 and communication link 152. Devices 120, 120' may include wired or wireless devices. As discussed further below, devices 120, 120' may be at fixed positions or may be mobile devices.

**[0021]** In one exemplary embodiment, a number of devices 120 are present in an environment. In some examples, the devices 120 (and device 120') are cellular telephones (e.g., "smartphones"). The environment represented by audio scene 130 may be an urban environment, for example, with the devices 120, 120' being present on city streets, in office buildings, or in homes of the users. Generally, the devices 120, 120' may be personal to the users/owners (of the devices), and may be mobile devices, carried with the user throughout the day.

**[0022]** In FIG. 1, a small number of representative devices 120, 120' are illustrated. As discussed further below, the potentially enabled devices 120, 120' may be part of a

large population of devices (e.g., a large fraction of the telephones in a metropolitan area) and system 100 may adaptively enable particular subsets of the devices 120 and/or selectively configure enabled devices 120. For instance, device 120' (or server 140) may enable and/or configure the devices 120 according to triggering events detected at one or more devices 120, 120'.

**[0023]** It should be understood that the description below focuses on smartphones as an example, and other types of fixed or mobile devices may be used in conjunction with or instead of smartphones. Also, the description below focuses on aggregation or combination of audio information as an example, but aggregation and processing of other forms of information, including video and biometric information may be performed in conjunction with or instead of the audio data examples described below.

**[0024]** As introduced above, any particular device 120, 120' is able to sense some aspect of an overall audio "scene" in its environment. Such a scene may include, for example, the device owner's own speech even when not carrying out a telephone call, other sounds made by the owner (such as coughing), the speech of others in proximity to the user and environmental sounds in proximity to the user (such as sirens, gunshots, etc.).

**[0025]** Generally, system 100 makes use of the audio acquisition capabilities of one or more of the devices 120, 120' in order to extract information related to the views of the audio scene 130 by the one or more devices 120, 120'. In one exemplary approach to acquisition of the raw content, every device 120 could continually transmit its acquired signals over communication system 150 to a central server 140 (via communication link 152). For example, the communication system 150 may comprise a cellular telephone system and/or a wireless data network. However, such continual transmission may not be feasible due to the sheer volume given the large number of devices 120, 120' that are fielded, and may raise other issues regarding privacy of those in the environments of the devices 120, 120'.

**[0026]** Another exemplary approach to extracting information is for each device 120, 120' to perform a local signal analysis based on the signals acquired by that device. However, such an approach may have limitations due to the computational limitations of the devices 120, 120'. Also, a purely local processing may lose advantages that could be gained by fusing of information from multiple devices 120, 120'.

**[0027]** An exemplary approach describe below addresses some of the limitations of a purely local or a purely centralized approach using a combination of one or more of the following features:

1) Local processing of acquired signals (on devices 120), at least to identify occurrences of events that may be of interest;

2) Local buffering of audio for selective transmission to device 120' or central server 140, for example, on an ongoing basis or based on a request from device 120' or server 140, or based on local identification of a local event (at one or more of devices 120); and

3) Selective enabling of acquisition and/or processing (or specification of the type of processing) at particular devices 120, 120', for example, based on their geographic location and/or other proximity metrics (e.g., a social network rather than a geographic distance metric).

**[0028]** Note that the locations of the devices 120, 120' (e.g., three-dimensional coordinates) are generally known by the devices 120, 120' and/or central server 140. As an example, a positioning system 180 makes use of units having known locations, such as GPS satellites 182, fixed cellular transmission towers, Wi-Fi access points, etc. to maintain an estimate of the positions of the devices.

**[0029]** Referring to FIG. 2A, a functional block diagram of exemplary device 120 is shown. Device 120 may include one or more of sensor module 202, local data analysis module 204, communication module 206, controller 208, media/state storage 210, position module 212, user interface 214, display 216, warning indicator 218, speaker 220 and privacy module 236.

**[0030]** A typical device 120 includes communication module 206, which provides a communication link 152 through the communication system 150 to sever 140 and/or a communication link 154 to other devices 120, 120'. Communication module 206 may also serve a role in acquiring positioning signals (e.g., GPS signals, Wi-Fi signal strengths, etc.), and may also provide a way to communicate directly with other devices 120.

**[0031]** Device 120 may include sensor module 202 for the acquisition of sensor information. Sensor module 202 may include one or more microphones 222 for collecting acoustic information regarding audio scene 130 (FIG. 1). Sensor module 202 may also include one or more environmental sensors (such as a temperature sensor, a motion sensor such as an accelerometer) for collecting environmental information associated with device 120. Sensor module 202 may also include one or more biometric sensors 226 (such as heart rate) for sensing biometric information regarding a user of device 120. Sensor module 202 may also include camera 228 (i.e., an image sensor) for capturing still images and/or video of the surrounding environment of device 120. Sensor module 202 may also include a compass for providing location information. In general, sensor module 202 may include any sensor capable of measuring a physical quantity and converting it into a signal that may be used by system 100. For example, sensors in sensor module 202 may also include, without limitation, one or more of light detection sensors, proximity sensors, gravity detection sensors, a magnetic field

detection sensors, electrical field detection sensors, vibration sensors, pressure sensors, humidity sensors, moisture sensors, toxin detection sensors, nutrient detection sensors or pheromone detection sensors.

**[0032]** User interface 214 may include any suitable user interface capable of providing parameters for one or more of sensor module 202, local data analysis module 204, communication module 206, media/state storage 210, position module 212, display 216, warning indicator 218, speaker 220 and privacy module 236. User interface 214 may include, for example, a pointing device, a keyboard and/or a display device.

**[0033]** Device 120 may include display 216, warning indicator 218 and/or speaker 220 for presenting information to a user of device 120. Display 216 may include any suitable display device capable of presenting information on device 120. Warning indicator 218 may include any suitable visual indicator for presenting a warning on device 120. The warning may include, for example, an indication that audio information is being recorded. It is understood that speaker 220 may also audibly present a warning indication. Although user interface 214 and display 216 are illustrated as separate devices, it is understood that the functions of user interface 214 and display 216 may be combined into one device. According to an exemplary embodiment, device 120 may receive acoustic and/or other information (via display 216, warning indicator 218 and/or speaker 220) that has been mitigated, amplified and/or passed to device 120 from device 120' (FIG. 1) based on information acquired from one or more devices 120.

**[0034]** Device 120 may include position module 212, to maintain a position estimate for device 120. For example, position module 212 may use positioning system 180 (FIG. 1) to obtain the position estimate.

**[0035]** Media/state storage 210 may store at least one of raw sensor information (from sensor module 202), locally analyzed information (from local data analysis module 204) or location information (from position module 212). Media/state storage 210 may include, for example, a magnetic disk, an optical disk, flash memory or a hard drive.

**[0036]** Controller 208 may be coupled, for example, via a data and control bus (not shown) to one or more of sensor module 202, local data analysis module 204, communication module 206, media/state storage 210, position module 212, user interface 214, display 216, warning indicator 218, speaker 220 and privacy module 236. Controller 208 may be configured to control acquisition of sensor information, local analysis of sensor information, transmission and/or receipt of sensor information, transmission and/or receipt of local analysis information, as well as any presentation of information by device 120 (such as via display 216, warning indicator 218 and/or speaker 220). Controller 208 may include, for example, a logic circuit, a digital signal processor or a microprocessor. It is understood that one or more functions of local data analysis module 204 may be performed by controller 208.

**[0037]** Local data analysis module 204 may be configured to analyze information collected locally by sensor module 202 for device 120. Local data analysis module 204 may include acoustic analysis module 230 for analyzing audio information (such as from one or more microphones 222). The audio information may include speech, music as well as environmental sounds (such as an approaching train). The speech may be generated by a user of device 120, as well as by other individuals proximate to device 120. Local data analysis module 204 may perform the analysis either locally or with the aid of backend server architecture or similar mechanisms.

**[0038]** Local data analysis module 204 may also include other sensor analysis module 232 for analyzing information from other sensors of sensor module 202. For example, other sensor analysis module 232 may analyze information from one or more of environmental sensor(s) 224, biometric sensor(s) 226 and/or camera 228. Local data analysis module 204 may combine results from acoustic analysis module 230 (such as keywords, target sounds) and other sensor analysis module 232 to determine the occurrence of one or more particular events (and/or a characteristic of audio scene 130).

**[0039]** Acoustic analysis module 230 and/or other sensor module 232 may also pre-process the respective sensor information, for example, to substantially remove or reduce noise. Modules 230, 232 may also filter the noise-reduced sensor information to identify high value signals which may be indicative of the occurrence of particular events.

**[0040]** Local data analysis module 230 may include classifiers 234 associated with acoustic analysis module and/or other sensor analysis module. Classifiers 234 may be used to build profiles of audio information, environmental information, biometric information and/or image information.

**[0041]** In an exemplary embodiment, acoustic analysis module 230 may preprocess the audio information to recognize speech, perform keyword spotting on speech information, and in addition build voice models of various speakers within the auditory range of the device. The models may, for example, use classifiers 234 and machine learning methods to identify gender, probable age range, nationality and other demographic features from the speech signals.

**[0042]** In addition, there may be classifiers 234, for instance, to recognize any slurring due to the influence of alcohol or similar substances, accent classifiers to detect and identify accent patterns belonging to specific language groups, and emotion classifiers to classify speakers and speech into happy, sad, stressed, angry or other emotional states. Thus, given any audio input that includes any speech, individual devices 120 or system 100 (FIG. 1) as a whole may be able to build an acoustic profile of each speech participant in that input, where the profile not only includes the keywords spotted, but

also other data such as demographic data about each speaker including gender, probable age, possible nationality etc., as well as classifier results about emotional state, and/or whether the speaker is under the influence.

**[0043]** The acquisition of keywords with demographic data may help advertisers target their sales, based on factors such as gender, age and potential levels of disposable income, and to track their sale cycle from users noticing their advertisements to those users who actually make a purchase. Emotion indicators may be used to take palliative or preventative steps to avoid customer dissatisfaction. Other information like slurring may be used as corroboratory information in situations such as accidents or may be used to prevent accidents.

**[0044]** Privacy module 236 may include mechanisms to implement privacy and/or security requirements and policies for applications relating to the acquisition and use of information of various kinds, including audio information, by one or more devices associated with a number of carriers. These policies and mechanisms may control the use of devices 120 (and device 120′ (FIG. 1)) including the ability to remotely switch on and switch off sensing (e.g., listening), the ownership of any audio information garnered by these devices 120 (and device 120′ (FIG. 1)), the users' ability to easily control sensing and information acquisition, mechanisms to opt-in and opt-out of applications, carrier-wide or network-wide data gathering, the protection of any audio personally identifiable information (PII) that is gathered, and any aggregated data that is created from a number of devices 120 (device 120′ (FIG. 1) and networks. Policies or standard practices may also be established for private or semi-private situations where not all users present have opted-in for data acquisition. For example, when system 100 (FIG. 1) records speech from users that are not likely to be opted-in to the information acquisition, system 100 may provide a warning indication to all devices 120 in the immediate vicinity to indicate that audio information is being recorded. The warning indication may be provided on warning indicator 218.

**[0045]** Referring next to FIG. 2B, a functional block diagram of exemplary device 120′ is shown. Device 120′ is similar to device 120 (FIG. 2A), except that device 120′ may also include device selection/data acquisition module 240 and scene analysis module 242. Similarly to device 120 (FIG. 2A), components of device 120′ may be coupled together via a data and control bus (not shown).

**[0046]** Device selection/data acquisition module 240 (also referred to herein as module 240) may receive sensor information and/or locally analyzed information from selected devices 120 (FIG. 1). Scene analysis module 242 may combine the sensor information and/or locally analyzed information from among the selected devices, in order to determine at least one characteristic of audio scene 130 (or the environment, in general).

**[0047]** Module 240 may determine the locations of at least some of devices 120 (FIG. 1). Module 240 may select one or more devices 120 (FIG. 1) from among plural devices 120, for example, based on the location of these devices 120 as well as any characteristics (such as an event) determined by scene analysis module 242. Accordingly, as a characteristic is detected (by scene analysis module 242), module 240 may adaptively acquire information from selected devices 120 (FIG. 1), in order to better analyze audio scene 130. Module 240 may also configure selected devices 120 (FIG. 1) to acquire specific information, (for example one device 120 may acquire image data via camera 228 (FIG. 2A) whereas another sensor may be configured to acquire audio data via microphone 222 (FIG. 2A). As another example, module 240 may configure multiple devices 120 to acquire audio data via respective microphones 222 (FIG. 2A), so that the multiple microphones 222 form a beam forming array.

**[0048]** Referring generally to FIGs. 1, 2A and 2B, system 100 makes use of one or more of enabling and configuring of devices (via device selection/data acquisition module 240) for prospective monitoring, access to logged data for retrospective analysis, and real-time notification of events (such as by scene analysis module 242). This adaptation of system 100 may be based on detection of triggering events at the devices 120, 120'. For example, device 120' may enable detection of certain acoustic events (e.g., words, spoken topics, music, and environmental sounds) and may adapt the configurations on selected devices 120 based on reports from other devices 120.

**[0049]** Device 120' (and devices 120) may include software for coordinating the set of devices 120. The software may have centralized control, peer-to-peer control or a hybrid model involving centralized, peer-to-peer and other control mechanisms. Individual devices 120, 120' may switch between being master devices controlling other devices, or slave devices under the temporary partial control of other devices. The network of devices 120, 120' may so configure itself to optimize power consumption on individual devices 120 by distributing the sensing load across a number of devices 120, 120', or by other mechanisms such as sharing bandwidth across devices 120, 120'. The networking used may be based on ideas related to mobile ad hoc networks (MANET), Scatternet or other mechanisms.

**[0050]** For example, system 100 may dynamically organize and reorganize its nodes into hierarchies or graphs, with some devices 120, 120' chosen to be master nodes while other possibly geographically proximate devices to be slave nodes. Slave nodes may perform actions based on instructions from master nodes. They may preprocess information and convey processed information to master nodes, instead of conveying all information acquired, thus distributing computation among nodes and reducing the communication bandwidth. In addition, communication requirements may improve because only a few master nodes may communicate with each other, instead of all, say

N devices trying to communicate with each other, which would require ($N^2/2$) connections.

**[0051]** Because each node knows its location, depending on system requirements, the network may organize itself into one or more linear chains or local groups, where information is passed between physically proximate devices, very much like a bucket brigade conveying information. With a peer-to-peer architecture, individual devices 120, 120'– either just master nodes or both master nodes and slave nodes – may record information about neighboring nodes and their capabilities and features, so that, for instance, connectivity between any pair of nodes can easily and effectively be established at low computational cost.

**[0052]** Other optimization techniques may also be adopted – for instance, when data logs are recorded, the system may determine if several devices are in the same audio or other sensor context. For example, if several phones 120, 120' are located in the same context, not every phone 120, 120' has to record all data – the system 100 may designate a scribe node which acts as a local repository for data and for ensuring the data gets stored to some centralized server 140 (or device 120') in the cloud. This may save considerable logging effort on the part of the other nodes.

**[0053]** Alternatively or in addition, the system 100 may distribute sensor load among devices 120, 120' so that not every node has to acquire information via all of its sensors in sensor module 202. Some sensor modules 202 may concentrate on acquiring audio information, while other devices 120, 120' may acquire position information and still other sensor modules 202 may acquire temperature or altitude information, and so on. This may reduce power and communication bandwidth requirements for the entire system 100. Several such schemes may be devised to optimize the throughput and efficiency of the system as a whole. According to an exemplary embodiment, system 100 may also distribute processing of sensor information among devices 120, 120', so that different individual tasks are performed by devices 120, 120'. This may reduce the computational burden on some devices 120 (or device 120') which may not have suitable processing capabilities for a specific task.

**[0054]** The system 100 as a whole may use carrier-agnostic handlers in the cloud. Specifically, the networking may utilize services from a number of wireless telephony, Wi-Fi or other carriers, and suitable policies may be put in place to enable carrier-agnostic behaviors. Specifically, so that no user may be denied sharing of information because of association with specific carriers, and so that digital bridges exist to share information across carriers where desired. In a variant, some features may be made unique to a carrier for marketing reasons.

**[0055]** It is understood that devices 120, 120' do not have to be phones. Devices 120, 120' may be stand-alone devices, or may be an integral part of a GPS, hearing aid,

mobile phone, TV remote, car key fob, portable game controller or similar device. Device 120 (and/or device 120') may be carried by the user on his person, or be installed in or on a vehicle such as a car.

**[0056]** For certain applications, devices 120 (and/or device 120') may be fixed and installed at home, or be part of fixed telephones, desktop computers, TV sets or game consoles. Each device 120 (and/or device 120') may include one or more sensors with associated software. Different kinds of devices 120, 120' may include different sensors and/or different software. If device 120 or device 120' is more like a smartphone, system 100 may have access to textual data including electronic mail, chat transcripts and documents, and audio data including phone conversations, music on the device or streamed to the device, ambient audio picked up by microphones, and user search logs. All of this data may be relevant to the user. This data, along with the user's context and environmental variables, may be used for personalization of information consumed by the user and then where appropriate repurposed for commercial applications to the user or the community at large.

**[0057]** Referring to FIG. 3, a flowchart diagram of an exemplary method for processing information from a plurality of distributed devices is shown. The steps illustrated in FIG. 3 represent an example embodiment of the present invention. It is understood that certain steps may be performed in an order different from what is shown. It is also understood that certain steps may be eliminated.

**[0058]** At step 300, the location of devices 120 (FIG. 1) may be determined, for example, by controller 120' based on information previously received from devices 120. For example, controller 120' (FIG. 1) may directly communicate with devices 120 to determine their locations. As another example, the location of devices 120 (FIG. 1) may be known from communication with communication system 150 and/or sever 140.

**[0059]** At step 302, a subset of devices 120 (FIG. 1) may be selected, for example by device selection/data acquisition module 240 (FIG. 2B) of controller 120'. For example, controller 120' (FIG. 1) may select one or more devices 120 based on a predetermined characteristic of the environment and the location of devices 120.

**[0060]** At step 304, sensor information and/or locally processed information may be received by controller 120' (FIG. 1) from the selected subset, for example, by device selection/data acquisition module 240 (FIG. 2B). For example, controller 120' (FIG. 1) may receive raw sensor information from respective sensor modules 202 (FIG. 2A) and/or locally processed information from respective local data analysis modules 204 (FIG. 2A). Controller 120' (FIG. 2B) may also acquire sensor information and/or locally processed information from its own sensor module 202 and local data analysis module 204. The information from at least one of the devices 120 may be received responsive to a confirmation indication from the respective device 120, to indicate an allowance by

device 120 to release its respective information to the controller. For example, the confirmation indication may be provided manually by a user of the respective device 120, or may be provided automatically by the respective device 120, based on the privacy settings of the device 120.

**[0061]** At step 306, information received from the subset (as well as, optionally, from controller 120' (FIG. 1)) is combined to determine a characteristic of the environment, for example, by scene analysis module 242 (FIG. 2B) of controller 120'.

**[0062]** At step 308, it is determined whether the subset should be adjusted, for example, by device selection/data acquisition module 240 (FIG. 2B) of controller 120'. For example, the subset may be adjusted based on an event detected by a local data analysis module 204 (FIG. 2A) of one or more devices 120, the characteristic of the environment, any context from the characteristic, the location of devices 120 (FIG. 1) (e.g., position, orientation in space), demographics from the characteristic, any social-graph membership among devices 120, etc. For example, if one device 120 (FIG. 1) detects a gunshot, device 120' may expand the subset of devices 120 to additional devices (to triangulate the location of the gunshot) and/or to send a warning indication to all devices 120 in range.

**[0063]** If it is determined, at step 308, that the subset should be adjusted, step 308 proceeds to step 310. At step 310, selection of the devices in the subset may be adjusted and/or a configuration of selected devices of the subset may be adjusted, for example, by device selection/data acquisition module 240 (FIG. 2B). For example, different devices 120 (FIG. 1) may be switched on or off. As another example, different sensors of sensor modules 202 (FIG. 2A) may be configured to acquire sensor information.

**[0064]** If it is determined, at step 308, that the subset should not be adjusted, step 308 may proceed to step 304, to continually determine a characteristic of the environment.

**[0065]** Alternately, step 308 may proceed to step 312 (environmental monitoring), step 314 (localization and tracking), step 316 (topic monitoring), step 318 (triggering events) and/or step 320 (other monitoring and regulation). The characteristic of the environment may be used for a number of different applications, which are described further below.

**[0066]** Referring generally to FIG. 1, in an exemplary embodiment, a platform may be developed to enable users to develop applications that: harness a set of these devices 120; acquire signals from devices 120; switch subsets of devices 120 on or off (based on information about context, including position, orientation in space, social-graph membership, and demographics); process and analyze information obtained from sensors of devices 120; set triggers to enable or disable sensing, processing or analysis;

and adapt system 100 to sensed, processed or analyzed information. The platform may allow individual devices 120, 120' to be customized and personalized to users (consumers) to mitigate, amplify or pass-through acoustic and other information to users based on acoustic and other information acquired from one or more devices.

**[0067]** Once such a platform is developed, applications may be developed for many of the scenarios and use-cases described herein. The platform may specify minimum hardware requirements, such as minimal sensor numbers and configuration, minimal onboard computing resources in terms of hardware and software, and an application programming interface (API) to allow developers to access all the features and resources available on the device.

**[0068]** An example platform specification may include: one or more microphones or a microphone array; one or more accelerometers typically to cover two or three axes of motion or orientation; a compass; an on-board GPS system; zero or more other sensors such as contact or non-contact temperature sensors; cameras with a minimal required resolution, with Bluetooth®, Wi-Fi and other capabilities; software including classifiers to analyze speech, to analyze media including music, video, and still images; software to acquire environmental metrics and analyze them in various contexts such as urban vs. suburban, and residential vs. industrial; software to preprocess signals acquired to remove or reduce noise, filter the remaining signals to identify high value signals and to transmit them to a server 140 in a compressed form if desired; a database of sound signatures; and software to handle reactive mechanical tasks in response to sensor data- all with enough power to provide a realistic and acceptable user experience.

## 2 Example use cases

**[0069]** In this section, a number of example use cases are provided to illustrate how an exemplary system 100 (FIG. 1), described above, may be used in practice.

### 2.1 Environmental monitoring

**[0070]** A number of uses relate to monitoring an environment of a set of smartphones. In a public health monitoring example, the on-board audio processor may be configured detect occurrences of coughs, typically by the owner of the device or by other people in the proximity of the device. Such detection may use, for example, statistical spotting techniques (e.g., Hidden Markov Model (HMM) techniques, Gaussian Mixture Model (GMM) techniques) trained on a corpus of recordings of coughs know as a Universal Background Model. Communication of locally aggregated results, for example, a number of coughs per hour, may be uploaded to the central server 140 or device 120' on a schedule, or when the rate deviates from an expected or maximum value. In this way, the controller 120' (or server 140) may be able to identify local "hot spots" of coughing.

**[0071]** Other educational and public health uses may be possible with epidemiological applications of such systems. For example, pertussis (whooping cough) is a highly

contagious disease and one of the leading causes of deaths world-wide that is preventable with the use of vaccines. Exemplary system 100 may be used to provide information to parents of children with coughs or with other symptoms such as asthmatic symptoms to help them decide when to seek medical help, and to provide epidemiological data about pertussis, asthma and related illnesses.

**[0072]** In some scenarios of such monitoring, only a limited subset of devices may be initially configured to perform the local processing needed to detect the coughs. However, when controller 120' determines that there is a possible hot spot of activity, controller 120' may enable further devices in the geographic proximity of the hot spot to gain further information about the extent of the situation. In some examples, the controller 120' may enable further devices based on a social proximity, for example, to account for the possible transmission of an illness to others that are close in a social sense. In addition to enabling further devices, the controller 120' may disable devices and control the overall monitoring set for the task.

**[0073]** In a variant, the system 100 may use sensed information to alert patients to asthmatic attacks in children, along with information on the child's environment at the onset of the attack, to enable them to ensure that prompt remedial or palliative action is taken.

**[0074]** In yet another variant, the system may be used to alert patients of breathing disorders such as sleep apnea. Sleep apnea is a disorder that is characterized by abnormal low breathing or abnormal pauses in breathing during sleep, often accompanied by snoring. Often the snorer is not aware that they snore or that they could have a life threating medical issue, and they suffer from fatigue, daytime sleepiness and other symptoms, often for years and years. Diagnosis often requires an overnight sleep study in a special lab set up with sensors. Knowledge about snoring and having a record of snoring behavior can help in the diagnosis and remediation of this condition. System 100 may be trained to recognize snoring, and to distinguish it from other kinds of similar noises, and help in detecting and recording snoring behavior to help people with breathing disorders identify their problems and seek appropriate help.

**[0075]** In another monitoring use case, the devices 120 may be used to monitor environmental sound levels (e.g., sound pressure level), for example, for workers in a factory workplace. Devices 120 of workers monitor the noise level and maintain a record, for example, cumulative durations of various ranges of noise level. This locally-determined information may be provided on regular or locally triggered basis, for example, if the noise level exceeds certain prescribed limits (e.g., an absolute limit, a limit for accumulated time above a prescribed sound pressure level, etc.). The controller 120' (or server 140) may query further devices 120 to determine the location of high noise levels, for example, based on locally logged detailed information that correlate

noise level and location within the workplace. Also, other characteristics of environmental sound, for instance, related to the source of the sound may be detected. For example, a machine type (e.g., whistle, engine, press, saw, drill etc.) may be discriminated, for instance using pattern matching techniques (e.g., HMM, GMM techniques).

**[0076]** A similar sound-level monitoring may be used to track environmental sounds levels, for example, in particular restaurants, on particular streets, etc. and such monitoring may also identify time-of-day variation of such levels. Ornithologists may be interested in the ability to monitor the presence or absence of bird songs over time and space. Others might be interested in using sound arrays to monitor insect infestations. Exemplary system 100 may make it possible to compare treatment areas with controls to measure the effectiveness of proposed countermeasures. In some examples, if the device 120 is not connected to the communication system 150, information is logged, time stamped and stored in a non-volatile memory and then uploaded when the device 120 is once again connected or its memory is interrogated. This may be typical after an automobile accident or other fatal or non-fatal incidents.

**[0077]** If a large number of cars on the same highway suddenly decelerate at the same time, then the network could decide to issue a warning to cars a few miles behind the obstacle. In addition, the ability to measure traffic flow using an array of smartphones (equipped with communication networks and sensors such as accelerometers and microphones and GPS/location sensors) has the potential to improve traffic routing in the short term, and traffic planning in the long term. Many of the applications envisioned in the present invention may have both short-term and long-term benefits. Short-term benefits use networks with low latency (such as the radio stack), whereas long-term applications can make use of networks with longer latency (such as uploading information at the end of the day when the device is docked in a networked cradle).

**[0078]** In another monitoring use, phones may be enabled to "name that tune" in the environment, and both provide the owner to download that song to their device library and upload the location of the playing to the central controller, which monitors the aggregated presence of different songs. Consider a music festival with several stages, where different groups are playing. As the user walks around these stages, a network of systems may be continuously acquiring audio data, detecting and isolating, for instance, music, identifying the music and showing users the name of the piece being played, the album, the artistes playing etc. The system may provide a mechanism for users to purchase the music if it is of interest to them. There are stand-alone programs to identify music being played, but they require a single device to collect a good sample of music, send it to a server and then possibly identify the music. In contrast, by having a

network of devices 120 collect data, data acquisition is more robust and distributed, and users are able to get their music identified faster.

**[0079]** Detection of particular music being played in the environment of devices may be aggregated to determine marketing related information. By monitoring what people hear as they go about their lives, the system may acquire considerable information about the media segment. The information captured on music played, the artiste/group being played, the volume of music purchased etc. is very valuable, especially when pivoted on various dimensions. In addition, in stores where music is sold, features such as the audio background and lingering behavior may also be valuable.

**[0080]** These devices may also be used to share information about what users listen to or see, or to find out what their friends are seeing or listening to. Currently users have to take the effort to tweet or post their music-playing or video-watching behavior. However, a few days of this can get tedious, and soon users may no longer post information on their listening or viewing habits. Exemplary devices 120 may automatically identify songs or TV programs, inform friends in the users' social graph or create virtual communities of users with similar listening or viewing interests.

2.2 Localization and Tracking

**[0081]** Some use cases take advantage of the multiple locations of the devices 120 to perform localization and/or tracking of audio sources. In one example, aircraft noise data may be obtained by having a "jet detector" implemented in the on-board audio processor of a set of devices 120. Upon detection of a loud jet noise, which is reported to the controller 120' (or server 140), other devices 120 in the proximity of the reporting device(s) 120 are enabled. Buffered time stamped audio and device location data is uploaded to the controller 120' (or server 140), where a triangulation approach may be used to determine a track of the detected audio source. Based on the track, further devices 120 may be enabled along the project track so that the audio source may continue to be tracked. If the source is lost (i.e., doesn't follow a predicted tract), more devices 120 over a larger area may be enabled to re-acquire the location of the audio source. In this way, an overall assessment of the audio tracks of loud aircraft may be determined based on the aggregated acquired audio data.

**[0082]** The selected set of devices 120 effectively acts as a configurable microphone mesh for acquiring audio data. In other examples, the devices 120 can act as a configurable accelerometer mesh for acquiring spatially and/or temporally distributed motion-related data.

**[0083]** Similar tracking information may be used, for example, to track sirens in a city. Such tracking may be used, for example, to predict traffic flow in a city that may be affected by an emergency.

**[0084]** Another type of localization may be used in near real-time or in an after-the-fact forensic mode. For example, the devices 120 may be carried by police officers or bystanders near the scene of a shooting. After detection of a gunshot event by one or more of the devices 120 (e.g., the officers' devices), the controller 120' (or server 140) may upload locally buffered audio from the officers' devices 120 or other devices 120 in the environment, and perform a localization of the source of the shooter's location. In a near real-time example, this information may be provided to the police officers to aid in their police duties. A similar type of arrangement may be used in a military situation in which audio is buffered at devices 120 carried by multiple soldiers, and the combined information may be used to estimate the direction of a sniper location.

**[0085]** Note that a central server 140 is not necessarily required. For example, devices 120 may locally exchange information to perform aggregated analysis, such as localization. In one such example, each device 120 may include a detector for an event of interest (e.g., gunshot), and upon detection of the event may pass the raw audio or a partially processed version of the audio (e.g., an intensity time profile) to nearby devices 120 (e.g., using ad hoc wireless communication), which perform local assessments of shooter direction based on the information they obtain.

**[0086]** In yet another scenario, these devices 120 may be used for adaptive crowd control. In situations with high traffic, whether vehicular or pedestrian traffic, these devices 120 may be configured as a mobile ad hoc network to estimate traffic flow from noise, with no requirement for any fixed or embedded sensors. Using the dynamically acquired traffic pattern information, the system 100 may broadcast instructions though the devices 120 or through other means to direct people through paths of lower traffic density, open up different gates or paths, or use sonification or acoustic visualization to alert users to high traffic versus low traffic paths.

**[0087]** A related idea is to create mobile sound-based security systems where the system 100 is able to quickly learn about ambient conditions and sound trends, and use this to signal situations away from normal conditions.

**[0088]** In another use case, these devices 120 may use sentiment detection and emotion detection to identify centroids of trouble in large crowds. A variant of this system 100 can be used to detect user dissatisfaction in their language, or in non-speech audio to alert management to, for example, open more counters in stores.

**[0089]** When users try to meet up with friends in large auditoria or sports stadia, it is often impossible to use mobile phones or to hear conversations on phones. The system 100 may use knowledge of users' social graphs to indicate the presence of friends using directional sonic visualization or sonification, with some variation in tone or volume as users approach their friends. Using the peer to peer architecture of the system 100 along with the knowledge in each device 120 about its neighboring devices 120 and their

features, the system 100 can quickly and effectively determine the possible locations of friends. By utilizing the position information, and the orientation information acquired from the user's device 120, the system 100 can provide differential tones, volumes or other signals to indicate whether the user is moving towards or away from their friends (and whether they are pointed towards or away from their friends), and provide an indication about how far away they are. The precision of this indication may go up with the number of peer devices 120 contributing information to the system 100.

**[0090]** In another localization use case, a number of devices 120 may be enabled to sense audio, for example, for a group conference call. The locally acquired audio may be used to identify the location of the speaker, and to control which device 120 (or devices 120) are used to generate the audio for the call. For example, a device 120 closest to the person speaking, or the device 120 providing the highest signal quality or intelligibility, may be selected, thereby providing an improved audio quality.

**[0091]** In another localization use case, devices 120 may be tracked during a shopping trip, for example, in a grocery store or at a mall. The track taken by the user with corresponding audio or video information may be used to identify areas of customer focus and interest, and provide user-specific information, for example, promotional information related to purchase opportunities in the vicinity of the device 120.

**[0092]** After-the-fact analysis of a track may be used to correlate movement with actual purchases made, or to possible interest in various classes of items. For example, a relatively high time spent in the vicinity of a product type may indicate an interest in that product type. Users may be interested in opting in to having their path tracked in exchange for receiving promotions.

2.3 Topic monitoring

**[0093]** In another use example, a device 120 may be enabled to monitor the owner's environment as they converse during the day, and as they listen to media broadcasts. Topic detection techniques, for instance, based on spotting topic-related keywords, may be used to assess topics of interest to the user. During the day, or in a periodic summary, the user is presented with collateral information related to the topics. For instance, if the user enters into a conversation about a particular topic, recent news or background material may be offered on the device 120. Such topic monitoring may also be useful to provide other targeted material to the user, for example, in the form of advertising that is relevant to the user's interests.

**[0094]** The configuration of other devices 120 may be adapted based on what is detected at the user's device 120. For example, other devices 120 in geographic or social proximity to the user's device 120 may be configured to detect the presence of similar topics. In this way, the other devices 120 may have a higher likelihood of

correctly detecting the topics. Furthermore, the controller 120' or server 140 may be able to track the extent of interest in a topic.

**[0095]** Another topic-related monitoring use may be related to a third party requesting detection of audio signals, such as audio components of advertising to determine where these advertisements have been played. For example, an advertiser may have controller 120' or server 140 configure devices 120 to detect an advertisement, and then determine where the advertisement has been played and potentially heard.

**[0096]** In a related use case, the system 100 may use information garnered from the sensors of devices 120 and from other sources such as electronic program guides (EPG) to identify what programs users have been listening to or viewing, to get Nielsen-like viewership statistics or to acquire business intelligence. Current systems tend to rely on home systems or manually created diaries, both of which are prone to error. Using exemplary devices 120 and exemplary system 100 may allow for this monitoring to be done wherever the user is, and whatever media device they use, and to use information from user activity to distinguish active listening or viewing from, for instance, a TV playing to an empty room.

2.4 Triggering events

**[0097]** Generally, use cases described above use various triggering events to begin local logging of audio and/or to initiate communication with the server 140, device 120' and/or other nearby devices 120. In addition to audio-based events (e.g., specific words, spoken topics, music, sounds, etc.), other events may trigger monitoring and/or communication. For instance, content of text communication (e.g., Short Message Service (SMS) messages) may initiate monitoring and/or configure what is to be searched for. Other data, such as accelerometer data, biometric data, and detection of a video image (such as change in luminance, etc.) that is available to the device may also be used in a trigger. For example, high acceleration may be associated with a vehicle accident or a fall, and this may initiate audio monitoring or communication with the server 140 (or device 120'), which may be able to determine if an accident has occurred based on the audio scene 130, in which case emergency help may be summoned.

**[0098]** The system 100 may also be used in the care of the elderly and the disabled. Currently senior citizens and the disabled can purchase a conventional device to signal when they need help, for example if they fall or feel dizzy. However, these conventional systems require the user to consciously make a decision and press a button on the device to ask for help. The problem is that there may be situations where the user cannot make the decision, may be too embarrassed to ask for help, may feel their problem is not critical enough to ask for help, or may not even be able to access the button to call for help. For instance when the user has a stroke or if they have a fall, it

may be difficult for an elderly user to press the button. The system 100 described here may use data fusion ideas to combine speech and noise detection from one or more devices 120 along with other accelerometer data to detect calls for help, or sounds from falls, dropped objects, etc., distinguish between false alarms and real problems, and summon help when required as well. System 100 may also be able to turn on the speaker phone to have a dialog with the "help" side of the call.

**[0099]** In another form of triggering event, when a device 120 is removed from the direct acoustic environment, for example, by being put in a user's pocket, the change in audio signal characteristics may trigger a message to the controller 120' or server 140 to indicate that the device 120 is no longer available for acquiring audio based on a poor signal-to-noise ratio (SNR) operating environment. Similarly, when the device 120 is taken out of the pocket, it may again start monitoring the environment and/of notify the controller 120' (or server 140) that it is once again available. In addition, when the device is no longer obtaining adequate SNR, the device 120 may be able to enable other devices 120 within its proximity to acquire the signal and thus improve the overall SNR. In addition, many devices are now manufactured with multiple microphones (primarily used for beam forming) as to obtain an improved SNR for the user. As the user may often carry the device 120 in their pocket or purse, system 100 may be able to select which microphone in the device 120 is desirably enabled or what beam forming array would be best evoked to obtain a maximum SNR.

**[00100]** In some examples, vehicle texting is disabled by the system 100. By detecting an acceleration signature consistent with being in a moving vehicle and/or by picking up the type of sounds picked up while driving, the device 120 can detect road noise, the engine noise, wheel bearing noise, breaking noise All of these sounds may be used to either disable or enable the user from utilizing their device 120 for texting while the car is in motion. The device 120 may query its proximity and determine if other devices 120 were present within the body of the automobile. Assuming the answer were yes, further analysis may be used to provide limitations on the driver's device 120 from texting while still allowing the balance of the individuals to text. Some cars also disable or limit select navigational controls for safety reasons when the car is in motion. If the device 120 is able to detect a front seat passenger, the system may choose not to limit navigational controls.

**[00101]** In some examples, key word spotting obtained from in-situ conversations is aggregated from both the sender and recipient. During the course of normal telephone conversations, the device 120 may identify specific sounds, words, etc being uttered by both parties of a conversation. The system 100 may interrogate these sounds and provide the user with information either thru a graphical user interface (GUI), or audio

based or text based feedback. As an example, assuming a call was about a trip to Paris, the device 120 could render information about promotional pricing on an airline to Paris.

**[00102]** One or more of these devices 120 may be used to identify trends in audio and other information acquired by these devices 120, for example using keyword spotting in audio streams. Keyword trends may be used to adaptively mediate or modify information consumed by users. In one scenario, information sources such as news media, search engines and similar information outlets may acquire information on trends from individual users or groups of users, and show different items to different users based on keyword trending. Specifically such a system 100 may choose topics users have been known to prefer.

**[00103]** Trending on non-speech audio may be used to identify patterns of people flow or vehicular flow. Aggregated logs of speech and non-speech audio may be used for a number of diverse applications, including identifying less noisy apartments or houses to rent or buy and areas of hotels or theater halls that may be better soundproofed. Longer term trending and identification of trends and periodic variations may be used for soundproofing or weatherproofing offices and residences.

2.5 Other aspects and uses

**[00104]** The ability to aggregate information over many smartphones can be provided with or without the cooperation of the carriers. It could be done, for example, with a third party application, which doesn't need the approval of a particular carrier and communicates via Wi-Fi or Bluetooth®. In this way, information can be aggregated across phones serviced by multiple competing carriers.

**[00105]** In some exemplary embodiments of the system 100, the system 100 may trigger off key events such as rapid deceleration of several cars at the same time and place, sirens, keywords, etc. The ability to collect vast quantities of data may improve the triggering capability. Search companies are providing better search relevancy than ever before, largely because they are collecting more data than was possible before the popularity of modern search engines. But with the exemplary system 100, it may become possible to collect even more data. If every phone were collecting audio data for an hour a day, the aggregate data resource would be much larger and much more valuable than the data collections currently collected by even the largest search companies.

**[00106]** In some exemplary embodiments of the system 100, if a device 120 in the system 100 may detect certain important keywords and phrases like "fire," then the system 100 may respond appropriately. The importance and urgency of a term depends both on the consequences of inaction as well as term weighting concepts that are well known in the field of Information Retrieval.

**[00107]** Similarly, if a system 100 hears an important term (such as a keyword like "fire" or a non-word like a cough or an event picked up on some other sensor of device 120 such as a rapid deceleration), then the system may turn on numerous other nearby sensors in the array to confirm the event, to improve the signal to noise ratio and/or to localize the event in time and space.

**[00108]** In some uses, trending analysis may use the large amount of data available through the system 100. Consider the cough example mentioned above. Aggregations of coughs over time and space may provide tracking of health over time and space. The approach is similar some approaches to prediction of the flu based on queries where they showed that they could predict flu a couple of weeks faster than the Centers for Disease Control and Prevention (CDC). But the proposed cough metric should have even better resolution over time and space since it is based on a larger quantity of sensed data.

**[00109]** Collection of large amounts of sensed data provides a way to systematically predict (e.g., according to a statistical model) sequences or sets of sensed events of other information. Such prediction may effectively be exploited based on principles related to Shannon's Noisy Channel Model, for example, to improve transmission capacity for such events. For example, such data can allow one to create a better "language model" for events, which will do a better job of predicting what sounds to expect to hear (the prior for the noisy channel model) as well as sounds that are anonymous (triggers that should sound alarms and start recording).

**[00110]** In some examples, workplace monitoring (and monitoring of the environment) may be enabled by the system 100. The system 100 may effectively provide "smartdust" on smartphones, which is able to monitor workplaces for health issues by measuring acoustical events like coughs. Moreover, in some uses, the system 100 may sense correlates of stress such as noise. Some call centers, for example, have more stress related illnesses because the call volume has relatively large numbers of unhappy customers. It may be possible to predict risk of certain types of illnesses well before symptoms develop, both at work as well as elsewhere.

**[00111]** An ad hoc network of devices 120 may be used to fine-tune a number of features. Consider concert-hall acoustics, for instance. Concert halls are typically tuned for the major uses of their space. For example, a symphony hall may be tuned especially for a large group of artistes and their instruments, and may not be as well suited to, for example, solo vocalists. Sound quality in a hall is also dependent on the size of the audience, their ambient noise characteristics etc. The network of system 100 may enable data to be acquired from a large number of devices 120 in the audience, so that the hall management can adapt to the ambient noise levels and fine-tune sound

levels for any performance, with any number of performers and instruments, and with different audiences.

**[00112]** The ad hoc network can also be used for monitoring and regulatory purposes. Sound pressure levels or similar measures of rock concerts, gym classes and other potentially noisy environments may be monitored against safe listening levels, and infractions reported to the appropriate management or regulatory agency.

**[00113]** A similar scheme may be used to fine-tune the temperature in large auditoria, rooms or halls, based on data acquired from a number of devices 120 and individual sensors in that space. Large spaces have their own airflow and heating and cooling patterns, based on placement of air ducts, windows, doors and other openings. Heating and cooling is typically based on measuring temperature in one and occasionally more sensing locations. If the sensor is near a sunny window or a draft caused by a constantly open door, the temperature in that space can be unsatisfactory. By measuring temperature in several locations using a set of devices 120 as described in this invention, it will be possible to have finer, more localized control of temperature.

**[00114]** Some exemplary embodiments of the system 100 may make predictions based on a small sample of "opt ins." The system 100 (e.g., "cloud") may be equipped with appropriate logic to determine how to make appropriate inferences based on information gathered from those phones 120 that choose to opt into the system 100. Many of these inferences are relatively straightforward, though care may need to be taken to account for the fact that the sample is not a random sample. The set of people that own a smartphone and choose to participate will be skewed toward certain demographics, at least in the near term.

3 Backup communication uses

**[00115]** In some versions of the system, the mesh-like features of the set of personal devices 120 may be exploited. Cell phones may be viewed as relatively passive (receive only) devices, but there are times, such as during an emergency, where it could be desirable to be able to deploy an active communication network very quickly as an overlay to more traditional telephone and internet networks.

**[00116]** During an emergency such as a man-made event like 9/11 or a natural disaster such as a major hurricane, it is possible that parts of key communication infrastructures could be down. There was a time when telecommunication networks were much more protected than they are these days. The telephone network used to be more reliable than the power grid. Central offices are typically backed up with batteries and generators (and submarine doors in places like New Orleans that are subject to flooding). Plain old telephone service (POTS) handsets used to be powered from the central office, so the service could stay up even if the standard power grid was down.

**[00117]** These days, most handsets sold in popular stores depend on the power grid. Most phones have lots of features and a power cord. Some have battery backup, but there is little incentive to replace the battery. Soon, the battery backup feature may be a thing of the past because many people aren't willing to pay for such features. Engineers like to design bridges for the hundred years' flood, but it is hard to persuade customers to pay for features they probably won't use. Given these realities, it is desirable to develop a way to deploy a backup network just-in-time. Unlike batteries and generators, which are expensive whether we use them or not, a backup network based on phones typically won't cost the public much if any additional capital, because most of the equipment is already in place.

**[00118]** Key features of a backup network:

1. Two-way communication: Telephone receivers normally receive but they can also be used to store and forward information. Thus for example, if a phone was on a mobile platform (say in a pocket or in a car), then the phone could be used in sneakernet mode to store a signal in one place and repeat it from another place.
2. Damage Assessment (the ability to determine quickly and easily what is working and what is not): During 9/11, there were many outages (e.g., fiber cuts under #7 World Trade Center, cell towers on the rooftops, switches under both #1 and #2 World Trade Center, police and fire radio communication in certain places), but some things were working (e.g., cell towers in New Jersey, BlackBerry™ email, systems based on satellites). A key requirement is to determine what is working and what is not, and to communicate workarounds to those that need them. An array of cell phones in a multitude of pockets and cars could determine fairly quickly what is working and what is not. Hopefully, some of these devices may be connected to something that is working (such as a satellite) or would eventually move out of the affected area so enough of them could report an accurate and timely damage assessment picture back to the cloud. Using this information, both digital and real world traffic may be adaptively rerouted.
3. Workarounds: Municipal vehicles such as buses have batteries and generators. Soon, such vehicles may also have Wi-Fi that is connected to satellites. The cloud could direct such resources where they are needed most.

**[00119]** An acoustical array, such as what is described herein, may also be used in damage assessment. For example, the acoustical array may determine both whether there is too much noise (e.g., explosions) as well as too little noise (e.g., absence of human activity), aggregated over time and space.

4 Authorization and privacy

**[00120]** In some exemplary embodiments of the system 100, privacy considerations may be addressed using one or more features, which may include the following. First,

monitoring may be enabled on a device 120 only if the user explicitly "opts in" to permit particular monitoring options. A reason that a user may accept such monitoring is that he, in return, obtains information that is valuable to him, for example, by being provided more relevant search results or other information. Another feature relates to encryption of the monitored information. For example, audio may be encrypted in a manner than prevents interception during uploading and/or processing by a controller 120' or server 140. Furthermore, in systems 100 in which multiple central controllers are used (e.g., one controller 120' or server 140 per cellular telephone carrier), the user may explicitly permit sharing between or among controllers.

**[00121]** In some examples, devices 120 may have features that inhibit collection of audio environment data. Such features may be mechanical (for example, mechanically preventing audio pickup with a shutter mechanism) or can be electronic (for example, with an electronic slider switch on the device).

**[00122]** In some examples, sensors can be selectively turned on or off both at the edge of the network (in the smartphone), as well as in the network (in the cloud), as well as elsewhere. For example, the operator of a movie theatre may have the ability to turn off speakers that would annoy others in the movie theatre, and similarly the operator of an airplane should have the ability to turn off communication features that could jeopardize the safety of fellow passengers. Moreover, after an incident, such as a plane accident, the authorities should have the ability to probe (via a wired or wireless interface to the memory of the phone-could be non-volatile) the smartphones on the plane for information that could be helpful in the investigation. In other words, the array of smartphones on the plane could serve as a kind of "black box" to prevent similar such incidents in the future.

**[00123]** However, privacy is also important in at least some versions of the system 100. In some exemplary embodiments, the owner of the smartphone should have the ability to pull the curtain with confidence that the phone is not invading the user's privacy, even if the phone has been taken over by a virus. When the curtain is pulled, the user wants to be sure that the phone is not recording information that could be embarrassing or self-incriminating. The phone should not be recording information that could be subject to subpoena or a court order such as discovery. The user should have the ability to opt out in a way that cannot be overridden by the owner of the network, government authority, or anyone else (such as a malicious hacker). For example, privacy may be implemented by a switch, as described further below.

**[00124]** Feature interaction can be a tricky problem in a communication network. While it is desirable that many parties have the ability to turn on and off certain features in certain ways, as discussed above, it is also important that it be clear to all parties

what happens when different parties issue commands that may conflict with one another in complicated and unanticipated ways.

**[00125]** In particular, in at least some exemplary embodiments of the system, the owner of the phone ought to be in charge. In such embodiments, the owner may have the ability to physically disconnect the sensors in a way that cannot be overruled by any other party. One such method may include a physical switch that would disconnect the sensors in a way that the user can verify by visual inspection of the phone. The physical switch may be operated manually by the user and cannot be overridden remotely under software control.

**[00126]** In addition to the physical switch, there may also be a software controlled switch that may empower authorized parties to turn on and off features such as recording of sensors, recognizing keywords and uploading appropriate information to the cloud where inferences can be made that aggregate over space and time. Policies may eventually be determined regarding who is allowed to do what, and what is appropriate and what is not.

Other devices

**[00127]** As introduced above, the exemplary approaches described above are not limited to smartphones. For example, in-vehicle systems (e.g., navigation devices), media devices (e.g., televisions, set-top boxes, desktop computers, laptop computers), and other fixed or mobile devices may be used in similar ways. For example, in the case of an in-vehicle navigation system, an in-vehicle conversation may be monitored and information about a location (e.g., a restaurant) that is being discussed may be provided on the device's display.

**[00128]** Another type of device that may be used in such a system is an earpiece that provides audio input and output for a telephone (device). An advantage of monitoring with the earpiece is that it is exposed to the acoustic environment even when the associated phone is not exposed to the environment, for example, when the phone is in a user's pocket, thereby providing an improved signal-to-noise ratio (SNR). Another embodiment may have the entire mobile communication (cell phone) being integrated into the earpiece.

**[00129]** Another type of device 120 that may be used in such a system 100 is a hearing aid. The hearing aid may allow the entire feature set thus described in herein to be made practical. The advantage of this is data which could be mined from this age population is thought to be very different for the generation of users who typically use headphones for their communication activities.

**[00130]** Use of earpieces as described above can be thought of as ownership or control of the "last inch," which is similar to the ownership of the "last mile," which has been strategically important in the telephone business. The same dynamic underlies the

debate over net neutrality. So too, ownership over the last inch will become strategically important in the war over eyes and ears. The web is currently about eyeballs and mouse clicks, but soon the war will move to a struggle for access to ears as well as eyes. The hearing aid or earpiece could be viewed as a chief of staff. It gets to decide what the user hears and what the user doesn't hear. The hearing aid could give the wife preferred access. It could also block spam, and filter out unwanted commercials. Alternatively, the hearing aid or earpiece could run an auction similar to a paid search, where the hearing aid is a market maker that attempts to find an equilibrium between the need of the user for relevance and utility to the advertiser.

**[00131]** These auctions typically use a Vickrey auction to encourage advertisers to bid their true utility. If the user chooses to follow up on an ad (with a mouse click), then the advertiser pays the second highest bid. The hearing aid or earpiece could work in a similar way though, perhaps, instead of clicking on an ad, it might be easier for the user to participate by some other means such as a spoken command.

**[00132]** Although the invention has been described in terms of systems and methods for processing information from a plurality of distributed devices, it is contemplated that one or more steps and/or components may be implemented in software for use with microprocessors/general purpose computers (not shown). In this embodiment, one or more of the functions of the various components and/or steps described above may be implemented in software that controls a computer. The software may be embodied in non-transitory tangible computer readable media (such as, by way of non-limiting example, a magnetic disk, optical disk, flash memory, hard drive, etc.) for execution by the computer.

**[00133]** For example, some of the software may include instructions for execution at the personal devices 120 and device 120'. This software may be stored on a non-transitory tangible computer readable medium at a central location, for example, at a server 140 for distribution to the devices 120, 120', may be transferred over a digital communication medium, and/or stored in a machine readable medium at the devices 120, 120' (e.g., as downloaded applications/applets). Some of the software may be hosted at central servers 140 (e.g., in a distributed "cloud" of processors) and made accessible by storing it on non-transitory tangible computer-readable media for execution on processors of the servers 140.

**[00134]** Although the invention is illustrated and described herein with reference to specific embodiments, the invention is not intended to be limited to the details shown. Rather, various modifications may be made in the details within the scope and range of equivalents of the claims and without departing from the invention.

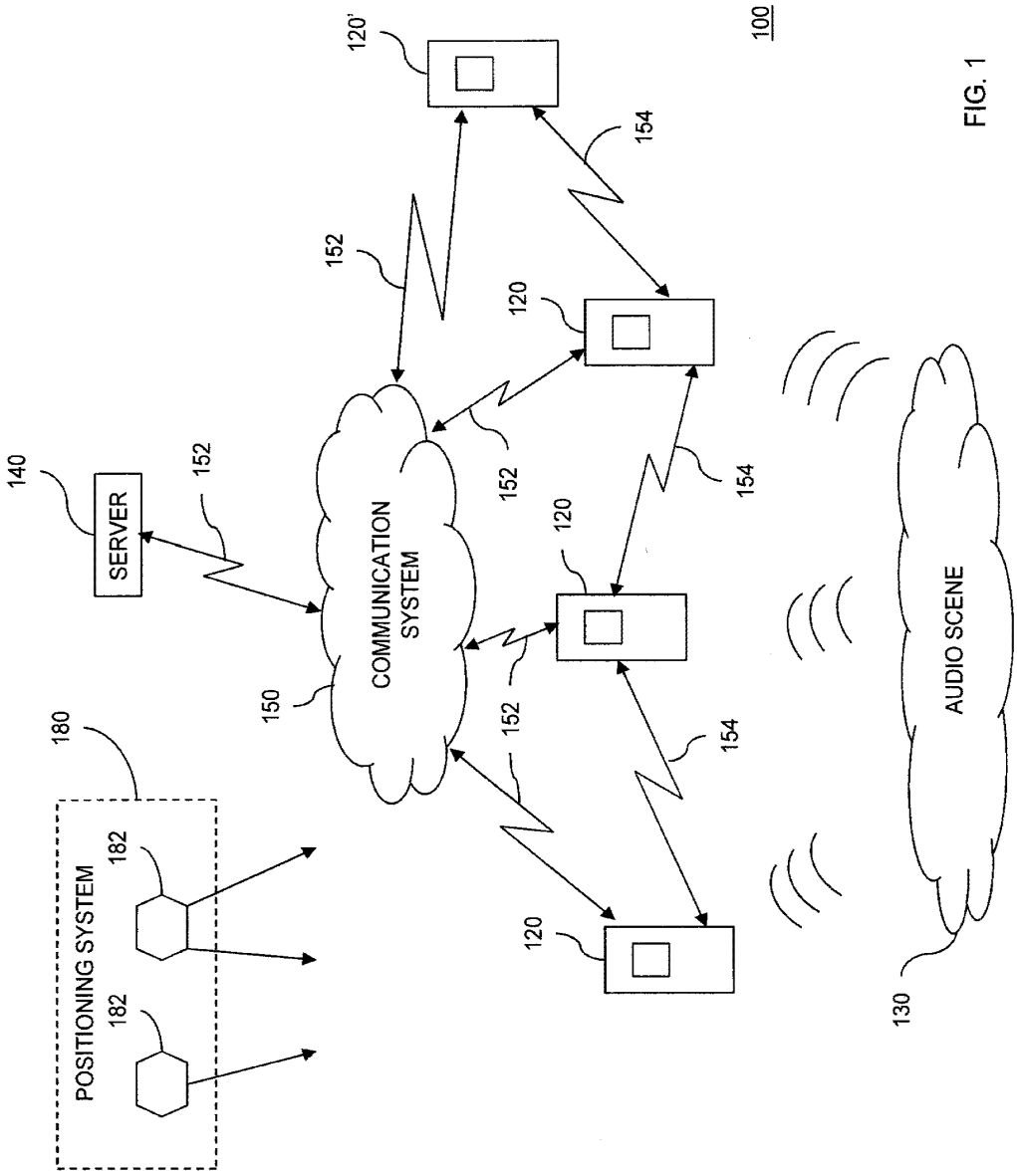

100
120'
154
152
120
152
154
140
SERVER
152
COMMUNICATION SYSTEM
150
120
152
154
180
POSITIONING SYSTEM
182
182
120
AUDIO SCENE
130

FIG. 1

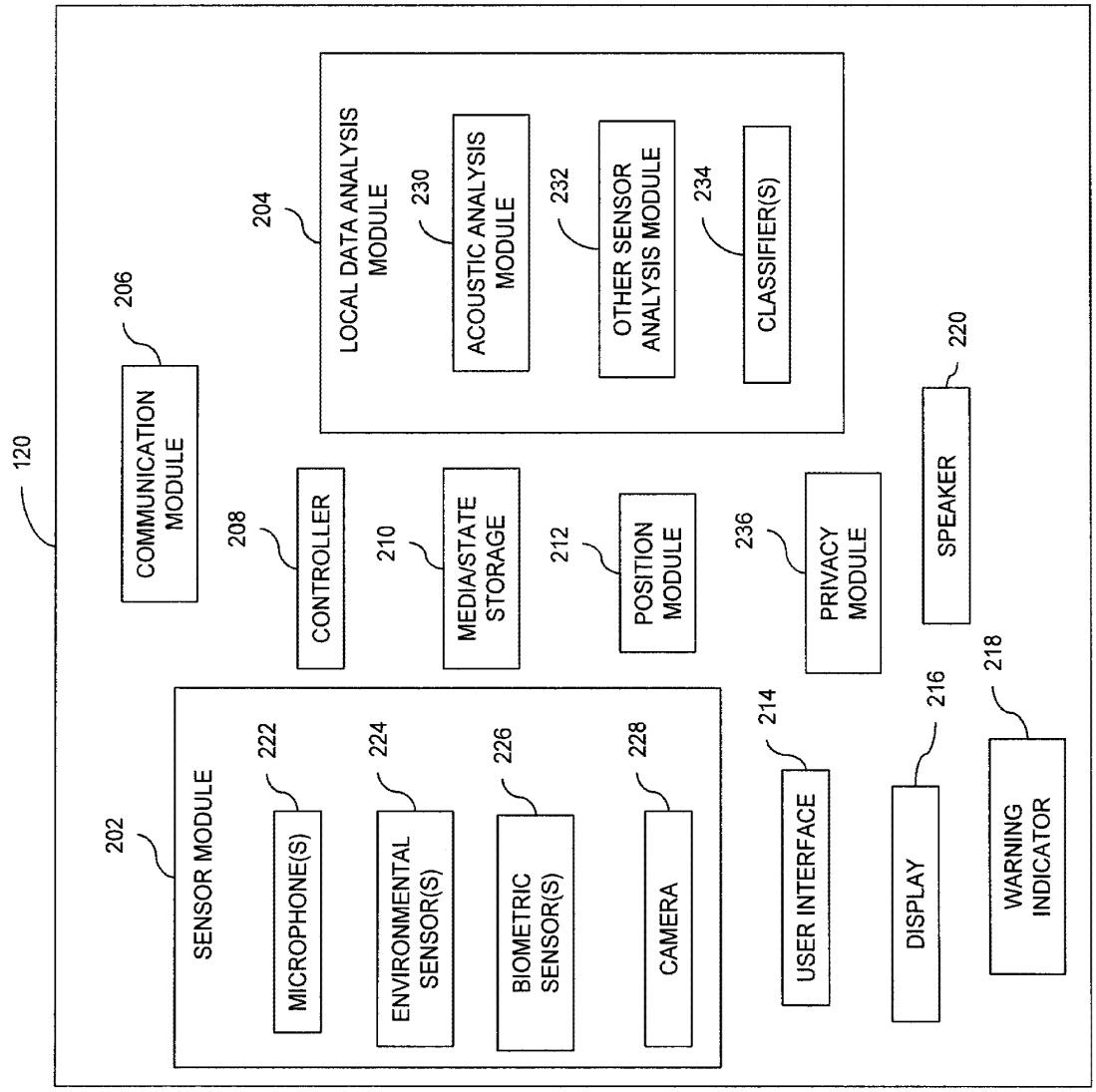

120
COMMUNICATION MODULE
206
LOCAL DATA ANALYSIS MODULE
204
ACOUSTIC ANALYSIS MODULE
230
OTHER SENSOR ANALYSIS MODULE
232
CLASSIFIER(S)
234
CONTROLLER
208
MEDIA/STATE STORAGE
210
POSITION MODULE
212
PRIVACY MODULE
236
SPEAKER
220
SENSOR MODULE
202
MICROPHONE(S)
222
ENVIRONMENTAL SENSOR(S)
224
BIOMETRIC SENSOR(S)
226
CAMERA
228
USER INTERFACE
214
DISPLAY
216
WARNING INDICATOR
218

FIG. 2A

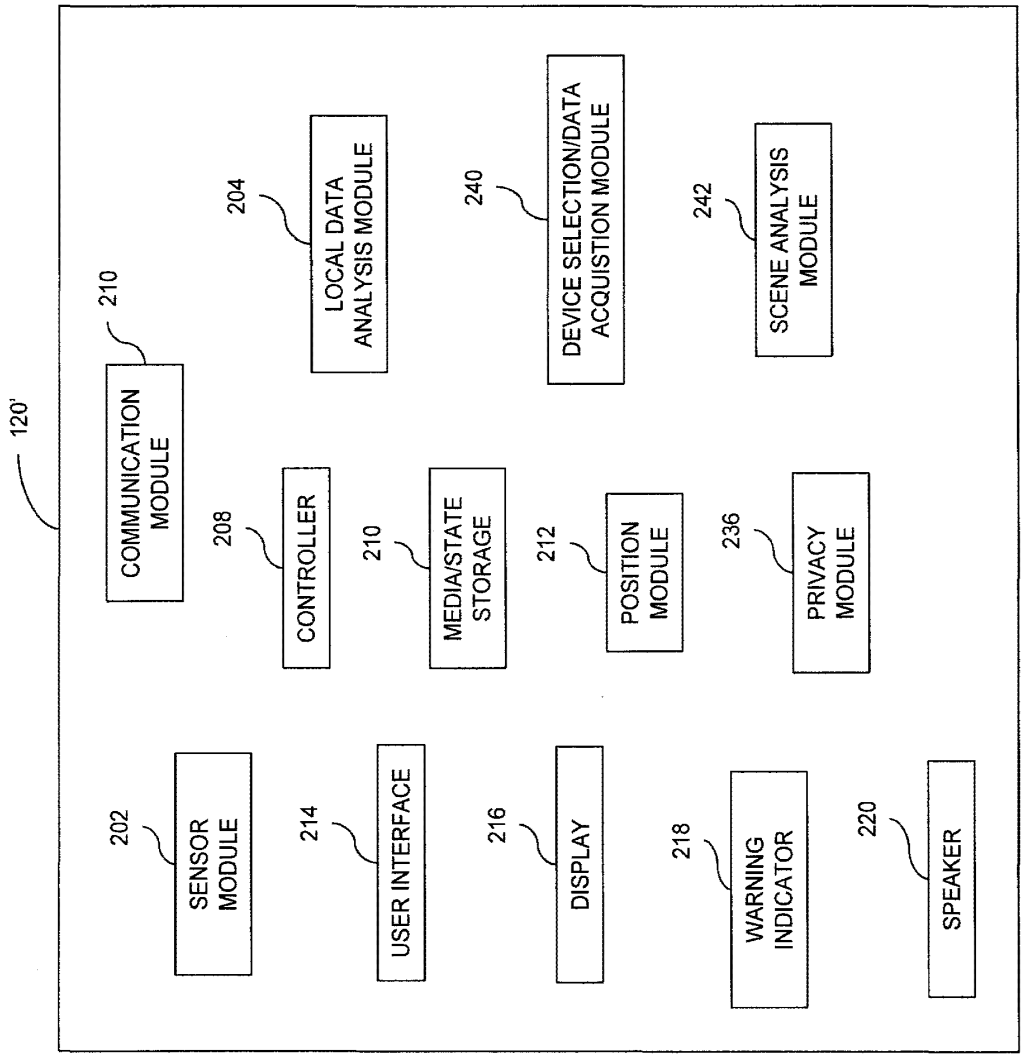

120'
COMMUNICATION MODULE
210
LOCAL DATA ANALYSIS MODULE
204
DEVICE SELECTION/DATA ACQUISTION MODULE
240
SCENE ANALYSIS MODULE
242
CONTROLLER
208
MEDIA/STATE STORAGE
210
POSITION MODULE
212
PRIVACY MODULE
236
SENSOR MODULE
202
USER INTERFACE
214
DISPLAY
216
WARNING INDICATOR
218
SPEAKER
220

FIG. 2B

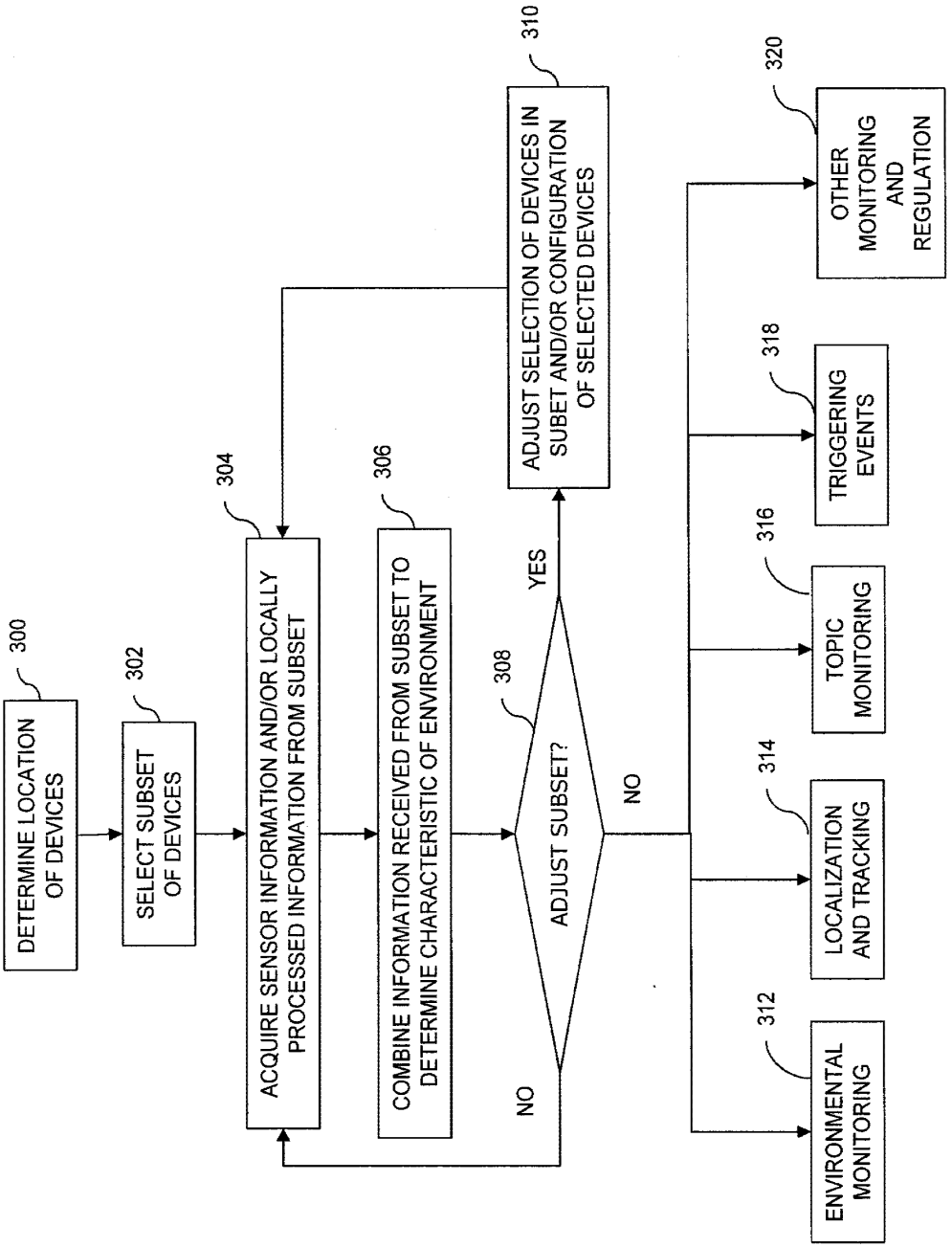

DETERMINE LOCATION OF DEVICES
300
SELECT SUBSET OF DEVICES
302
ACQUIRE SENSOR INFORMATION AND/OR LOCALLY PROCESSED INFORMATION FROM SUBSET
304
COMBINE INFORMATION RECEIVED FROM SUBSET TO DETERMINE CHARACTERISTIC OF ENVIRONMENT
306
ADJUST SUBSET?
308
YES
NO
ADJUST SELECTION OF DEVICES IN SUBET AND/OR CONFIGURATION OF SELECTED DEVICES
310
NO
ENVIRONMENTAL MONITORING
312
LOCALIZATION AND TRACKING
314
TOPIC MONITORING
316
TRIGGERING EVENTS
318
OTHER MONITORING AND REGULATION
320

FIG. 3

What is claimed is:

1. A distributed system comprising:

a plurality of devices distributed in an environment,

each device having at least a communication capability for interchanging information with others of the devices and/or with a communication system, and

each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, and

wherein at least one of the communication system or one or more of the devices is configured as a controller, the controller being configured to: select a subset of devices from among the plurality of devices, receive information based on the acquired sensor data of the selected subset, and combine the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices.

2. The system of claim 1, wherein the distributed system includes a server hosted at the communication system.

3. The system of claim 1, wherein at least one of the devices includes at least one of a wireless device or a wired device.

4. The system of claim 1, wherein at least one of the devices includes at least one of a fixed device or a mobile device.

5. The system of claim 1, wherein at least one of the devices includes at least one of a mobile telephone device, an earpiece, a hearing aid, a navigation device, a computer a sensor module having at least one sensor.

6. The system of claim 1, wherein the one or more sensors includes at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

7. The system of claim 1, wherein at least one of the devices includes a position module for determining a position of the respective device.

8. The system of claim 1, wherein each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller for determining the characteristic of the environment.

9. The system of claim 8, wherein the local data analysis module includes an acoustic analysis module to process audio information.

10. The system of claim 8, wherein the local data analysis module includes a sensor analysis module to process non-audio related information.

11. The system of claim 1, wherein the controller is configured to determine locations for at least some of the devices.

12. The system of claim 11, wherein the controller is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

13. The system of claim 1, wherein the controller is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

14. The system of claim 13, wherein the configuration information includes data characterizing events to be detected in the sensor data.

15. The system of claim 1, wherein the environment includes an audio scene.

16. The system of claim 15, wherein the characteristic of the audio scene includes at least one of speech events or non-speech events.

17. The system of claim 16, wherein when the distributed system records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded.

18. The system of claim 1 wherein the distributed system further determines trend information across a population of users of the devices from the combined information.

19. The system of claim 1, wherein the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

20. The system of claim 1, wherein the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

21. The system of claim 20, wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

22. The system of claim 1, wherein at least one of the devices includes at least one of a user interface, a display, a warning indicator, a speaker or a privacy module.

23. The system of claim 1, wherein the controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

24. A controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices, the controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the controller comprising:

a selection/acquisition module configured to select a subset of devices from among the plurality of devices and for receiving information based on the acquired sensor data of the selected subset of devices; and

a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

25. The controller of claim 24, wherein the controller is configured to determine locations for at least some of the devices.

26. The controller of claim 25, wherein the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

27. The controller of claim 24, wherein the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

28. The controller of claim 24, wherein the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module.

29. The controller of claim 24, further comprising a sensor module including at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

30. The controller of claim 29, further comprising a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment.

31. The controller of claim 24, wherein the controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment.

32. A method for processing information from a plurality of devices distributed in an environment, the method comprising:

selecting a subset of devices from among the plurality of devices by a controller, the controller including at least one of a communication system or a device, each device having at least a communication capability for interchanging information with others of the devices and/or with the communication system, each of at least some of the devices

having one or more sensors for acquiring sensor data related to the environment proximate to the device;

acquiring sensor data by the selected subset of devices;

receiving information based on the acquired sensor data of the selected subset of devices; and

combining, by the controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

33. The method of claim 32, wherein the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the controller for the information.

34. The method of claim 32, wherein the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment.

35. The method of claim 32, the method further including determining trend information across a population of users of the devices from the combined information.

36. The method of claim 32, the method further including monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

37. The method of claim 32, the method further including determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

38. The method of claim 32, the method further including adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment.

39. The method of claim 32, wherein the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

UNITED STATES PATENT AND TRADEMARK OFFICE

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| U.S. APPLICATION NUMBER NO. | FIRST NAMED APPLICANT | ATTY. DOCKET NO. |
|---|---|---|
| 13/976,636 | Steven W. Goldstein | AMBZ-101US |

71158
RatnerPrestia
P.O. Box 980
Valley Forge, PA 19482

| INTERNATIONAL APPLICATION NO. | |
|---|---|
| PCT/US11/68103 | |
| I.A. FILING DATE | PRIORITY DATE |
| 12/30/2011 | 12/30/2010 |

**CONFIRMATION NO. 3839**
**371 FORMALITIES LETTER**

*OC000000062963040*

Date Mailed: 08/02/2013

## NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371 IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

The following items have been submitted by the applicant or the IB to the United States Patent and Trademark Office as an Elected Office (37 CFR 1.495):

- Indication of Small Entity Status
- Priority Document
- Copy of the International Application filed on 06/27/2013
- Copy of the International Search Report filed on 06/27/2013
- Information Disclosure Statements filed on 06/27/2013
- U.S. Basic National Fees filed on 06/27/2013
- Priority Documents filed on 06/27/2013

The applicant needs to satisfy supplemental fees problems indicated below.

The following items **MUST** be furnished within the period set forth below in order to complete the requirements for acceptance under 35 U.S.C. 371:

- Oath or declaration of the inventors, in compliance with 37 CFR 1.497(a) and (b), identifying the application by the International application number and international filing date.
- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.492(h) of $70 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fees required for this application is $**70** for a Small Entity:

- $**70** Surcharge.

**ALL OF THE ITEMS SET FORTH ABOVE MUST BE SUBMITTED WITHIN TWO (2) MONTHS FROM THE DATE OF THIS NOTICE OR BY 32 MONTHS FROM THE PRIORITY DATE FOR THE APPLICATION, WHICHEVER IS LATER. FAILURE TO PROPERLY RESPOND WILL RESULT IN ABANDONMENT.**

The time period set above may be extended by filing a petition and fee for extension of time under the provisions of 37 CFR 1.136(a).

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)



FORM PCT/DO/EO/905 (371 Formalities Notice)

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

**If you are not using EFS-Web to submit your reply, you must include a copy of this notice.**

NADINE V CLARK

Telephone: (571) 272-8687



FORM PCT/DO/EO/905 (371 Formalities Notice)

## PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/976,636

### APPLICATION AS FILED - PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY FEE($) |
|---|---|---|---|---|---|---|---|
| BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | 140 | | N/A | |
| SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | 60 | | N/A | |
| EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | 360 | | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | 39 minus 20 = | * 19 | x 40 = | 760 | OR | | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | 3 minus 3 = | * | x 210 = | 0.00 | | | |
| APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | 0.00 | | | |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | 0.00 | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | 1320 | | TOTAL | |

### APPLICATION AS AMENDED - PART II

AMENDMENT A

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY ADDITIONAL FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

AMENDMENT B

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE($) | ADDITIONAL FEE($) | | RATE($) | ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

AMBZ-101US PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appln. No: | 13/976,636 |
| Applicant: | Steven W. Goldstein |
| Filed: | June 27, 2013 |
| Title: | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| TC/A.U.: | TBD |
| Examiner: | TBD |

**RESPONSE TO NOTICE TO FILE MISSING REQUIREMENTS OF U.S. NATIONAL PHASE APPLICATION**

Mail Stop **PCT**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Notice dated August 2, 2013, enclosed is a Declaration/Power of Attorney in compliance with 37 C.F.R. § 1.497(a) and (b). With this submission, access is being given to a credit card account to cover the required surcharge fee of $70.

Respectfully submitted,

Jonathan H. Spadt, Reg. No. 45,122
Attorney for Applicant
Deborah M. Grove, Reg. No. 61,091
Patent Agent for Applicant

JHS/DMG/emp

Enclosures: Declaration/Power of Attorney

Dated: October 1, 2013

P.O. Box 980
Valley Forge, PA 19482-0980
(610) 407-0700

The Director is hereby authorized to charge or credit Deposit Account No. **18-0350** for any additional fees, or any underpayment or credit for overpayment in connection herewith.

2035263_1

# DECLARATION/ POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION

☐ Declaration Submitted With Initial Filing (37 CFR 1.63)

☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

☐ Supplemental Declaration (37 CFR 1.67)

| | |
|---|---|
| **Attorney Docket Number:** | AMBZ-101US |
| **First Named Inventor:** | Steven W. Goldstein |
| ***COMPLETE IF KNOWN*** | |
| Application Number: | 13/976,636 |
| Filing Date: | June 27, 2013 |
| Art Unit: | TBD |
| Examiner Name: | TBD |

**I hereby declare that:**

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

*(Title of the Invention)*

the specification of which

☐ is attached hereto

***OR***

☒ was filed on (MM/DD/YYYY) 12-30-2011 as United States Application or PCT International Application Number PCT/US2011/068103 and was amended on (MM/DD/YYYY) _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

**Authorization To Permit Access To Application by Participating Offices**

☒ If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified application is filed to have access to the application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the application-as-filed with respect to: 1) the above-identified application, 2) any foreign application to which the above-identified application claims priority under 35 USC 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified US application, and 3) any U.S. application from which benefit is sought in the above-identified application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Offices.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

| Prior Foreign Application Number(s) | Country | Foreign Filing Date (MM/DD/YYYY) | Priority Not Claimed | Certified Copy Attached? Yes | No |
|---|---|---|---|---|---|
| | | | ☐ | ☐ | ☐ |
| | | | ☐ | ☐ | ☐ |
| | | | ☐ | ☐ | ☐ |
| | | | ☐ | ☐ | ☐ |

☐ Additional foreign application numbers are listed on a supplemental priority data sheet attached hereto.

I hereby appoint:

☒ **Practitioners at Customer Number 71,158**

***OR***

☐ Practitioner(s) named below:

| Name | Registration Number |
|---|---|
| | |
| | |
| | |
| | |

as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

| Direct all correspondence to: | ☒ Practitioners Customer Number listed above; ***OR*** ☐ Correspondence Address Below | |
|---|---|---|
| Name: | | |
| Address: | | |
| City: | State: | Zip: |
| Country: | Telephone: | Fax: |

**WARNING:**

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available. Petitioner/applicant is advised that documents which form the record of a patent application (such as the PTO/SB/01) are placed into the Privacy Act system of records DEPARTMENT OF COMMERCE, COMMERCE-PAT-7, System name: Patent Application Files. Documents not retained in an application file (such as the PTO-2038) are placed into the Privacy Act system of COMMERCE/PAT-TM-10, System name: Deposit Accounts and Electronic Funds Transfer Profiles.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

| **Name of Sole or First Inventor:** | | ☐ A Petition has been filed for this unsigned inventor. | |
|---|---|---|---|
| Given Name (first and middle (if any)) | | Family Name or Surname | |
| Steven W. | | Goldstein | |
| Inventor's Signature | | | Date: Sep 3, 2013 |
| Residence: City: Delray Beach | State: FL | ~~Country:~~ US | Citizenship: US |
| Mailing Address: 16390 Maddalena Place | | | |
| Mailing Address: | | | |
| City: Delray Beach | State: FL | Zip: 33446 | Country: US |

| **Name of Second Inventor:** | | ☐ A Petition has been filed for this unsigned inventor. | |
|---|---|---|---|
| Given Name (first and middle (if any)) | | Family Name or Surname | |
| | | | |
| Inventor's Signature | | | Date: |
| Residence: City: | State: | Country: | Citizenship: |
| Mailing Address: | | | |
| Mailing Address: | | | |
| City: | State: | Zip: | Country: |

☐ Additional inventors are listed on the next page.

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 13976636 |
| **Filing Date:** | |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Filer:** | Deborah M. Grove/Edna Phelan |
| **Attorney Docket Number:** | AMBZ-101US |

Filed as Small Entity

## U.S. National Stage under 35 USC 371 Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| Oath/Decl > 30 Mos From 371 commencement | 2617 | 1 | 70 | 70 |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **70** |

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 17004453 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 71158 |
| **Filer:** | Deborah M. Grove/Edna Phelan |
| **Filer Authorized By:** | Deborah M. Grove |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 01-OCT-2013 |
| **Filing Date:** | |
| **Time Stamp:** | 12:11:31 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $70 |
| RAM confirmation Number | 17203 |
| Deposit Account | 180350 |
| Authorized User | GROVE, DEBORAH |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:<br>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees) | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Applicant Response to Pre-Exam Formalities Notice | responsemsisingrequirements.pdf | 32768<br>d5105eb743f6b311d2b1af343f8ec84af92b68dd | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Oath or Declaration filed | declaration.pdf | 233584<br>e6985178c9f76e906388d3700b5d346e8325e308 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Fee Worksheet (SB06) | fee-info.pdf | 30052<br>144a6c5c7711ded10f73c2b3612acabdc88bd824 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 296404 | | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**<u>New Applications Under 35 U.S.C. 111</u>**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**<u>National Stage of an International Application under 35 U.S.C. 371</u>**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**<u>New International Application Filed with the USPTO as a Receiving Office</u>**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| U.S. APPLICATION NUMBER NO. | FIRST NAMED APPLICANT | ATTY. DOCKET NO. |
|---|---|---|
| 13/976,636 | Steven W. Goldstein | AMBZ-101US |

71158
RatnerPrestia
P.O. Box 980
Valley Forge, PA 19482

| INTERNATIONAL APPLICATION NO. | |
|---|---|
| PCT/US11/68103 | |
| I.A. FILING DATE | PRIORITY DATE |
| 12/30/2011 | 12/30/2010 |

**CONFIRMATION NO. 3839**
**371 ACCEPTANCE LETTER**




Date Mailed: 10/09/2013

## NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office in its capacity as a Designated / Elected Office (37 CFR 1.495), has determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

| 10/01/2013 | 10/01/2013 |
|---|---|
| DATE OF RECEIPT OF 35 U.S.C. 371(c)(1), (c)(2) and (c)(4) REQUIREMENTS | DATE OF COMPLETION OF ALL 35 U.S.C. 371 REQUIREMENTS |

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE " FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1), (c)(2) and (c)(4) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** *The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363).* Once the Filing Receipt has been received, send all correspondence to the Group Art Unit designated thereon.

The following items have been received:

- Indication of Small Entity Status
- Copy of the International Application filed on 06/27/2013
- Copy of the International Search Report filed on 06/27/2013
- Information Disclosure Statements filed on 06/27/2013
- Oath or Declaration filed on 10/01/2013
- U.S. Basic National Fees filed on 06/27/2013
- Priority Documents filed on 06/27/2013
- Authorization to Permit Access filed on 10/01/2013

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

NADINE V CLARK

Telephone: (571) 272-8687



FORM PCT/DO/EO/903 (371 Acceptance Notice)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | | 1390 | AMBZ-101US | 39 | 3 |

**CONFIRMATION NO. 3839**

71158
RatnerPrestia
P.O. Box 980
Valley Forge, PA 19482

**FILING RECEIPT**

*OC000000064238987*

Date Mailed: 10/09/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Inventor(s)**
Steven W. Goldstein, Delray Beach, FL;

**Applicant(s)**
Steven W. Goldstein, Delray Beach, FL;

**Assignment For Published Patent Application**
Ambientz, Boca Raton, FL

**Power of Attorney:** The patent practitioners associated with Customer Number 71158

**Domestic Priority data as claimed by applicant**
This application is a 371 of PCT/US11/68103 12/30/2011
which claims benefit of 61/431,507 01/11/2011
and claims benefit of 61/428,369 12/30/2010

**Foreign Applications** for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
*Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.*

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

**If Required, Foreign Filing License Granted:** 10/05/2013
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/976,636**
**Projected Publication Date:** 01/16/2014

**Non-Publication Request:** No

**Early Publication Request:** No
**** SMALL ENTITY ****
**Title**

INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

**Preliminary Class**

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

## LICENSE FOR FOREIGN FILING UNDER

## Title 35, United States Code, Section 184

## Title 37, Code of Federal Regulations, 5.11 & 5.15

**GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

---


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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

## PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/976,636

### APPLICATION AS FILED - PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY FEE($) |
|---|---|---|---|---|---|---|---|
| BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | 140 | | N/A | |
| SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | 60 | | N/A | |
| EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | 360 | | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | 39 minus 20 = | * 19 | x 40 = | 760 | OR | | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | 3 minus 3 = | * | x 210 = | 0.00 | | | |
| APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | 0.00 | | | |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | 0.00 | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | 1320 | | TOTAL | |

### APPLICATION AS AMENDED - PART II

AMENDMENT A

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY ADDITIONAL FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

AMENDMENT B

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY ADDITIONAL FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

Doc Code: PET.POA.WDRW
Document Description: Petition to withdraw attorney or agent (SB83)

PTO/AIA/83 (04-13)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**REQUEST FOR WITHDRAWAL AS ATTORNEY OR AGENT AND CHANGE OF CORRESPONDENCE ADDRESS**

| | |
|---|---|
| Application Number | 13/976,636 |
| Filing Date | 10/1/2013 |
| First Named Inventor | Steven W. Goldstein |
| Art Unit | 2642 |
| Examiner Name | |
| Practitioner Docket Number | AMBZ-101US |

**To: Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, VA 22313-1450**

Please withdraw me as attorney or agent for the above-identified patent application, and

- [✓] all the practitioners of record;
- [ ] the practitioners (with registration numbers) of record listed on the attached paper(s); or
- [ ] the practitioners of record associated with Customer Number: _____

NOTE: The immediately preceding box should only be marked when the practitioners were appointed using the listed Customer Number.

The reason(s) for this request are those described in 37 CFR:

- [ ] 11.116(a)(1)
- [ ] 11.116(a)(2)
- [ ] 11.116(a)(3)
- [ ] 11.116(b)(1)
- [ ] 11.116(b)(2)
- [ ] 11.116(b)(3)
- [ ] 11.116(b)(4)
- [ ] 11.116(b)(5)
- [✓] 11.116(b)(6)
- [ ] 11. 116(b)(7) Please explain below:

**Certifications**

**Check each box below that is factually correct. WARNING: If a box is left unchecked, the request will likely not be approved.**

1. [✓] I/We have given reasonable notice to the client, prior to the expiration of the response period, that the practitioner(s) intend to withdraw from employment.
2. [✓] I/We have delivered to the client or a duly authorized representative of the client all papers and property (including funds) to which the client is entitled.
3. [✓] I/We have notified the client of any responses that may be due and the time frame within which the client must respond.

Please provide an explanation, if necessary:



This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

PTO/AIA/83 (04-13)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

# REQUEST FOR WITHDRAWAL AS ATTORNEY OR AGENT AND CHANGE OF CORRESPONDENCE ADDRESS

**Complete the following section only when the correspondence address will change.** *Changes of address will only be accepted to an applicant.*

Change the correspondence address and direct all future correspondence to:

A. [✓] The address of the applicant associated with Customer Number: 000117822

**OR**

B. [ ] Applicant

Address

| City | State | Zip | Country |
|---|---|---|---|
| | | | |

| Telephone | Email |
|---|---|
| | |

I am authorized to sign on behalf of myself and all withdrawing practitioners.

Signature

Name Kenneth N. Nigon Registration No. 31,549

Address P.O. Box 980

| City Valley Forge | State PA | Zip 19482 | Country US |
|---|---|---|---|

Date November 12, 2013 Telephone No. 610-407-0700

***NOTE: Withdrawal is effective when approved rather than when received.***



This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 17373749 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 71158 |
| **Filer:** | Kenneth Nicholas Nigon/Edna Phelan |
| **Filer Authorized By:** | Kenneth Nicholas Nigon |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 12-NOV-2013 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 13:59:03 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Miscellaneous Incoming Letter | requestforwtihdrawal.pdf | 107693<br>2b91c6226e528722d0e813e988b4ed8e2f5ecc8e | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |

| | |
|---|---|
| **Total Files Size (in bytes):** | 107693 |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | AMBZ-101US |

**CONFIRMATION NO. 3839**

71158
RatnerPrestia
P.O. Box 980
Valley Forge, PA 19482

**PUBLICATION NOTICE**

*OC000000066122606*

**Title:**INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

**Publication No.**US-2014-0018097-A1
**Publication Date:**01/16/2014

## NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

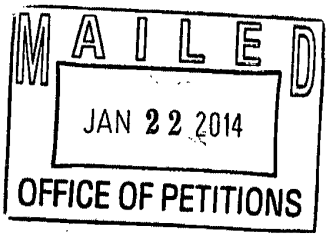
Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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**RatnerPrestia**
**P.O. Box 980**
**Valley Forge PA 19482**

| | | |
|---|---|---|
| In re Application of<br>Steven W. Goldstein | : | |
| Application No. 13/976,636 | : | DECISION ON PETITION |
| Filed: October 1, 2013 | : | TO WITHDRAW |
| Attorney Docket No. AMBZ-101US | : | FROM RECORD |

This is a decision on the Request to Withdraw as attorney or agent of record under 37 C.F.R. § 1.36(b), filed November 12, 2013.

The request is **NOT APPROVED.**

The Office will no longer accept address changes to a new practitioner or law firm filed with a Request, absent the filing of a power of attorney to the new representative. The Office will either change the correspondence address of record to the most current address information provided for the assignee of the entire interest who properly became of record under 37 CFR 3.71 or, if no assignee of the entire interest has properly been made of record under 37 CFR 3.71, the most current address information provided for the first named inventor.

Accordingly, the request to withdraw from record cannot be approved because a proper forwarding address was not provided. The request to change the correspondence address should be the most current address of the: (1) the first named signing inventor; or (2) an assignee of the entire interest under 37 C.F.R 3.71. If an assignee has intervened in this application, then a statement under 3.73(b) must be provided along with a renewed request.

All future communications from the Office will continue to be directed to the above-identified address until otherwise properly notified.

Telephone inquiries concerning this decision should be directed to the undersigned at 571-272-4618.

/Kimberly Inabinet/

Kimberly Inabinet
Paralegal Specialist
Office of Petitions

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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# TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

| | |
|---|---|
| Application Number | 13/976636 |
| Filing Date | October 1, 2013 |
| First Named Inventor | Steven W. Goldstein |
| Title | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| Art Unit | 2642 |
| Examiner Name | Rafael Perez Gutierrez |
| Attorney Docket Number | AMBZ-101US |

**SIGNATURE of Applicant or Patent Practitioner**

| | | | |
|---|---|---|---|
| Signature | /pablo meles/ | Date (Optional) | |
| Name | Pablo Meles | Registration Number | 33739 |
| Title (if Applicant is a juristic entity) | | | |
| Applicant Name (if Applicant is a juristic entity) | | | |

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 11/30/2014 OMB 0651-0051
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

# POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

| Application Number | Filing Date |
|---|---|
| 13/976636 | Oct. 1, 2013 |

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 117822

**OR**

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

**Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:**

☑ The address associated with the above-mentioned Customer Number

**OR**

☐ The address associated with Customer Number:

**OR**

| | | | | | |
|---|---|---|---|---|---|
| Firm or Individual Name | | | | | |
| Address | | | | | |
| City | | State | | Zip | |
| Country | | | | | |
| Telephone | | Email | | | |

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

☑ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☐ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

**SIGNATURE of Applicant for Patent**

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

| | | | |
|---|---|---|---|
| Signature | | Date (Optional) | 7-23-2014 |
| Name | Steven W. Goldstein | | |
| Title | | | |

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 19659470 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 71158 |
| **Filer:** | Pablo Meles |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 23-JUL-2014 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 14:22:37 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Power of Attorney | AMBZ-101US_POA.pdf | 757777<br>c1c3c19fb8dff6f0e27083ca264163fcd491edba | no | 2 |

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|---|---|
| **Warnings:** | |
| **Information:** | |

| | |
|---|---|
| **Total Files Size (in bytes):** | 757777 |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

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United States Patent and Trademark Office
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www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | AMBZ-101US |

**CONFIRMATION NO. 3839**

117822
Personics Holdings, LLC.
4800 N Federal Hwy. Ste A205
Boca Raton, FL 33431

**POA ACCEPTANCE LETTER**

*OC00000006980271 7*

Date Mailed: 07/28/2014

## NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/23/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/hgray/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | AMBZ-101US |

**CONFIRMATION NO. 3839**

**POWER OF ATTORNEY NOTICE**

71158
RatnerPrestia
P.O. Box 980
Valley Forge, PA 19482




Date Mailed: 07/28/2014

## NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/23/2014.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/hgray/

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Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | AMBZ-101US | 3839 |

117822 7590 01/15/2015

Personics Holdings, LLC.
4800 N Federal Hwy. Ste A205
Boca Raton, FL 33431

| EXAMINER | |
|---|---|
| WYCHE, MYRON | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 01/15/2015 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

iepstein@personicslabs.com
personics_docketing@cardinal-ip.com
pmeles@personicslabs.com

| Office Action Summary | Application No. 13/976,636 | Applicant(s) GOLDSTEIN, STEVEN W. | |
|---|---|---|---|
| | Examiner MYRON K. WYCHE | Art Unit 2644 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *6/27/13*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *1-39* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-39* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *6/27/13* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date *6/27/13*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

**DETAILED ACTION**

***Information Disclosure Statement***

The information disclosure statements (IDS) submitted on 6/27/13 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-39 are rejected under pre-AIA 35 U.S.C. 102(a) as being anticipated by "A Survey of Mobile Phone Sensing" (Lane).

Regarding claim 1, Lane discloses: "a distributed system comprising: a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices and/or with a communication system, and each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device **(ABSTRACT, pg. 141, pg. 142: "social networking")**, and wherein at least one of the communication system or one or more of the devices is configured as a controller, the controller being configured to: select a subset of devices from among the plurality of devices, receive information based on the acquired sensor data of the selected subset, and combine the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices" **(SBSTRACT, pg. 140, pg. 141: "sensors"; pg. 142, FIG. 2; pg. 143, FIG. 3; pg. 144-145: "Learn, Inform, Share, and Persuasion")**.

With respect to claim 2, Lane discloses: "the distributed system includes a server hosted

at the communication system" **(pg. 140, col. 2, para. 1 – para. 2)**.

Regarding claim 3, Lane discloses: "at least one of the devices includes at least one of a wireless device or a wired device" **(ABSTRACT, pg. 141)**.

With respect to claim 4, Lane discloses: "at least one of the devices includes at least one of a fixed device or a mobile device" **(ABSTRACT, pg. 141: "mobile device")**.

Regarding claim 5, Lane discloses: "at least one of the devices includes at least one of a mobile telephone device, an earpiece, a hearing aid, a navigation device, a computer a sensor module having at least one sensor" **(ABSTRACT, pg. 141: "sensors")**.

With respect to claim 6, Lane discloses: "the one or more sensors includes at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor" **(ABSTRACT, pg. 141: "sensors")**.

Regarding claim 7, Lane discloses: "at least one of the devices includes a position module for determining a position of the respective device" **(ABSTRACT, pg. 141: "sensors")**.

With respect to claim 8, Lane discloses: "each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller for determining the characteristic of the environment" **(ABSTRACT, pg. 141: "sensors"; pg. 144: "mobile phone sensing architecture")**.

Regarding claim 9, Lane discloses: "the local data analysis module includes an acoustic analysis module to process audio information" **(ABSTRACT, pg. 141: "sensors"; pg. 144: "learn")**.

With respect to claim 10, Lane discloses: "the local data analysis module includes a sensor analysis module to process non-audio related information" **(ABSTRACT, pg. 141: "sensors"; pg. 144: "sense")** .

Regarding claim 11, Lane discloses: "the controller is configured to determine locations for at least some of the devices" **(ABSTRACT, pg. 141-142)**.

With respect to claim 12, Lane discloses: "the controller is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices" **(ABSTRACT, FIG. 2, pg. 142)**.

Regarding claim 13, Lane discloses: "the controller is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices" **(pg. 142; pg. 143; pg. 145: "programmability")**.

With respect to claim 14, Lane discloses: "the configuration information includes data characterizing events to be detected in the sensor data" **(pg. 141: "sensors"; FIG. 4; pg. 145: "programmability")**.

Regarding claim 15, Lane discloses: "the environment includes an audio scene" **(pg. 141: "sensors"; FIG. 4)**.

With respect to claim 16, Lane discloses: "the characteristic of the audio scene includes at least one of speech events or non-speech events" **(pg. 141: "sensors")**.

Regarding claim 17, Lane discloses: "the distributed system records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded" **(pg. 144; col. 1, para. 1-2; pg. 145: "inform", "share", and "persuasion"; pg. 149: "privacy")**.

With respect to claim 18, Lane discloses: "the distributed system further determines trend information across a population of users of the devices from the combined information" **(pg. 134, FIG. 3; pg. 144: "learn", FIG. 4)**.

Regarding claim 19, Lane discloses: "the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information" **(pg. 142; pg. 143; pg. 144, FIG. 4)**.

With respect to claim 20, Lane discloses: "the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information **(pg. 140: col. 1, para. 3; pg. 141: "sensors"; pg. 145)**.

Regarding claim 21, Lane discloses: "the aggregated motion-related characteristics comprise

human or vehicle flow characteristics" **(pg. 140: col. 1, para. 3: "humans"; para. 141: "sensors")**.

With respect to claim 22, Lane discloses: "at least one of the devices includes at least one of a user interface, a display, a warning indicator, a speaker or a privacy module" **(pg. 141: "sensors", "UI", "display")**.

Regarding claim 23, Lane discloses: "the controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller" **(pg. 145: "inform", "share", "persuasion")**.

With respect to claim 24, Lane discloses: "a controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices, the controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the controller comprising:a selection/acquisition module configured to select a subset of devices **(ABSTRACT; pg. 141, pg. 142: "social network"; FIG. 2)** from among the plurality of devices and for receiving information based on the acquired sensor data of the selected subset of devices; and a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices" **(pg. 143, FIG. 3; pg. 144-145: "learn", "inform", "share", "persuasion")**.

Regarding claim 25, Lane discloses: "the controller is configured to determine locations for at least some of the devices" **(pg. 141-142)**.

With respect to claim 26, Lane discloses: "the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices" **(pg. 142, FIG. 2)**.

Regarding claim 27, Lane discloses: "the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices" **(pg. 142)**.

With respect to claim 28, Lane discloses: "the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module" **(pg. 142, FIG. 2)**.

Regarding claim 29, Lane discloses: "a sensor module including at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor" **(pg. 141: "sensors")**.

With respect to claim 30, Lane discloses: "a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment" **(pg. 141: "sensors"; pg. 144: "mobile phone sensing architecture")**.

Regarding claim 31, Lane discloses: "the controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment" **(pg. 143, FIG. 3)**.

With respect to claim 32, Lane discloses: "a method for processing information from a plurality of devices distributed in an environment, the method comprising: selecting a subset of devices from among the plurality of devices by a controller, the controller including at least one of a communication system or a device, each device having at least a communication capability for interchanging information with others of the devices and/or with the communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device **(ABSTRACT; pg. 141; pg. 142: "social network"; FIG. 2)**; acquiring sensor data by the selected subset of devices **(pg. 143, FIG. 3)**; receiving information based on the acquired sensor data of the selected subset of devices **(pg. 143, FIG. 3)**; and combining, by the controller, the received information from the selected

subset of devices to determine a characteristic of the environment proximate to one or more of the devices" **(pg. 143, FIG. 3)**.

Regarding claim 33, Lane discloses: "the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the controller for the information" **(pg. 142; pg. 143; pg. 144: "learn")**.

With respect to claim 34, Lane discloses: "the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment" **(pg. 14`: "sensors"; pg. 144: "learn")**.

Regarding claim 35, Lane discloses: "determining trend information across a population of users of the devices from the combined information" **(pg. 143; FIG. 3; FIG. 4; pg. 144: "learn")**.

With respect to claim 36, Lane discloses: "monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information" **(pg. 142; pg. 143; pg. 144, FIG. 4)**.

Regarding claim 37, Lane discloses: "determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information" **(pg. 140: col. 1, para. 3; pg. 141: "sensors"; pg. 145)**.

With respect to claim 38, Lane discloses: "adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment" **(pg. 143, FIG. 3)**.

Regarding claim 39, Lane discloses: "the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller" **(pg. 145: "inform", "share", "persuasion")**.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MYRON K. WYCHE whose telephone number is (571)272-3390. The examiner can normally be reached on M-F- 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Myron Wyche/ 1/12/15
Primary Patent Examiner
AU 2644

| Notice of References Cited | Application/Control No. 13/976,636 | Applicant(s)/Patent Under Reexamination GOLDSTEIN, STEVEN W. | |
|---|---|---|---|
| | Examiner MYRON K. WYCHE | Art Unit 2644 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|---|---|---|---|
| | A | US- | | | |
| | B | US- | | | |
| | C | US- | | | |
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| | E | US- | | | |
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| | L | US- | | | |
| | M | US- | | | |

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| | N | | | | | |
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**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | Lane et al., "A Survey of Mobile Phone Sensing"; IEEE Communications Magazine, pg. 140-150, September 2010 |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | Examiner | Art Unit |
| | MYRON K WYCHE | 2644 |

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| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
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| Final | Original | 01/12/2015 | | | | | | | | |
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| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

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|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
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| Final | Original | 01/12/2015 | | | | | | | | |
| | 37 | ✓ | | | | | | | | |
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| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | Examiner | Art Unit |
| | MYRON K WYCHE | 2644 |

| CPC- SEARCHED | | |
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| CPC COMBINATION SETS - SEARCHED | | |
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| US CLASSIFICATION SEARCHED | | | |
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| Class | Subclass | Date | Examiner |
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| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Inventor NAME Search | 1/12/15 | MW |
| WORD Search | 1/12/15 | MW |

| INTERFERENCE SEARCH | | | |
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| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
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AMBZ-101US PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appln. No: | TBD |
| Applicant: | Steven W. Goldstein |
| Filed: | Filed Herewith |
| Title: | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| TC/A.U.: | TBD |
| Examiner: | TBD |

**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

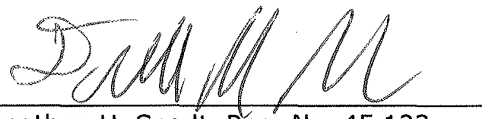
Pursuant to 37 C.F.R. §§ 1.97 and 1.98 and to the duty of disclosure set forth in 37 C.F.R. § 1.56, the Examiner in charge of the above-identified application is requested to consider and make of record the references listed on the PTO/SB/08a and PTO/SB/08b forms submitted herewith. A copy of each reference listed on the PTO/SB/08a and PTO/SB/08b forms, other than U.S. patents, is enclosed.

Although the information submitted herewith may be "material" to the Examiner's consideration of the subject application, this submission is not intended to constitute an admission that such information is "prior art" as to the claimed invention.

In accordance with 37 C.F.R. § 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made.

This Information Disclosure Statement is being filed concurrently with the above-referenced application.

Respectfully submitted,



Jonathan H. Spadt, Reg. No. 45,122
Attorney for Applicant
Deborah M. Grove, Reg. No. 61,091
Patent Agent for Applicant

JHS/DMG/emp

Enclosures: PTO/SB/08a and PTO/SB/08b
(2) References
(1) Search Report
(1) Written Opinion

Dated: June 27, 2013

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Valley Forge, PA 19482-0980
(610) 407-0700

The Director is hereby authorized to charge or credit Deposit Account No. **18-0350** for any additional fees, or any underpayment or credit for overpayment in connection herewith.

1898058_1

/Myron Wyche/ 01/06/2015

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

*(Use as many sheets as necessary)*

**SHEET 1 of 2**

| *Complete if Known* | |
|---|---|
| Application Number | TBD 13976636 - GAU: 2644 |
| Filing Date | Filed Herewith |
| First Named Inventor | Steven W. Goldstein |
| Art Unit | TBD |
| Examiner Name | TBD |
| Attorney Docket No. | AMBZ-101US |

**U.S. PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Document Number: Number - Kind Code[2] (if known) | Publication Date (MM-DD-YYYY) | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|
| /M.W./ | | US-2011/0065451 | 03-17-2011 | Danado et al. | |
| /M.W./ | | US-2010/0299615 | 11-25-2010 | Miluzzo et al. | |
| /M.W./ | | US-2009/0327478 | 12-31-2009 | Krause et al. | |
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**FOREIGN PATENT DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Foreign Patent Document: Country Code[3] - Number[4] - Kind Code[5] (If known) | Publication Date (MM-DD-YYYY) | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
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| Examiner Signature | /Myron Wyche/ | Date Considered | 01/06/2015 |
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**SHEET 2 of 2**

| *Complete if Known* | |
|---|---|
| Application Number | TBD 13976636 - GAU: 2644 |
| Filing Date | Filed Herewith |
| First Named Inventor | Steven W. Goldstein |
| Art Unit | TBD |
| Examiner Name | TBD |
| Attorney Docket No. | AMBZ-101US |

**NON-PATENT LITERATURE DOCUMENTS**

| Examiner Initials* | Cite No.[1] | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published | T[2] |
|---|---|---|---|
| /M.W./ | | Lane et al., "A Survey of Mobile Phone Sensing, " IEEE Communications Magazine, September, 2010, pp. 140-150. | ☐ |
| /M.W./ | | Singh, et al., "Towards Environment-to-Environment (E2E) Multimedia Communication Systems," Multimed Tools Appl (2009) 44:361-388. | ☐ |
| /M.W./ | | International Search Report for International Application No. PCT/US11/068103, dated May 3, 2012. | ☐ |
| /M.W./ | | Written Opinion for International Application No. PCT/US11/068103, dated May 3, 2012. | ☐ |
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| Examiner Signature | /Myron Wyche/ | Date Considered | 01/06/2015 |
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| SERIAL NUMBER | FILING or 371(c) DATE<br>RULE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | 455 | 2644 | AMBZ-101US |

**APPLICANTS**

**INVENTORS**

Steven W. Goldstein, Delray Beach, FL;

**** CONTINUING DATA ***************************

This application is a 371 of PCT/US11/68103 12/30/2011
which claims benefit of 61/431,507 01/11/2011
and claims benefit of 61/428,369 12/30/2010

**** FOREIGN APPLICATIONS ***************************

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10/05/2013

| Foreign Priority claimed ☐ Yes ☑ No<br>35 USC 119(a-d) conditions met ☐ Yes ☑ No<br>Verified and Acknowledged /MYRON WYCHE/ Examiner's Signature | ☐ Met after Allowance<br>Initials | STATE OR COUNTRY | SHEETS DRAWINGS | TOTAL CLAIMS | INDEPENDENT CLAIMS |
|---|---|---|---|---|---|
| | | FL | 4 | 39 | 3 |

**ADDRESS**

Personics Holdings, LLC.
4800 N Federal Hwy. Ste A205
Boca Raton, FL 33431
UNITED STATES

**TITLE**

INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

| FILING FEE RECEIVED | | |
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| 1390 | FEES: Authority has been given in Paper<br>No._____ to charge/credit DEPOSIT ACCOUNT<br>No._____ for following: | ☐ All Fees<br>☐ 1.16 Fees (Filing)<br>☐ 1.17 Fees (Processing Ext. of time)<br>☐ 1.18 Fees (Issue)<br>☐ Other _____<br>☐ Credit |

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
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| L2 | 165 | Goldstein-Steven-W.in. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:13 |
| L3 | 128 | l2 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:13 |
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| L10 | 18 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |

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| L14 | 33 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
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|---|---|---|---|---|---|---|
| L23 | 9 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
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**EAST Search History (Interference)**

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**1/12/2015 12:39:23 AM**
**C:\Users\mwyche\Documents\EAST\Workspaces\13_976636_1_12_15.wsp**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appln. No: | 13/976636 |
| Applicant: | Steven W. Goldstein |
| Filed: | September 25, 2013 |
| Title: | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| T.C./A.U.: | 2644 |
| Examiner: | MYRON WYCHE |
| Confirmation No.: | 3839 |
| Docket No.: | AMBZ-101US |

**AMENDMENT**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Office Action dated January 15, 2015, please amend the above-identified application as follows:

☐ **Amendments to the Specification** begin on page __ of this paper.

☒ **Amendments to the Claims** are reflected in the listing of claims which begins on page **2** of this paper.

☐ **Amendments to the Drawings** begin on page 8 of this paper and include an attached replacement sheet(s).

☐ **Amendments to the Abstract** are on page __ of this paper. A clean version of the Abstract is on page 6 of this paper.

☒ **Remarks/Arguments** begin on page **8** of this paper.

**Amendments to the Claims:** This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A distributed system comprising:

a plurality of devices distributed in an environment,

each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system, and

each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, and

wherein ~~at least one of the communication system or~~ one or more of the devices is configured as a controller on an ad hoc basis, the controller being configured to: select a subset of devices from among the plurality of devices, receive information based on the acquired sensor data of the selected subset using the mobile ad hoc network based on a predetermined characteristic of the environment and the location of the one or more device, and combine the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices.

2. (Currently Amended) The system of claim 1, wherein the distributed system ~~includes a server hosted at the communication system~~adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices.

3. (Currently Amended) The system of claim 1, wherein at least one of the devices includes at least one of a wireless device or a wired device and wherein the system enables the switching of a subset of devices on or off based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis.

.

4. (Original) The system of claim 1, wherein at least one of the devices includes at least one of a fixed device or a mobile device.

5. (Currently Amended) The system of claim 1, wherein at least one of the devices includes at least one of a mobile telephone device, an ear-piece, a hearing aid, a navigation device, a television remote, a car key fob, a portable game controller, GPS device, a computer ~~or~~ sensor module having at least one sensor.

6. (Original) The system of claim 1, wherein the one or more sensors includes at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

7. (Original) The system of claim 1, wherein at least one of the devices includes a position module for determining a position of the respective device.

8. (Original) The system of claim 1, wherein each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller for determining the characteristic of the environment.

9. (Original) The system of claim 8, wherein the local data analysis module includes an acoustic analysis module to process audio information.

10. (Original) The system of claim 8, wherein the local data analysis module includes a sensor analysis module to process non-audio related information.

11. (Original) The system of claim 1, wherein the controller is configured to determine locations for at least some of the devices.

12. (Original) The system of claim 11, wherein the controller is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

13. (Original) The system of claim 1, wherein the controller is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.



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14. (Currently Amended) The system of claim ~~13~~1, wherein the ~~configuration information includes data characterizing events to be detected in the sensor data~~mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

15. (Currently Amended) The system of claim ~~12~~, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network~~environment includes an audio scene~~.

16. (Currently Amended) The system of claim 15, wherein the environment includes an audio scene and a characteristic of the audio scene includes at least one of speech events or non-speech events.

17. (Original) The system of claim 16, wherein when the distributed system records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded.

18. (Original) The system of claim 1 wherein the distributed system further determines trend information across a population of users of the devices from the combined information.

19. (Original) The system of claim 1, wherein the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

20. (Original) The system of claim 1, wherein the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

21. (Original) The system of claim 20, wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

22. (Currently Amended) The system of claim 1, wherein at least one of the devices ~~includes at least one of a user interface, a display, a warning indicator, a speaker or a privacy module~~enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

23. (Original) The system of claim 1, wherein the controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

24. (Currently Amended) A controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network, the controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the controller comprising:

a selection/acquisition module configured on an ad hoc basis to select a subset of devices from among the plurality of devices using the mobile ad hoc network and for receiving information based on the acquired sensor data of the selected subset of devices; and

a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

25. (Original) The controller of claim 24, wherein the controller is configured to determine locations for at least some of the devices.

26. (Original) The controller of claim 25, wherein the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

27. (Original) The controller of claim 24, wherein the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

28. (Original) The controller of claim 24, wherein the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module.



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29. (Original) The controller of claim 24, further comprising a sensor module including at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

30. (Original) The controller of claim 29, further comprising a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment.

31. (Original) The controller of claim 24, wherein the controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment.

32. (Currently Amended) A method for processing information from a plurality of devices in a mobile ad hoc network distributed in an environment, the method comprising:

selecting a subset of devices from among the plurality of devices by a controller on a ad hoc basis using the mobile ad hoc network, the controller including at least one of a communication system or a device, each device having at least a communication capability for interchanging information with others of the devices and/or with the communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device;

acquiring sensor data by the selected subset of devices; receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network; and

combining, by the controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

33. (Original) The method of claim 32, wherein the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the controller for the information.

34. (Original) The method of claim 32, wherein the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment.

35. (Original) The method of claim 32, the method further including determining trend information across a population of users of the devices from the combined information.

36. (Original) The method of claim 32, the method further including monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

37. (Original) The method of claim 32, the method further including determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

38. (Original) The method of claim 32, the method further including adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset respon- sive to the characteristic of the environment.

39. (Original) The method of claim 32, wherein the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

**Remarks/Arguments:**

Claims 1, 2, 3, 5, 14-16, 22, 24, and 32 have been amended. No new matter is introduced herein. Claims 1-39 are pending.

The Applicant would also like to acknowledge and thank Examiner Wyche for the Conference Call of February 12, 2015 where some of the proposed amendments herein were discussed. No agreement was reached, but the general guidance provided is still appreciated. Further note that we are currently unaware of additional art cited in foreign applications other than the references cited from the PCT Application which we believe is already of record.

Claim Amendments

Claim 1 has been amended to include the aspect of having a plurality of devices as part of a mobile ad hoc network where one of the devices is configured as a controller on an ad hoc basis and configured to select a subset of devices and receive information based on acquired sensor data from the selected subset of devices using the mobile ad hoc network. No new matter is introduced herein.

Support for the amendments to claim 1 can be found throughout the specification and more particularly in paragraphs [0052], [0062], [0088], [0089], [0102], [0114] and [0115] of the specification (emphasis added):

> **[0052]** Device 120' (and devices 120) may include software for coordinating the set of devices 120. The software may have centralized control, peer-to-peer control or a hybrid model involving centralized, peer-to-peer and other control mechanisms. Individual devices 120, 120' may switch between being master devices controlling other devices, or slave devices under the temporary partial control of other devices. The network of devices 120, 120' may so configure itself to optimize power consumption on individual devices 120 by distributing the sensing load across a number of devices 120, 120', or by other mechanisms such as sharing bandwidth across devices 120, 120'. The networking used may be based on ideas related to mobile ad hoc networks (MANET), Scatternet or other mechanisms.
>
> **[0062]** At step 302, a subset of devices 120 (FIG. 1) may be selected, for example by device selection/ data acquisition module 240 (FIG. 2B) of controller 120'. For example, controller 120' (FIG. 1) may select one or more devices 120 based on a predetermined characteristic of the environment and the location of devices 120.
>
> **[0088]** Note that a central server **140** is not necessarily required. For example, devices **120** may locally exchange information to perform aggregated analysis, such as localization. In one such example, each device **120** may include a detector for an event of interest (e.g., gunshot), and upon detection of the event may pass the raw audio or a partially processed version of the audio (e.g., an intensity time profile) to nearby devices **120** (e.g., using ad hoc wireless communication), which perform local assessments of shooter direction based on the information they obtain.

**[0089]** In yet another scenario, these devices **120** may be used for adaptive crowd control. In situations with high traffic, whether vehicular or pedestrian traffic, these devices **120** may be configured as a mobile ad hoc network to estimate traffic flow from noise, with no requirement for any fixed or embedded sensors. Using the dynamically acquired traffic pattern information, the system **100** may broadcast instructions though the devices **120** or through other means to direct people through paths of lower traffic density, open up different gates or paths, or use sonification or acoustic visualization to alert users to high traffic versus low traffic paths.

**[0102]** In another form of triggering event, when a device 120 is removed from the direct acoustic environment, for example, by being put in a user' s pocket, the change in audio signal characteristics may trigger a message to the controller 120' or server 140 to indicate that the device 120 is no longer available for acquiring audio based on a poor signal-to-noise ratio (SNR) operating environment. Similarly, when the device 120 is taken out of the pocket, it may again start Jan. 16, 2014 monitoring the environment and/ of notify the controller 120' (or server 140) that it is once again available. In addition, when the device is no longer obtaining adequate SNR, the device 120 may be able to enable other devices 120 within its proximity to acquire the signal and thus improve the overall SNR. In addition, many devices are now manufactured with multiple microphones (primarily used for beam forming) as to obtain an improved SNR for the user. As the user may often carry the device 120 in their pocket or purse, system 100 may be able to select which microphone in the device 120 is desirably enabled or what beam forming array would be best evoked to obtain a maximum SNR.

**[0114]** An ad hoc network of devices **120** may be used to fine-tune a number of features. Consider concert-hall acous- tics, for instance. Concert halls are typically tuned for the major uses of their space. For example, a symphony hall may be tuned especially for a large group of artistes and their instruments, and may not be as well suited to, for example, solo vocalists. Sound quality in a hall is also dependent on the size of the audience, their ambient noise characteristics etc. The network of system **100** may enable data to be acquired from a large number of devices **120** in the audience, so that the hall management can adapt to the ambient noise levels and fine-tune sound levels for any performance, with any number of performers and instruments, and with different audiences.

**[0115]** The ad hoc network can also be used for monitoring and regulatory purposes. Sound pressure levels or similar measures of rock concerts, gym classes and other potentially noisy environments may be monitored against safe listening levels, and infractions reported to the appropriate management or regulatory agency.

Claim 2 has been amended to include where the distributed system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices.

Support for the amendments to claim 2 can be found throughout the specification and more particularly in paragraph [0022] of the specification (emphasis added):

**[0022]** In FIG. **1,** a small number of representative devices **120, 120'** are illustrated. As discussed further below, the potentially enabled devices **120, 120'** may be part of a large population of devices (e.g., a large fraction of the telephones in a metropolitan area) and system **100** may adaptively enable particular subsets of the devices **120** and/or selectively configure enabled devices **120.** For instance, device **120'** (or server **140)** may enable and/or configure the devices **120** according to triggering events detected at one or more devices **120,120'.**

Support for the amendment to claim 3 can be found in paragraph [0065] (emphasis added):

[0065] At step 308, it is determined whether the subset should be adjusted, for example, by device selection/data acquisition module 240 (FIG. 2B) of controller 120'. For example, the subset may be adjusted based on an event detected by a local data analysis module 204 (FIG. 2A) of one or more devices 120, the characteristic of the environment, any context from the characteristic, the location of devices 120 (FIG. 1) (e.g., position, orientation in space),

> demographics from the characteristic, any social-graph membership among devices 120, etc. For example, if one device 120 (FIG.1) detects a gunshot, device 120' may expand the subset of devices 120 to additional devices (to triangulate the location of the gunshot) and/or to send a Warning indication to all devices 120 in range.

Support for the amendments to claim 5 can be found in paragraph [0058] (emphasis added):

> **[0058]** It is understood that devices 120, 120' do not have to be phones. Devices 120, 120' may be stand-alone devices, or may be an integral part of a GPS, hearing aid, mobile phone, TV remote, car key fob, portable game controller or similar device. Device 120 (and/or device 120') may be carried by the user on his person, or be installed in or on a vehicle such as a car.

Claims 14, 15, and 22 have been amended to include a mobile ad hoc network that is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network and in a broader sense that at least one of the devices in the mobile ad hoc network enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

Support for the amendments to claims 14, 15 and 22 can be found throughout the specification and more particularly in paragraphs [0114] and [0115] noted above.

§102 Rejections

Claims 1-39 have been rejected under 35 U.S.C. §102(b) as being anticipated by "A Survey of Mobile Phone Sensing" by Lane (hereinafter "Lane". Claim 1 has incorporated the element of having the plurality of devices being part of a mobile ad hoc network. Lane discusses and focuses on reporting and analyzing information through a social network or centralized service and does not disclose the use of a mobile ad hoc network. Note that Lane further fails to disclose or suggest that one or more of the devices are configured as a controller on an ad hoc basis. Thus, Lane fails to include all the features of claim 1. Therefore, we submit that the rejection of claim 1 and any dependent claims under 35 U.S.C. §102(b) as being anticipated by Lane are moot in view of the amendment to claim 1. Accordingly, allowance of claim 1 is respectfully requested. Claims 2-23 are allowable as being dependent on an allowable base claim.

Furthermore, with respect 2, Lane fails to disclose or suggest that the distributed system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices. Thus, it is further emphasized that claim 2 is allowable.

With respect to claim 3, Lane fails to disclose or suggest a system that enables the switching of a subset of devices on or off based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis. Thus, it is further emphasized that claim 3 is allowable.

With respect to claim 14, Lane fails to disclose or suggest that at least one of the device enables the fine tuning of an acoustical characteristic in a concert hall based on data acquired from at least a subset of devices from the ad hoc network. Thus, it is further emphasized that claim 14 is allowable.

With respect to claim 15, Lane fails to disclose or suggest that at least one of the device enables the fine tuning of an acoustical characteristic in a concert hall based on data acquired from at least a subset of devices from the ad hoc network according to a triggering events detected at one or more of the devices of the mobile ad hoc network. Thus, claim 15 is allowable.

With respect to claim 22, Lane fails to disclose or suggest that at least one of the devices enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network. Thus, claim 22 is allowable.

Similarly, claim 24 has incorporated the element of a mobile ad hoc network, which is not found in the cited portions of Lane. Accordingly, Lane fails to render claim 24 anticipated and therefore claim 24 is allowable. Claims 25-31 are allowable as being dependent on an allowable base claim.

Claim 32 has also incorporated the element of a mobile ad hoc network, which is not found in the cited portions of Lane. Accordingly, Lane fails to render claim 32 anticipated and therefore claim 32 is allowable. Claims 33-39 are allowable as being dependent on an allowable base claim.

Conclusion

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

____/pablo meles/_____
Pablo Meles, Reg. No. 33,739
Attorney for Applicants

The Director is hereby authorized to charge or credit Deposit Account No. **504284** for any additional fees, or any underpayment or credit for overpayment in connection herewith.

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 21509555 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 117822 |
| **Filer:** | Pablo Meles |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 19-FEB-2015 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 11:33:34 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | AMBZ-101US_NFOAR_19January2015.pdf | 183258<br>08ebbd64b78151fcfbe3f40b1c174514638e175b | yes | 12 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Amendment/Req. Reconsideration-After Non-Final Reject | 1 | 1 |
| | Claims | 2 | 7 |
| | Applicant Arguments/Remarks Made in an Amendment | 8 | 12 |
| **Warnings:** | | | |
| **Information:** | | | |
| | **Total Files Size (in bytes):** | 183258 | |

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**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
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PTO/SB/06 (09-11)
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| **PATENT APPLICATION FEE DETERMINATION RECORD**<br>Substitute for Form PTO-875 | Application or Docket Number<br>13/976,636 | Filing Date<br>10/01/2013 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY**: ☐ LARGE ☒ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = * | | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = * | | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

| AMENDMENT | 02/19/2015 | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * 39 | Minus | ** 39 | = 0 | X $40 = | 0 |
| | Independent (37 CFR 1.16(h)) | * 3 | Minus | ***3 | = 0 | X $210 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | **0** |

| AMENDMENT | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/MARIA LOREDO/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | AMBZ-101US | 3839 |

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| EXAMINER | |
|---|---|
| WYCHE, MYRON | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 06/03/2015 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

iepstein@personicslabs.com
personics_docketing@cardinal-ip.com
pmeles@personicslabs.com

| Office Action Summary | Application No. 13/976,636 | Applicant(s) GOLDSTEIN, STEVEN W. | |
|---|---|---|---|
| | Examiner MYRON K. WYCHE | Art Unit 2644 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *2/19/15*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *1-39* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-39* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

**DETAILED ACTION**

***Response to Arguments***

Applicant's arguments with respect to claims 1-39 have been considered but are moot because of new grounds of rejection necessitated by the amendment.

***Claim Rejections - 35 USC § 103***

Claims 1-13, 17-21 and 23-39 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over "A Survey of Mobile Phone Sensing" (Lane) in view of US Patent Application Publication No. 20100316033 (Atwal) and US Patent Application Publication No. 20100040079 (Park et al).

Regarding claim 1, Lane discloses: "a distributed system comprising: a plurality of devices distributed in an environment, and each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device **(ABSTRACT, pg. 140, pg. 141: "sensors"; pg. 142: "social networking"; FIG. 2; pg. 143, FIG. 3; pg. 144-145: "Learn, Inform, Share, and Persuasion")**.

However, Lane does not clearly disclose the remaining limitations of the claim. To that end, Atwal discloses: "each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network")** and "one or more of the devices is configured as a controller on an ad hoc basis" **([0042]: "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Lane with the invention of Atwal in order to provide a mobile ad hoc network with adaptive control (e.g., *see* Atwal @ **[0042]**).

However, the combination of Lane and Atwal does not clearly disclose the remaining limitations of the claim. To that end, Park et al. discloses: "the controller being configured to: select **(ABSTRACT:**

**"…determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling")** a subset of devices **(FIG. 7)** from among the plurality of devices **(FIG. 6)**, receive information based on the acquired sensor data of the selected subset using the mobile ad hoc network based on a predetermined characteristic of the environment and the location of the one or more of the device, and combine the received information from the selected subset to determine a charteristic of the environment proximate to one or more of the devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the combination of Lane and Atwal with the invention of Park et al. in order to provide efficient message routing in a mobile ad hoc network (e.g., *see* Park et al. @ [0038]).

With respect to claim 2, Atwal discloses: "adaptively enables" **([0042]:"… a plurality of mobile devices interact as nodes in a mobile ad hoc network and in which packets are IP routable to the individual device independent of fixed infrastructure elements; enhancing MBRI operation through the use of dynamic adaptation"; In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

In addition, Park et al. discloses: "configures the subset of device according to triggering events detected at one or more of the plurality of devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

Regarding claim 3, Lane discloses: "at least one of the devices includes at least one of a wireless device or a wired device" **(ABSTRACT, pg. 141)**.

In addition, Park et al. discloses: "the system enables the switching of a subset of devices on **(FIG. 6)** or off **(FIG. 7)**, based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

With respect to claim 4, Lane discloses: "at least one of the devices includes at least one of a fixed device or a mobile device" **(ABSTRACT, pg. 141: "mobile device")**.

Regarding claim 5, Lane discloses: "at least one of the devices includes at least one of a mobile telephone device, an earpiece, a hearing aid, a navigation device, a television remote, a car key fob, a portable game controller, GPS device, a computer a sensor module having at least one sensor" **(ABSTRACT, pg. 141: "sensors")**.

With respect to claim 6, Lane discloses: "the one or more sensors includes at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor" **(ABSTRACT, pg. 141: "sensors")**.

Regarding claim 7, Lane discloses: "at least one of the devices includes a position module for determining a position of the respective device" **(ABSTRACT, pg. 141: "sensors")**.

With respect to claim 8, Lane discloses: "each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller for determining the characteristic of the environment" **(ABSTRACT, pg. 141: "sensors"; pg. 144: "mobile phone sensing architecture")**.

Regarding claim 9, Lane discloses: "the local data analysis module includes an acoustic analysis module to process audio information" **(ABSTRACT, pg. 141: "sensors"; pg. 144: "learn")**.

With respect to claim 10, Lane discloses: "the local data analysis module includes a sensor analysis module to process non-audio related information" **(ABSTRACT, pg. 141: "sensors"; pg. 144: "sense")** .

Regarding claim 11, Lane discloses: "the controller is configured to determine locations for at least some of the devices" **(ABSTRACT, pg. 141-142)**.

With respect to claim 12, Lane discloses: "the controller is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices" **(ABSTRACT, FIG. 2, pg. 142)**.

Regarding claim 13, Lane discloses: "the controller is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices" **(pg. 142; pg. 143; pg. 145: "programmability")**.

Regarding claim 17, Lane discloses: "the distributed system records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded" **(pg. 144; col. 1, para. 1-2; pg. 145: "inform", "share", and "persuasion"; pg. 149: "privacy")**.

With respect to claim 18, Lane discloses: "the distributed system further determines trend information across a population of users of the devices from the combined information" **(pg. 134, FIG. 3; pg. 144: "learn", FIG. 4)**.

Regarding claim 19, Lane discloses: "the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information" **(pg. 142; pg. 143; pg. 144, FIG. 4)**.

With respect to claim 20, Lane discloses: "the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information **(pg. 140: col. 1, para. 3; pg. 141: "sensors"; pg. 145)**.

Regarding claim 21, Lane discloses: "the aggregated motion-related characteristics comprise human or vehicle flow characteristics" **(pg. 140: col. 1, para. 3: "humans"; para. 141: "sensors")**.

Regarding claim 23, Lane discloses: "the controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller" **(pg. 145: "inform", "share", "persuasion")**.

With respect to claim 24, Lane discloses: "a plurality of devices distributed in an environment, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device" **(ABSTRACT, pg. 140, pg. 141: "sensors"; pg. 142: "social networking"; FIG. 2; pg. 143, FIG. 3; pg. 144-145: "Learn, Inform, Share, and Persuasion")**.

In addition, Atwal discloses: "each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network")** and "one or more of the devices is configured as a controller on an ad hoc basis" **([0042]: "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Further, Park et al. discloses: "the controller comprising: a selection/acquisition module configured on an ad hoc basis to select **(ABSTRACT: "…determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling")** a subset of devices **(FIG. 7)** from among the plurality of devices using the mobile ad hoc network **(FIG. 6)** and for receiving information based on the acquired sensor data of the selected subset of devices; and a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices"

**([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

Regarding claim 25, Lane discloses: "the controller is configured to determine locations for at least some of the devices" **(pg. 141-142)**.

With respect to claim 26, Lane discloses: "the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices" **(pg. 142, FIG. 2)**.

Regarding claim 27, Lane discloses: "the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices" **(pg. 142)**.

With respect to claim 28, Lane discloses: "the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module" **(pg. 142, FIG. 2)**.

Regarding claim 29, Lane discloses: "a sensor module including at least one of a microphone, a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor" **(pg. 141: "sensors")**.

With respect to claim 30, Lane discloses: "a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment" **(pg. 141:**

**"sensors"; pg. 144: "mobile phone sensing architecture")**.

Regarding claim 31, Lane discloses: "the controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment" **(pg. 143, FIG. 3)**.

With respect to claim 32, Lane discloses: "each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device **(ABSTRACT, pg. 140, pg. 141: "sensors"; pg. 142: "social networking"; FIG. 2; pg. 143, FIG. 3; pg. 144-145: "Learn, Inform, Share, and Persuasion")**.

In addition, Atwal discloses: "each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network")** and "one or more of the devices is configured as a controller on an ad hoc basis" **([0042]: "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Further, Park et al. discloses: "selecting a subset of devices **(FIG. 7)** from among the plurality of devices by a controller on a ad hoc basis using the mobile ad hoc network **(FIG. 6; ABSTRACT: "…determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling")**, acquiring sensor data by the selected subset of devices ; receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network; and combining, by the controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a**

**subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

Regarding claim 33, Lane discloses: "the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the controller for the information" **(pg. 142; pg. 143; pg. 144: "learn")**.

With respect to claim 34, Lane discloses: "the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment" **(pg. 14`: "sensors"; pg. 144: "learn")**.

Regarding claim 35, Lane discloses: "determining trend information across a population of users of the devices from the combined information" **(pg. 143; FIG. 3; FIG. 4; pg. 144: "learn")**.

With respect to claim 36, Lane discloses: "monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information" **(pg. 142; pg. 143; pg. 144, FIG. 4)**.

Regarding claim 37, Lane discloses: "determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information" **(pg. 140: col. 1, para. 3; pg. 141: "sensors"; pg. 145)**.

With respect to claim 38, Lane discloses: "adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment" **(pg. 143, FIG. 3)**.

Regarding claim 39, Lane discloses: "the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller" **(pg. 145: "inform", "share", "persuasion")**.

Claims 14-16 and 22 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Lane in view of Atwal, Park et al. and US Patent Application Publication No. 20110143728 (Holoapainen et al).

Claims 14, 15 and 22 are dependent upon claim 1. As discussed above, claim 1 is disclosed by Lane, Atwal and Park et al. Thus, those limitations of claim 1 recited in claims 14, 15 and 22 are also disclosed by Lane, Atwal and Park et al.

However, the combination of Lane, Atwal and Park et al. does not clearly disclose the remaining limitations of the claims. To that end, Holapainen et al. discloses: "a mobile ad hoc network **(FIG.1: 105; [0027]: "By way of example, the communication network 105 of system 100 includes one or more networks such as … mobile ad-hoc network (MANET)")** is used to fine tune acoustical characteristics **(FIG. 3; FIG. 5; [0044]: "FIG. 5 is a flowchart of a process for acquiring additional media to verify a matched target expression, according to one embodiment"; "When acquiring media with expression as shown in step 303 of FIG. 3, additional media may be acquired to enhance the matching of the target expressions")** …. based on data acquired from at least a subset of devices form the mobile ad hoc network" **(FIG. 1; 101a-101n; [0027]: "…UEs 101a-101n includes a component to acquire media (e.g., an image, a sound recording, etc.), such as a digital camera/camcorder, a scanning device, a sound recording device, or any other sensors that may be used to capture media data. The UEs 101a-101n also have connectivity to one another as well as to the communication service 103 via a communication network 105")**. The disclosed: "additional media may be acquired to enhance the matching", as disclosed by Holapeinen et al. corresponds to the claimed: "fine tuning." In addition, it is noted that it would have been obvious to collect sound media in the claimed: "concert hall" of claims 14 and 15. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art to further modify the combination of Lane, Atwal and Park et al. with the invention of Holapeinen et al. in order to provide a sound recording device sensor to collect acoustical data (e.g., see Holapeinen et al. @ **[0027]**).

With respect to claim 16, Holapeinen et al. discloses: "environment includes an audio scene **([0026]: "As used herein, the term "media" refers to various forms of media, including audio, video, still images, pictures, etc")** and a characteristic of the audio scene includes at least one of speech events or non-speech events" **([0071]: "…audio function circuitry 1109 includes a microphone 1111 and microphone amplifier that amplifies the speech signal output from the**

**microphone 1111")**.

With respect to claim 22, Park et al. discloses: "using a subset of devices **(FIG. 7)** from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

In addition, Holapeinen et al., as discussed above, discloses: "enables the fine tuning of an acoustical characteristic" (i.e., "he disclosed: "additional media may be acquired to enhance the matching", as disclosed by Holapeinen et al. corresponds to the claimed: "fine tuning").

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MYRON K. WYCHE whose telephone number is (571)272-3390. The examiner can normally be reached on M-F- 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Myron Wyche/ 5/31/15
Primary Patent Examiner
AU 2644

| Notice of References Cited | Application/Control No. 13/976,636 | Applicant(s)/Patent Under Reexamination GOLDSTEIN, STEVEN W. | |
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| | Examiner MYRON K. WYCHE | Art Unit 2644 | Page 1 of 1 |

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| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|---|---|---|---|
| * | A | US-2011/0143728 | 06-2011 | HOLOPAINEN et al. | 455/414.1 |
| * | B | US-2010/0316033 | 12-2010 | Atwal, Peter | 370/338 |
| * | C | US-2010/0040079 | 02-2010 | Park et al. | 370/432 |
| | D | US- | | | |
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| | K | US- | | | |
| | L | US- | | | |
| | M | US- | | | |

**FOREIGN PATENT DOCUMENTS**

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**NON-PATENT DOCUMENTS**

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|---|---|---|
| | U | Nicholas D. Lane, "A Survey of Mobile Phone Sensing, September 2010, IEEE Press |
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| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| L1 | 1061128 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:07 |
| L2 | 1061128 | H04W 84/02 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:07 |
| L3 | 367997 | H04J 3/26 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:08 |
| L4 | 740927 | l1 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:08 |
| L5 | 740935 | l2 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:08 |
| L6 | 330035 | l3 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:08 |
| L7 | 3 | l4 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:10 |
| L8 | 3 | l5 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:10 |
| L9 | 2 | l6 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:10 |
| L10 | 0 | l4 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:11 |

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| L11 | 0 | l5 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:11 |
| L12 | 0 | l6 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:11 |
| L13 | 0 | l4 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| L14 | 0 | l5 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| L15 | 0 | l6 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| L16 | 0 | l4 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| L17 | 0 | l5 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| L18 | 0 | l6 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| L19 | 1 | l4 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:13 |
| L20 | 1 | l5 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:13 |
| L21 | 0 | l6 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:13 |
| L22 | 0 | l4 AND (("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:14 |

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| L23 | 0 | l5 AND (("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:14 |
| L24 | 0 | l6 AND (("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:14 |
| S1 | 1 | (13/976636).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:11 |
| S2 | 165 | Goldstein-Steven-W.in. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:13 |
| S3 | 128 | S2 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:13 |
| S4 | 0 | S3 AND Ambientz | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:14 |
| S5 | 13 | S2 AND Ambientz | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:14 |
| S6 | 0 | S5 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:15 |
| S7 | 1006009 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:25 |
| S8 | 731073 | S7 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:25 |
| S9 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |
| S10 | 18 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |

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| S11 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |
| S12 | 33 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:29 |
| S13 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
| S14 | 33 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
| S15 | 29 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
| S16 | 3127 | ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S17 | 335 | S8 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S18 | 17109 | ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S19 | 7 | S10 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S20 | 14 | S12 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S21 | 1899 | S16 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S22 | 10366 | S18 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:33 |

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| S23 | 9 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
| S24 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
| S25 | 5 | S23 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
| S26 | 1 | (13/976636).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 10:53 |
| S27 | 1 | S26 AND "ad hoc" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 10:53 |
| S28 | 9576 | "mobile ad hoc network" OR MANET | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:01 |
| S29 | 5329 | S28 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:01 |
| S30 | 0 | ("mobile ad hoc network" OR MANET) SAME adaptively SAME configure | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:02 |
| S31 | 0 | ("mobile ad hoc network" OR MANET) SAME adaptively SAME events | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:03 |
| S32 | 0 | ("mobile ad hoc network" OR MANET) SAME adaptively SAME trigger | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:03 |
| S33 | 0 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME trigger | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:04 |
| S34 | 256 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:04 |

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| S35 | 200 | S34 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:05 |
| S36 | 2 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME configure | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:05 |
| S37 | 2 | S36 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:05 |
| S38 | 95 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME topology | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:06 |
| S39 | 85 | S38 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:06 |
| S40 | 305 | S39 AND H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:07 |
| S41 | 0 | S39 AND "H04W 64/00" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:07 |
| S42 | 0 | S39 AND H04W64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:08 |
| S43 | 12 | S39 AND "455".clas. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:08 |
| S44 | 0 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME topology SAME sensor | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:49 |
| S45 | 0 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME topology SAME sensors | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:49 |
| S46 | 302 | ("mobile ad hoc network" OR MANET) SAME sensors | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:49 |

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| S47 | 240 | ("mobile ad hoc network" OR MANET) SAME sensors SAME topology | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:49 |
| S48 | 0 | ("mobile ad hoc network" OR MANET) SAME sensors SAME topology SAME adaptive | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:50 |
| S49 | 0 | ("mobile ad hoc network" OR MANET) SAME sensors SAME topology SAME configure | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:50 |
| S50 | 10017 | mobile WITH "ad hoc network" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:13 |
| S51 | 6430 | "mobile ad hoc network" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:13 |
| S52 | 0 | "mobile ad hoc network" WITH "plurality of devices" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:14 |
| S53 | 0 | "mobile ad hoc network" SAME "plurality of devices" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:14 |
| S54 | 535 | "mobile ad hoc network" WITH "plurality" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:15 |
| S55 | 2 | "mobile ad hoc network" WITH "plurality" WITH phone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:15 |
| S56 | 0 | "mobile ad hoc network" WITH "plurality" WITH phones | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:15 |
| S57 | 86 | "mobile ad hoc network" WITH "plurality" WITH devices | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:15 |
| S58 | 0 | "mobile ad hoc network" SAME "plurality of mobile" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:16 |

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| S59 | 73 | S57 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:16 |
| S60 | 0 | ("mobile ad hoc network" SAME "plurality of mobile") SAME controller | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:21 |
| S61 | 12 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME controller | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:22 |
| S62 | 11 | S61 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:22 |
| S63 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME ((switch or switching) WITH (on or off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:36 |
| S64 | 1 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME ((switch or switching)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:37 |
| S65 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:38 |
| S66 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME (trigger or triggers) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:41 |
| S67 | 3 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:41 |
| S68 | 3 | S67 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:42 |
| S69 | 11 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME power | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:46 |
| S70 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME "power conservation" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:46 |

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|---|---|---|---|---|---|---|
| S71 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME ("power" WITH (on or off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:46 |
| S72 | 9 | S69 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:47 |
| S73 | 9 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME battery | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:49 |
| S74 | 8 | S73 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:49 |
| S75 | 1 | ("mobile ad hoc network") SAME ((switch or switching) WITH (on OR off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:52 |
| S76 | 0 | S75 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:52 |
| S77 | 132 | ("mobile ad hoc network" OR MANET) SAME ((switch or switching) WITH (on OR off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:53 |
| S78 | 2 | S77 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:54 |
| S79 | 4 | ("mobile ad hoc network" OR MANET) SAME "power conservation" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 07:03 |
| S80 | 3 | S79 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 07:03 |
| S81 | 123 | ("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 11:59 |
| S82 | 96 | S81 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 12:00 |

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|---|---|---|---|---|---|---|
| S83 | 35 | ("mobile ad hoc network" OR MANET) WITH (power WITH (conservation OR consumption)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 12:00 |
| S84 | 30 | S83 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 12:00 |
| S85 | 2 | ("mobile ad hoc network" OR MANET) WITH (power WITH (conservation OR consumption)) SAME (on OR off) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 12:03 |
| S86 | 2 | S85 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 12:03 |
| S87 | 123 | ("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:25 |
| S88 | 14 | ("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:26 |
| S89 | 9 | S88 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:26 |
| S90 | 132 | ("mobile ad hoc network" OR MANET) SAME ((switch or switching) WITH (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:31 |
| S91 | 2 | S90 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:31 |
| S92 | 181 | ("mobile ad hoc network" OR MANET) SAME ((switch or switching or turn or turning or shut or shutting) WITH (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:32 |
| S93 | 21 | S92 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:32 |
| S94 | 19 | S93 NOT S91 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:32 |

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|---|---|---|---|---|---|---|
| S95 | 33 | ("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:46 |
| S96 | 22 | S95 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:46 |
| S97 | 3 | ("mobile ad hoc network" OR MANET) SAME (select WITH subset) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:55 |
| S98 | 2 | S97 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:55 |
| S99 | 5 | ("mobile ad hoc network" OR MANET) SAME (acoustical) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:32 |
| S100 | 0 | S99 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:32 |
| S101 | 63 | ("mobile ad hoc network" OR MANET) SAME (acoustical or sound) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:33 |
| S102 | 0 | ("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) WITH hall) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:33 |
| S103 | 0 | ("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) WITH characteristics) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:34 |
| S104 | 0 | ("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:34 |
| S105 | 63 | ("mobile ad hoc network" OR MANET) SAME ((acoustical or sound)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:34 |
| S106 | 5 | S105 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:34 |

**EAST Search History (Interference)**

< This search history is empty>

**5/ 31/ 2015 7:14:45 PM**
**C:\ Users\ mwyche\ Documents\ EAST\ Workspaces\ 13_976636_5_31_15.wsp**

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
|---|---|---|---|---|---|---|---|
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 01/12/2015 | 05/31/2015 | | | | | | | |
| | 1 | ✓ | ✓ | | | | | | | |
| | 2 | ✓ | ✓ | | | | | | | |
| | 3 | ✓ | ✓ | | | | | | | |
| | 4 | ✓ | ✓ | | | | | | | |
| | 5 | ✓ | ✓ | | | | | | | |
| | 6 | ✓ | ✓ | | | | | | | |
| | 7 | ✓ | ✓ | | | | | | | |
| | 8 | ✓ | ✓ | | | | | | | |
| | 9 | ✓ | ✓ | | | | | | | |
| | 10 | ✓ | ✓ | | | | | | | |
| | 11 | ✓ | ✓ | | | | | | | |
| | 12 | ✓ | ✓ | | | | | | | |
| | 13 | ✓ | ✓ | | | | | | | |
| | 14 | ✓ | ✓ | | | | | | | |
| | 15 | ✓ | ✓ | | | | | | | |
| | 16 | ✓ | ✓ | | | | | | | |
| | 17 | ✓ | ✓ | | | | | | | |
| | 18 | ✓ | ✓ | | | | | | | |
| | 19 | ✓ | ✓ | | | | | | | |
| | 20 | ✓ | ✓ | | | | | | | |
| | 21 | ✓ | ✓ | | | | | | | |
| | 22 | ✓ | ✓ | | | | | | | |
| | 23 | ✓ | ✓ | | | | | | | |
| | 24 | ✓ | ✓ | | | | | | | |
| | 25 | ✓ | ✓ | | | | | | | |
| | 26 | ✓ | ✓ | | | | | | | |
| | 27 | ✓ | ✓ | | | | | | | |
| | 28 | ✓ | ✓ | | | | | | | |
| | 29 | ✓ | ✓ | | | | | | | |
| | 30 | ✓ | ✓ | | | | | | | |
| | 31 | ✓ | ✓ | | | | | | | |
| | 32 | ✓ | ✓ | | | | | | | |
| | 33 | ✓ | ✓ | | | | | | | |
| | 34 | ✓ | ✓ | | | | | | | |
| | 35 | ✓ | ✓ | | | | | | | |
| | 36 | ✓ | ✓ | | | | | | | |

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 01/12/2015 | 05/31/2015 | | | | | | | |
| | 37 | ✓ | ✓ | | | | | | | |
| | 38 | ✓ | ✓ | | | | | | | |
| | 39 | ✓ | ✓ | | | | | | | |

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | Examiner | Art Unit |
| | MYRON K WYCHE | 2644 |

| CPC- SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| H04W 64/00 | 1/12/15 | MW |
| H04W 64/00 | 5/31/15 | MW |
| H04W 84/02 | 5/31/15 | MW |
| H04J 3/26 | 5/31/15 | MW |

| CPC COMBINATION SETS - SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Inventor NAME Search | 1/12/15 | MW |
| WORD Search | 1/12/15 | MW |
| Updated WORD Search | 5/31/15 | MW |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
| | | | |

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appln. No: | 13/976636 |
| Applicant: | Steven W. Goldstein |
| Filed: | September 25, 2013 |
| Title: | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| T.C./A.U.: | 2644 |
| Examiner: | MYRON WYCHE |
| Confirmation No.: | 3839 |
| Docket No.: | AMBZ-101US |

**AMENDMENT**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Office Action dated June 3, 2015, please amend the above-identified application as follows:

☐ **Amendments to the Specification** begin on page __ of this paper.

☒ **Amendments to the Claims** are reflected in the listing of claims which begins on page **2** of this paper.

☐ **Amendments to the Drawings** begin on page 8 of this paper and include an attached replacement sheet(s).

☐ **Amendments to the Abstract** are on page __ of this paper. A clean version of the Abstract is on page 6 of this paper.

☒ **Remarks/Arguments** begin on page **9** of this paper.

**Amendments to the Claims:** This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A ~~distributed~~ system comprising:

a device among a plurality of devices distributed in an environment,

~~each~~ the device having at least a communication capability for interchanging information with others ~~of~~ among the plurality of devices as part of a mobile ad hoc network and/or with a communication system, and

~~each of at least some of~~ the device~~s~~ having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and

wherein one or more of the devices among the plurality including the device is configured as a controller on an ad hoc basis, the controller being configured to: select a subset of devices from among the plurality of devices for collection of sensor data of an audio scene, receive information based on the acquired sensor data of the selected subset using the mobile ad hoc network based on a predetermined characteristic of the environment and the location of the one or more device~~s~~, and ~~combine~~ aggregate the received information from the selected subset to determine a characteristic of the ~~environment~~ audio scene proximate to one or more of the devices.

2. (Currently Amended) The system of claim 1, wherein the ~~distributed~~ system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone and at least one among a biometric sensor, location sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

3. (Previously Presented) The system of claim 1, wherein at least one of the devices includes at least one of a wireless device or a wired device and wherein the system enables the switching of a subset of devices on or off based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis.

4. (Original) The system of claim 1, wherein at least one of the devices includes at least one of a fixed device or a mobile device.

5. (Previously Presented) The system of claim 1, wherein at least one of the devices includes at least one of a mobile telephone device, an ear-piece, a hearing aid, a navigation device, a television remote, a car key fob, a portable game controller, GPS device, a computer or sensor module having at least one sensor.

6. (Currently Amended) The system of claim 1, wherein the one or more sensors includes the at least one ~~of a~~ microphone, and at least one among a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

7. (Original) The system of claim 1, wherein at least one of the devices includes a position module for determining a position of the respective device.

8. (Currently Amended) The system of claim 1, wherein each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller selected by the ad hoc network for determining the characteristic of the environment.

9. (Currently Amended) The system of claim 8, wherein the local data analysis module includes an acoustic analysis module to process audio information including processing of speech and non-speech events.

10. (Original) The system of claim 8, wherein the local data analysis module includes a sensor analysis module to process non-audio related information.

11. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc network is configured to determine locations for at least some of the devices.

12. (Currently Amended) The system of claim 11, wherein the controller selected by the ad hoc network is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

13. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc network is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

14. (Previously Presented) The system of claim 1, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

15. (Previously Presented) The system of claim 2, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

16. (Currently Amended) The system of claim ~~1~~ 1, wherein the environment includes ~~an~~ the audio scene and a characteristic of the audio scene includes at least one of speech events ~~or~~ and non-speech events to determine an emotional state or a medical disorder.

17. (Currently Amended) The system of claim 16, wherein when the system is a distributed system that records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded.

18. (Original) The system of claim 1 wherein the distributed system further determines trend information across a population of users of the devices from the combined information.

19. (Original) The system of claim 1, wherein the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

20. (Original) The system of claim 1, wherein the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

21. (Original) The system of claim 20, wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

22. (Previously Presented) The system of claim 1, wherein at least one of the devices enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

23. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

24. (Currently Amended) An ad hoc controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network, the ad hoc controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the ad hoc controller comprising:

a selection/acquisition module configured on an ad hoc basis to select a subset of devices from among the plurality of devices using the mobile ad hoc network and the one or more sensors and for receiving information based on the acquired sensor data of the selected subset of devices, the acquired sensor data being acquired from at least one or more microphones used for detecting keywords; and

a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

25. (Currently Amended) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to determine locations for at least some of the devices.

26. (Currently Amended) The ad hoc controller of claim 25, wherein the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

27. (Currently Amended) The ad hoc controller of claim 24, wherein the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

28. (Currently Amended) The ad hoc controller of claim 24, wherein the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module.

29. (Currently Amended) The ad hoc controller of claim 24, further comprising a sensor module including at least one ~~of a~~the one or more microphones, and at least one or more of a motion-related sensor, a temperature sensor, a biometric sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

30. (Currently Amended) The ad hoc controller of claim 29, further comprising a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment.

31. (Currently Amended) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment.

32. (Currently Amended) A method at an ad hoc controller for processing information from a plurality of devices in a mobile ad hoc network distributed in an environment, the method comprising:

selecting a subset of devices from among the plurality of devices by ~~a~~the ad hoc controller on an ad hoc basis using the mobile ad hoc network and based on sensor data collected, the ad hoc controller including at least one of a communication system or a device, each device having at least a communication capability for interchanging information with others ~~of~~among the devices and/or with the communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events;

acquiring sensor data by the selected subset of devices; receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network; and

combining, by the ad hoc controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

33. (Currently Amended) The method of claim 32, wherein the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the ad hoc controller for the information.

34. (Original) The method of claim 32, wherein the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment.

35. (Original) The method of claim 32, the method further including determining trend information across a population of users of the devices from the combined information.

36. (Original) The method of claim 32, the method further including monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

37. (Original) The method of claim 32, the method further including determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

38. (Original) The method of claim 32, the method further including adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment.

39. (Currently Amended) The method of claim 32, wherein the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the ad hoc controller.



IPR2024-01300 Page 00318

**Remarks/Arguments:**

Claims 1, 2, 6, 8, 9, 11-13, 16, 17, 23, 24, 25-31, 32, 33 and 39 have been amended. No new matter is introduced herein. Claims 1-39 are pending.

Claim Amendments

Claim 1 has been amended to include the aspect of comprising a device (having one or more sensors for acquiring sensor data) among a plurality of devices as part of a mobile ad hoc network where the device includes at least one microphone used for detecting keywords and used for detecting non-speech acoustic events and where one of the devices is configured as a controller on an ad hoc basis and configured to select a subset of devices for collection of sensor data of an audio scene and receive information based on acquired sensor data from the selected subset of devices using the mobile ad hoc network. No new matter is introduced herein.

Support for the amendments to claim 1 can be found throughout the specification and more particularly in paragraphs [0014], [0015], [0044], [0045], [0077], and [0132] of the specification (emphasis added):

> [0014] In some aspects of the present invention, the combination of characteristics of these devices provides a potentially rich source of information that may be combined in a way that generates valuable information that is not necessarily available to any individual device. As an illustrative example, **audio processed** locally at many different devices may be combined to identify geographic or social group trends **based on keywords spoken or other acoustic events (e.g., coughs) that are detected at the devices**.
>
> [0015] **Detection of coughs is an example where detection of non-speech acoustic events may be useful.** Because a cough is often a sudden and often repetitively occurring reflex, frequent coughing may indicate the presence of a disease (e.g., many viruses and bacteria benefit evolutionarily by causing the host to cough, which helps to spread the disease to new hosts). Most of the time, coughing is caused by a respiratory tract infection but can be triggered by choking, smoking, air pollution, asthma, gastro-esophageal reflux disease, post-nasal drip, chronic bronchitis, lung tumors, heart failure and medications such as ACE inhibitors. Detection of such events in the vicinity of the devices may provide significant information.
>
> [0044] In an exemplary embodiment, **acoustic analysis module 230 may preprocess the audio information to recog-nize speech, perform keyword spotting on speech information, and in addition build voice models of various speakers within the auditory range of the device**. The models may, for example, use classifiers 234 and machine learning methods to identify gender, probable age range, nationality and other demographic features from the speech signals.
>
> [0045] In addition, there may be classifiers 234, for instance, to recognize any slurring due to the influence of

alcohol or similar substances, accent classifiers to detect and identify accent patterns belonging to specific language groups, and emotion classifiers to classify speakers and speech into happy, sad, stressed, angry or other emotional states. **Thus, given any audio input that includes any speech, individual devices 120 or system 100 (FIG. 1) as a whole may be able to build an acoustic profile of each speech participant in that input, where the profile not only includes the keywords spotted, but also other data such as demographic data** about each speaker including gender, probable age, possible nationality etc., as well as classifier results about **emotional state**, and/or whether the speaker is under the influence

[0077] In yet another variant, the **system may be used to alert patients of breathing disorders such as sleep apnea.** Sleep apnea is a disorder that is characterized by abnormal low breathing or abnormal pauses in breathing during sleep, often accompanied by snoring. Often the snorer is not aware that they snore or that they could have a life threating **medical issue**, and they suffer from fatigue, daytime sleepiness and other symptoms, often for years and years. Diagnosis often requires an overnight sleep study in a special lab set up with sensors. Knowledge about snoring and having a record of snoring behavior can help in the diagnosis and remediation of this condition. System 100 may be trained to recognize snoring, and to distinguish it from other kinds of similar noises, and help in detecting and recording snoring behavior to help people with breathing disorders identify their problems and seek appropriate help.

[0132] In addition to the physical switch, **there may also be a software controlled switch that may empower authorized parties to turn on and off features such as** recording of sensors, **recognizing keywords and uploading appropriate information to the cloud where inferences can be made that aggregate over space and time.** Policies may eventually be determined regarding who is allowed to do what, and what is appropriate and what is not

§103 Rejections

The Office on page 2 of the Office Action, the Office concedes that Lane fails to disclose a mobile ad hoc network and a device among a plurality of devices that is configured as a controller on an ad hoc basis and relies on cited portions of Atwal at paragraph [0042] which only discloses "adaptation decisions may be made by a centralized controller, in a distributed manner, and the like." The Office on pages 2 and 3 further concedes that Lane and Atwal still fails to clearly disclose the remaining limitations of the claim. Applicant submits that Lane and Atwal fail to disclose a mobile ad hoc network and a device among a plurality of devices that is **configured as a controller on an ad hoc basis**. Nevertheless, the Office further relies on cited portions of Park et al. that the controller is configured to "…**determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling**." The selection of subsets of nodes are done for "**efficient multicast messages based on one- and two-hop topology information**." This is not the same purpose of the selection devices as recited in the claims in the Application herein. In contrast, as recited in amended claim 1, the section of the subset of devices is done for **collection of sensor data of an audio scene** and not for efficient multicast messages.

Furthermore, none of the cited references including Lane, Atwal, Park, and Holapainen disclose or suggest one or more sensors for acquiring sensor data related to the environment proximate to the device including **at least one microphone used for detecting keywords and used for detecting non-speech acoustic events**. More particularly, with respect the cited portions of Holapeinen, although paragraph [0027] references mobile ad-hoc network (MANET), Holapeinen however still fails to disclose or suggest the use of such mobile ad hoc network and sensors to select a controller on an ad hoc basis among a plurality of devices in such network. Furthermore, in paragraph [0027] and [0071] of Holapeinen, although Holapeinen refers to "media" as "including audio, video, still images, pictures, etc.", and references a microphone for amplifying a speech signal in paragraph [0071], **nothing in the cited portions of Holapeinen suggests or discloses using a microphone for detecting keywords and for detecting non-speech acoustic events**. There is no speech recognition or detecting of keyword and detecting of non-speech acoustic events disclosed or suggested by the cited portions of Holapeinen. Holapeinen in paragraph [0071] describes the used of a microphone and 1111 that feeds a coder/decoder (CODEC) 1113. This is not a device that detects keywords as claimed, but rather one that codes and decodes acoustic signal for efficient transmission and replay. Accordingly, Holapeinen fails to overcome the deficiencies of Lane, Atwal and Park. Lane, Atwal, Park, and Holapenein fail to render claim 1 and therefore claim 1 is allowable. Claims 2-21 are allowable as being dependent on an allowable base claim. Other limitations in the dependent claims further distinguish over the cited art. For example, with respect to claim 6, none of the cited references disclose or suggest a system that includes the microphone (that detects keywords and detects non-speech acoustic events) and further includes one or more of the enumerated sensors recited in the claim. With respect to claim 16, none of the cited references disclose a system where the audio scene includes at least one of speech events and non-speech events to determine an emotional state or medical disorder.

Claims 14, 15, and 22 were previously amended to include a mobile ad hoc network that is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network and in a broader sense that at least one of the devices in the mobile ad hoc network enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

With respect to claim 24, besides further clarifying or emphasizing that an ad hoc controller is used for interacting with a plurality of devices distributed in an environment, the claim has been further amended to recite that the selection/acquisition module is configured on an ad hoc basis to select a subset of devices from among the plurality of devices **using the mobile ad hoc network and the one or more sensors** and for receiving information based on the acquired sensor data of the selected subset of devices, **the acquired sensor data being acquired from at least one or more microphones used for detecting keywords and used for detecting non-speech acoustic events.** Again, note that the selection/acquisition module uses both the mobile ad hoc network and the one or more sensors as the basis of the selection of the subset for receiving information or acquiring sensor data. This is not the same as Park where the controller in Park is configured to "…**determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling**…." which is done for "….**efficient multicast messages based on one- and two-hop topology information**." Furthermore, none of the cited references discloses or suggests that the acquired sensor data is acquired from at least one or more microphones used for detecting keywords. Atwal and Park fail to overcome the deficiencies of Lane. Accordingly, Lane, Atwal and Park fail to render claim 24 obvious and therefore claim 24 is allowable. Claims 25-31 are allowable as being dependent on an allowable base claim.

Claim 32 has also incorporated the element of a mobile ad hoc network where selecting a subset of devices uses the mobile ad hoc network and the sensor data collected for making such selection, which is not found in the cited portions of Lane, Atwal or Park. Furthermore, none of the cited portions of Lane, Atwal or Park disclose or suggest a device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events. Accordingly, Lane, Atwal and Park fail to render claim 32 obvious and therefore claim 32 is allowable. Claims 33-39 are allowable as being dependent on an allowable base claim.

Conclusion

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

/pablo meles/
Pablo Meles, Reg. No. 33,739
Attorney for Applicants

The Director is hereby authorized to charge or credit Deposit Account No. **504284** for any additional fees, or any underpayment or credit for overpayment in connection herewith.

Doc Code: A.NE.AFCP
Document Description: After Final Consideration Pilot Program Request

PTO/SB/434 (05-13)

# CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

| Practitioner Docket No.: | Application No.: | Filing Date: |
|---|---|---|
| AMBZ-101US | 13976636 | 09/25/2013 |
| **First Named Inventor:** | **Title:** | |
| Steven W. Goldstein | METHOD AND DEVICE FOR OCCLUDING AN EAR CANAL HAVING A PREDETERMINED FILTER CHARACTERISTIC | |

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.

1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (*e.g.*, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The above-identified application contains an outstanding final rejection.
3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.
4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.
5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.
6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).
7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]
8. By filing this certification and request, applicant acknowledges the following:
    - Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.
    - The examiner will verify that the AFCP 2.0 submission is compliant, *i.e.*, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions:
        - The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, by mailing an advisory action.
        - If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview.
            - The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.
            - If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.

| Signature | Date |
|---|---|
| /pablo meles/ | |
| **Name (Print/Typed)** Pablo Meles | **Practitioner Registration No.** 33739 |

***Note:*** *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

☐ * Total of _____ forms are submitted.

# Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 23022111 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 117822 |
| **Filer:** | Pablo Meles |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 24-JUL-2015 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 18:26:08 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | AMBZ-101US_FOAR_3August2015_FINAL.pdf | 188402<br>98b6f8426c14a5b6cdf6e73ba8c5b8a7ec2083a4 | yes | 13 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Response After Final Action | 1 | 1 |
| | Claims | 2 | 8 |
| | Applicant Arguments/Remarks Made in an Amendment | 9 | 13 |

| | | | | | |
|---|---|---|---|---|---|
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | After Final Consideration Program Request | AMBZ-101US_RequestAfterFinalConsideration_sb0434.pdf | 226038<br>e32b2f8c7efa46f94a6924781996099a8efd2600 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 414440 | | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**<u>New Applications Under 35 U.S.C. 111</u>**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**<u>National Stage of an International Application under 35 U.S.C. 371</u>**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**<u>New International Application Filed with the USPTO as a Receiving Office</u>**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

PTO/SB/06 (09-11)
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| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>13/976,636 | Filing Date<br>10/01/2013 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY**: ☐ LARGE ☒ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = * | | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = * | | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

| AMENDMENT | 07/24/2015 | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * 39 | Minus | ** 39 | = 0 | X $40 = | 0 |
| | Independent (37 CFR 1.16(h)) | * 3 | Minus | ***3 | = 0 | X $210 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | **0** |

| AMENDMENT | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/MONICA FRANCIS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appln. No: | 13/976636 |
| Applicant: | Steven W. Goldstein |
| Filed: | September 25, 2013 |
| Title: | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| T.C./A.U.: | 2644 |
| Examiner: | MYRON WYCHE |
| Confirmation No.: | 3839 |
| Docket No.: | AMBZ-101US |

**AMENDMENT**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Office Action dated June 3, 2015 and the Conference Call of September 2, 2015, please amend the above-identified application as follows:

☐ **Amendments to the Specification** begin on page __ of this paper.

☒ **Amendments to the Claims** are reflected in the listing of claims which begins on page **2** of this paper.

☐ **Amendments to the Drawings** begin on page __ of this paper and include an attached replacement sheet(s).

☐ **Amendments to the Abstract** are on page __ of this paper. A clean version of the Abstract is on page 6 of this paper.

☒ **Remarks/Arguments** begin on page **10** of this paper.

**Amendments to the Claims:** This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A ~~distributed~~ system comprising:

a device among a plurality of devices distributed in an environment,

~~each~~ the device having at least a communication capability for interchanging information with others ~~of~~ among the plurality of devices as part of a mobile ad hoc network and/or with a communication system, and

~~each of at least some of~~ the device~~s~~ having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events; ~~and~~

wherein one or more of the devices among the plurality including the device is configured as a controller on an ad hoc basis, the controller being configured to: select a subset of devices from among the plurality of devices for collection of sensor data, receive information based on the acquired sensor data of the selected subset using the mobile ad hoc network based on a predetermined characteristic of the environment and the location of the one or more device~~s~~, and ~~combine~~ aggregate the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices; and

wherein the system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, at least a biometric sensor among a heart rate sensor, a blood pressure sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor and at least one among a location sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, or a moisture sensor.

2. (Currently Amended) The system of claim 1, wherein the ~~distributed~~ system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, the biometric sensor, the location sensor and at least one among the light detection sensor, the proximity sensor, the gravity detection sensor, the magnetic field detection sensor, the electrical field detection sensor, the vibration sensor, the pressure sensor, the humidity sensor, or the moisture sensor.

3. (Previously Presented) The system of claim 1, wherein at least one of the devices includes at least one of a wireless device or a wired device and wherein the system enables the switching of a subset of devices on or off based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis.

4. (Original) The system of claim 1, wherein at least one of the devices includes at least one of a fixed device or a mobile device.

5. (Previously Presented) The system of claim 1, wherein at least one of the devices includes at least one of a mobile telephone device, an ear-piece, a hearing aid, a navigation device, a television remote, a car key fob, a portable game controller, GPS device, a computer or sensor module having at least one sensor.

6. (Currently Amended) The system of claim 1, wherein the one or more sensors includes the at least one ~~of a~~ microphone, the biometric sensor, and at least one among a motion-related sensor, a temperature sensor, ~~a biometric sensor,~~ a compass, or an image sensor~~, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor~~.

7. (Original) The system of claim 1, wherein at least one of the devices includes a position module for determining a position of the respective device.

8. (Currently Amended) The system of claim 1, wherein each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller selected by the ad hoc network for determining the characteristic of the environment.

9. (Currently Amended) The system of claim 8, wherein the local data analysis module includes an acoustic analysis module to process audio information including processing of speech and non-speech events.

10. (Original) The system of claim 8, wherein the local data analysis module includes a sensor analysis module to process non-audio related information.

11. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc network is configured to determine locations for at least some of the devices.

12. (Currently Amended) The system of claim 11, wherein the controller selected by the ad hoc network is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

13. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc network is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

14. (Previously Presented) The system of claim 1, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

15. (Previously Presented) The system of claim 2, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

16. (Currently Amended) The system of claim ~~1~~ 1, wherein the environment includes an audio scene and a characteristic of the audio scene includes at least one of speech events ~~or~~ and non-speech events to determine an emotional state.

17. (Currently Amended) The system of claim 16, wherein when the system is a distributed system that records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded.

18. (Original) The system of claim 1 wherein the distributed system further determines trend information across a population of users of the devices from the combined information.

19. (Original) The system of claim 1, wherein the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

20. (Original) The system of claim 1, wherein the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

21. (Original) The system of claim 20, wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

22. (Previously Presented) The system of claim 1, wherein at least one of the devices enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

23. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

24. (Currently Amended) An ad hoc controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network, the ad hoc controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the ad hoc controller comprising:

a selection/acquisition module configured on an ad hoc basis to select a subset of devices from among the plurality of devices using the mobile ad hoc network and the one or more sensors and for receiving information based on the acquired sensor data of the selected subset of devices, the acquired sensor data being acquired from at least one or more microphones used for detecting at least keywords, and from at least a biometric sensor among a heart rate sensor or a blood pressure sensor; and

a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

25. (Currently Amended) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to determine locations for at least some of the devices.

26. (Currently Amended) The ad hoc controller of claim 25, wherein the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

27. (Currently Amended) The ad hoc controller of claim 24, wherein the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

28. (Currently Amended) The ad hoc controller of claim 24, wherein the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module.

29. (Currently Amended) The ad hoc controller of claim 24, further comprising a sensor module including at least one ~~of a~~the one or more microphones, the biometric sensor, and at least one or more of a motion-related sensor, a temperature sensor, ~~a biometric sensor,~~ a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

30. (Currently Amended) The ad hoc controller of claim 29, further comprising a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment.

31. (Currently Amended) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment.

32. (Currently Amended) A method at an ad hoc controller for processing information from a plurality of devices in a mobile ad hoc network distributed in an environment, the method comprising:

selecting a subset of devices from among the plurality of devices by ~~a~~ the ad hoc controller on an ad hoc basis using the mobile ad hoc network and based on sensor data collected, the ad hoc controller including at least one of a communication system or a device, each device having at least a communication capability for interchanging information with others ~~of~~ among the devices and/or with the communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and at least a biometric sensor used for detecting heart rate or blood pressure;

acquiring sensor data by the selected subset of devices; receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network; and

combining, by the ad hoc controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

33. (Currently Amended) The method of claim 32, wherein the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the ad hoc controller for the information.

34. (Original) The method of claim 32, wherein the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment.

35. (Original) The method of claim 32, the method further including determining trend information across a population of users of the devices from the combined information.

36. (Original) The method of claim 32, the method further including monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

37. (Original) The method of claim 32, the method further including determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

38. (Original) The method of claim 32, the method further including adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment.

39. (Currently Amended) The method of claim 32, wherein the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the ad hoc controller.

**Remarks/Arguments:**

The Applicant wishes to acknowledge and thank the Examiner for the Conference call of September 2, 2015 where the previously amended claims were discussed. Although no agreement was made, additional references to Guarino and Chow and potential strategies for further amendments were briefly discussed.

Claims 1, 2, 6, 8, 9, 11-13, 16, 17, 23, 24, 25-31, 32, 33 and 39 have been amended. No new matter is introduced herein. Claims 1-39 are pending.

Claim Amendments

Claim 1 has been amended to include the aspect of comprising a device (having one or more sensors for acquiring sensor data) among a plurality of devices as part of a mobile ad hoc network where the device includes at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and further includes at least a biometric sensor among a heart rate sensor, blood pressure sensor, a toxin detection sensor, a nutrient detection sensor, or a pheromone detection sensor, and where one of the devices is configured as a controller on an ad hoc basis and configured to select a subset of devices for collection of sensor data of an audio scene and receive information based on acquired sensor data from the selected subset of devices using the mobile ad hoc network. No new matter is introduced herein.

Support for the amendments to claim 1 can be found throughout the specification and more particularly in paragraphs [0014], [0015], [0044], [0045], [0077], and [0132] of the specification (emphasis added):

> [0014] In some aspects of the present invention, the combination of characteristics of these devices provides a potentially rich source of information that may be combined in a way that generates valuable information that is not necessarily available to any individual device. As an illustrative example, **audio processed** locally at many different devices may be combined to identify geographic or social group trends **based on keywords spoken or other acoustic events (e.g., coughs) that are detected at the devices**.
>
> [0015] **Detection of coughs is an example where detection of non-speech acoustic events may be useful.** Because a cough is often a sudden and often repetitively occurring reflex, frequent coughing may indicate the presence of a disease (e.g., many viruses and bacteria benefit evolutionarily by causing the host to cough,

which helps to spread the disease to new hosts). Most of the time, coughing is caused by a respiratory tract infection but can be triggered by choking, smoking, air pollution, asthma, gastro-esophageal reflux disease, post-nasal drip, chronic bronchitis, lung tumors, heart failure and medications such as ACE inhibitors. Detection of such events in the vicinity of the devices may provide significant information.

[0044] In an exemplary embodiment, **acoustic analysis module 230 may preprocess the audio information to recog-nize speech, perform keyword spotting on speech information, and in addition build voice models of various speakers within the auditory range of the device**. The models may, for example, use classifiers 234 and machine learning methods to identify gender, probable age range, nationality and other demographic features from the speech signals.

[0045] In addition, there may be classifiers 234, for instance, to recognize any slurring due to the influence of alcohol or similar substances, accent classifiers to detect and identify accent patterns belonging to specific language groups, and emotion classifiers to classify speakers and speech into happy, sad, stressed, angry or other emotional states. **Thus, given any audio input that includes any speech, individual devices 120 or system 100 (FIG. 1) as a whole may be able to build an acoustic profile of each speech participant in that input, where the profile not only includes the keywords spotted, but also other data such as demographic data** about each speaker including gender, probable age, possible nationality etc., as well as classifier results about **emotional state**, and/or whether the speaker is under the influence

[0077] In yet another variant, the **system may be used to alert patients of breathing disorders such as sleep apnea.** Sleep apnea is a disorder that is characterized by abnormal low breathing or abnormal pauses in breathing during sleep, often accompanied by snoring. Often the snorer is not aware that they snore or that they could have a life threating **medical issue**, and they suffer from fatigue, daytime sleepiness and other symptoms, often for years and years. Diagnosis often requires an overnight sleep study in a special lab set up with sensors. Knowledge about snoring and having a record of snoring behavior can help in the diagnosis and remediation of this condition. System 100 may be trained to recognize snoring, and to distinguish it from other kinds of similar noises, and help in detecting and recording snoring behavior to help people with breathing disorders identify their problems and seek appropriate help.

[0132] In addition to the physical switch, **there may also be a software controlled switch that may empower authorized parties to turn on and off features such as** recording of sensors, **recognizing keywords and uploading appropriate information to the cloud where inferences can be made that aggregate over space and time.** Policies may eventually be determined regarding who is allowed to do what, and what is appropriate and what is not

See also paragraphs [0013] and [0034](emphasis added):

**[0013]** Personal wireless devices, as well as other types of computing or communication devices, have become ubiquitous in our environment. Generally, such devices have a number of sensors, which may include, for instance, microphones, cameras, accelerometers, and in some cases may even have sensors for **biometric information, such as heart rate**. Such devices also generally include one or more communication systems, for example, a cellular telephone radio system (e.g., Code Division Multiple access (CDMA) or Global System for Mobile Communications (GSM)), a wireless local area network system (e.g., Wi-Fi, IEEE 802.11), wired computer network connections (e.g., data network connections via USB cradles, possibly via desktop computer applications) and in some cases other systems based on radio frequency (e.g.,……

**[0034]** Device 120 may include sensor module 202 for the acquisition of sensor information. Sensor module 202 may include one or more microphones 222 for collecting acoustic information regarding audio scene 130 (FIG. 1). Sensor module 202 may also include one or more environmental sensors (such as a temperature sensor, a motion sensor such as an accelerometer) for collecting environmental information associated with device 120. Sensor module 202 may also include **one or more biometric sensors 226 (such as heart rate) for sensing biometric information regarding a user of device 120**. Sensor module 202 may also include camera 228 (i.e., an image sensor) for capturing still images and/or video of the surrounding environment of device 120. Sensor module 202 may also include a compass for providing location information. In general, sensor module 202 may include any sensor capable of measuring a physical quantity and converting it into a signal that may be used by system 100. For example,

§103 Rejections

The Office on page 2 of the Office Action, the Office concedes that Lane fails to disclose a mobile ad hoc network and a device among a plurality of devices that is configured as a controller on an ad hoc basis and relies on cited portions of Atwal at paragraph [0042] which only discloses "adaptation decisions may be made by a centralized controller, in a distributed manner, and the like." The Office on pages 2 and 3 further concedes that Lane and Atwal still fail to clearly disclose the remaining limitations of the claim. Applicant submits that Lane and Atwal fail to disclose a mobile ad hoc network and a device among a plurality of devices that is **configured as a controller on an ad hoc basis**. Nevertheless, the Office further relies on cited portions of Park et al. that the controller is configured to "…**determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling**." The selection of subsets of nodes are done for "**efficient multicast messages based on one- and two-hop topology information**." This is not the same purpose of the selection devices as recited in the claims in the Application herein. In contrast, as recited in amended claim 1, the section of the subset of devices is done for **collection of sensor data** and not for efficient multicast messages. Furthermore, none of the cited references including Lane, Atwal, Park, and Holapainen disclose or suggest one or more sensors for acquiring sensor data related to the environment proximate to the device including **at least one microphone used for detecting keywords and used for detecting non-speech acoustic events**. More particularly, with respect the cited portions of Holapeinen, although paragraph [0027] references mobile ad-hoc network (MANET), Holapeinen however still fails to disclose or suggest the use of such mobile ad hoc network and sensors to select a controller on an ad hoc basis among a plurality of devices in such network. Furthermore, in paragraph [0027] and [0071] of Holapeinen, although Holapeinen refers to "media" as "including audio, video, still images, pictures, etc.", and references a microphone for amplifying a speech signal in paragraph [0071], **nothing in the cited portions of Holapeinen suggests or discloses using a microphone for detecting keywords and for detecting non-speech acoustic events, a biometric sensor among a heart rate sensor, a blood pressure sensor, a toxin detection sensor, a nutrient detection sensor, or a pheromone detection sensor and at least one among a location sensor, a light**

**detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, or a moisture sensor**. There is no speech recognition or detecting of keyword and detecting of non-speech acoustic events disclosed or suggested by the cited portions of Holapeinen. Holapeinen in paragraph [0071] describes the used of a microphone and 1111 that feeds a coder/decoder (CODEC) 1113. This is not a device that detects keywords as claimed, but rather one that codes and decodes acoustic signal for efficient transmission and replay.

Additional references such as US Patent Publication No. 2009/0312660 to Guarino et al. (hereinafter "Guarino") describes use of a microphone or other sensors such accelerometers or EMGs (or electromyogram which detects the electrical potential generated by muscle cells when such cells are electrically or neurologically activated) for monitoring cough events. See paragraph [0043] of Guarino

> **[0043]** 2. For the acquisition a microphone, several microphones or the combination of a microphone(s) with other sensors (like EMG, accelerometer, . . . ), a camera, or the combination of camera and microphone (s), or other sensors available for monitoring cough events are used.

These sensors are specific for monitoring coughs and not part of a mobile ad hoc network that uses a microphone to detect keywords **and** non-speech acoustic events **as well as** other sensor data in the aggregate that includes specific biometric sensor data and other sensor data selected from an enumerated list.

Another reference such as US Patent No. 7860722 to Charles Chow (hereinafter Chow) describes the use of a microphone for keyword detection. Chow also fails to disclose the use of a microphone to detect both keywords and non-speech acoustic events as well as detection of other sensor data in the aggregate that includes specific biometric sensor data and other sensor data selected from an enumerated list.

Accordingly, Guarino, Chow, and Holapeinen fails to overcome the deficiencies of Lane, Atwal and Park. Lane, Atwal, Park, Guarino, Chow and Holapenein fail to render claim 1 obvious and therefore claim 1 is allowable. Claims 2-21 are allowable as being dependent on an allowable base claim. Other limitations in the dependent claims further distinguish over the cited art. For example, with respect to claim 2, none of the references configures the subset of devices according to triggering events detected at one or more the plurality of devices using the at least one microphone, the biometric sensor, the location sensor and at least one among the light detection sensor, the proximity sensor, the gravity detection sensor, the magnetic field detection sensor, the electrical field detection sensor, the vibration sensor, the pressure sensor, the humidity sensor, or the moisture sensor.

With respect to claim 6, none of the cited references disclose or suggest a system that includes the microphone (that detects keywords and detects non-speech acoustic events), the biometric sensors (e.g., heart rate sensor or blood pressure sensor) and further includes one or more of the enumerated sensors recited in the claim. With respect to claim 16, none of the cited references disclose a system where the audio scene includes at least one of speech events and non-speech events to determine an emotional state.

Claims 14, 15, and 22 were previously amended to include a mobile ad hoc network that is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network and in a broader sense that at least one of the devices in the mobile ad hoc network enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

With respect to claim 24, besides further clarifying or emphasizing that an ad hoc controller is used for interacting with a plurality of devices distributed in an environment, the claim has been further amended to recite that the selection/acquisition module is configured on an ad hoc basis to select a subset of devices from among the plurality of devices **using the mobile ad hoc network and the one or more sensors** and for receiving information based on the acquired sensor data of the selected subset of devices, **the acquired sensor data being acquired from at least one or more microphones used for detecting at least keywords**

**and from at least a biometric sensor among a heart rate sensor or a blood pressure sensor.** Again, note that the selection/acquisition module uses both the mobile ad hoc network and the one or more sensors as the basis of the selection of the subset for receiving information or acquiring sensor data. This is not the same as Park where the controller in Park is configured to "…**determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling**…." which is done for "….**efficient multicast messages based on one- and two-hop topology information**." Furthermore, none of the cited references discloses or suggests that the acquired sensor data is acquired from at least one or more microphones used for detecting keywords and from a biometric sensor such as a heart rate sensor or a blood pressure sensor. Atwal and Park (as well Guarino and Chow) fail to overcome the deficiencies of Lane. Accordingly, Lane, Atwal, Guarino, Chow and Park fail to render claim 24 obvious and therefore claim 24 is allowable. Claims 25-31 are allowable as being dependent on an allowable base claim.

Claim 32 has also incorporated the element of a mobile ad hoc network where selecting a subset of devices uses the mobile ad hoc network and the sensor data collected for making such selection, which is not found in the cited portions of Lane, Atwal or Park. Furthermore, none of the cited portions of Lane, Atwal, Guarino, Chow, or Park disclose or suggest a device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events AND at least a biometric sensor used for detecting heart rate or blood pressure. Accordingly, Lane, Atwal and Park fail to render claim 32 obvious and therefore claim 32 is allowable. Claims 33-39 are allowable as being dependent on an allowable base claim.

Conclusion

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

/pablo meles/
Pablo Meles, Reg. No. 33,739
Attorney for Applicants

The Director is hereby authorized to charge or credit Deposit Account No. **504284** for any additional fees, or any underpayment or credit for overpayment in connection herewith.

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 23399571 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 117822 |
| **Filer:** | Pablo Meles |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 03-SEP-2015 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 16:20:08 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

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## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | AMBZ-101US_FOAR_3Sept2015_FINAL.pdf | 227311<br>040c9d973ee5d6772ac88316a03f254163cc7985 | yes | 16 |

| | Multipart Description/PDF files in .zip description | | |
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| | **Document Description** | **Start** | **End** |
| | Response After Final Action | 1 | 1 |
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**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

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**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | AMBZ-101US | 3839 |

117822 7590 09/09/2015

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| EXAMINER | |
|---|---|
| WYCHE, MYRON | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 09/09/2015 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

iepstein@personicslabs.com
personics_docketing@cardinal-ip.com
pmeles@personicslabs.com

| Examiner-Initiated Interview Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 13/976,636 | GOLDSTEIN, STEVEN W. | |
| | Examiner | Art Unit | |
| | MYRON K. WYCHE | 2644 | |

All participants (applicant, applicant's representative, PTO personnel):

(1) *MYRON K. WYCHE*.

(2) *Pablo Meles*.

(3) *Steven Goldstein*.

(4) _____.

Date of Interview: *02 September 2015*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *Claim 1*.

Identification of prior art discussed: *Atwal (20100316033); Chow (7,860,722); and Guarino (20090312660)*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

*The Examiner reviewed Applicant's AFCP 2.0 submission. In contrast to Applicant's arguments against the previously cited Atwal reference, the Examiner respectfully submits that Atwal clearly discloses: "a moble ad hoc network" and "one or more of the devices among the plurality including the device is configured as a controller" ([0042]: "… a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "… adaptation decisions may be made by a centalized controller, in a distributed manner"). In addition, the Examiner searched the prior art to identify possible references to address the newly added amended language and indicated Chow and Guarino et al. disclose: "keyword detection"/"microphone: (e.g., ABSTRACT) and "non-speech acoustic events" (FIG. 1a-FIG. 1c; [0058]: "cough detection"), respectively. In view of the above, an Advisory Action is entered in the case.* .

**Applicant recordation instructions**: It is not necessary for applicant to provide a separate record of the substance of interview.

**Examiner recordation instructions**: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

| /Myron Wyche/ 9/2/15<br>Primary Examiner<br>AU 2644 | |
|---|---|

| **Advisory Action Before the Filing of an Appeal Brief** | **Application No.** 13/976,636 | **Applicant(s)** GOLDSTEIN, STEVEN W. | |
|---|---|---|---|
| | **Examiner** MYRON K. WYCHE | **Art Unit** 2644 | **AIA (First Inventor to File) Status** No |

***--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

THE REPLY FILED 24 July 2015 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires *6* months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.

   *Examiner Note*: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: *See Continuation Sheet*. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☐ For purposes of appeal, the proposed amendment(s): (a) ☐ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☒ Other: Interview Summary.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed: .
    Claim(s) objected to: .
    Claim(s) rejected: 1-39.
    Claim(s) withdrawn from consideration: .

| /Myron Wyche/ 9/2/15<br>Primary Examiner, AU 2644 | |
|---|---|

Continuation of 3. NOTE: The Examiner reviewed Applicant's AFCP 2.0 submission. In contrast to Applicant's arguments against the previously cited Atwal reference, the Examiner respectfully submits that Atwal clearly discloses: "a moble ad hoc network" and "one or more of the devices among the plurality including the device is configured as a controller" ([0042]: "… a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "… adaptation decisions may be made by a centalized controller, in a distributed manner"). In addition, the Examiner searched the prior art to identify possible references to address the newly added amended language and indicated Chow and Guarino et al. disclose: "keyword detection"/"microphone: (e.g., ABSTRACT) and "non-speech acoustic events" (FIG. 1a-FIG. 1c; [0058]: "cough detection"), respectively. In view of the above, an Advisory Action is entered in the case. .

| Examiner-Initiated Interview Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 13/976,636 | GOLDSTEIN, STEVEN W. | |
| | Examiner | Art Unit | |
| | MYRON K. WYCHE | 2644 | |

All participants (applicant, applicant's representative, PTO personnel):

(1) *MYRON K. WYCHE*.

(2) *Pablo Meles*.

(3) *Steven Goldstein*.

(4) _____.

Date of Interview: *02 September 2015*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *Claim 1*.

Identification of prior art discussed: *Atwal (20100316033); Chow (7,860,722); and Guarino (20090312660)*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

*The Examiner reviewed Applicant's AFCP 2.0 submission. In contrast to Applicant's arguments against the previously cited Atwal reference, the Examiner respectfully submits that Atwal clearly discloses: "a moble ad hoc network" and "one or more of the devices among the plurality including the device is configured as a controller" ([0042]: "… a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "… adaptation decisions may be made by a centalized controller, in a distributed manner"). In addition, the Examiner searched the prior art to identify possible references to address the newly added amended language and indicated Chow and Guarino et al. disclose: "keyword detection"/"microphone: (e.g., ABSTRACT) and "non-speech acoustic events" (FIG. 1a-FIG. 1c; [0058]: "cough detection"), respectively. In view of the above, an Advisory Action is entered in the case.* .

**Applicant recordation instructions**: It is not necessary for applicant to provide a separate record of the substance of interview.

**Examiner recordation instructions**: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

| /Myron Wyche/ 9/2/15<br>Primary Examiner<br>AU 2644 | |
|---|---|

| AFCP 2.0 Decision | Application No. | Applicant(s) |
|---|---|---|
| | 13/976,636 | GOLDSTEIN, STEVEN W. |
| | Examiner | Art Unit |
| | MYRON K. WYCHE | 2644 |

This is in response to the After Final Consideration Pilot request filed 24 July 2015.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

   ☐ An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.

   ☐ A non-broadening amendment to at least one independent claim was not submitted.

   ☐ A proper AFCP 2.0 request was submitted in response to the most recent final rejection.

   ☐ Other:

2. **Proper Request**

   **A.** After final amendment submitted with the request will not be treated under AFCP 2.0.
   The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

   ☐ The after final amendment will be treated under pre-pilot procedure.

   **B.** Updated search and/or completed additional consideration.
   The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

   ☐ 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.

   ☐ 2. The after final amendment would not overcome all of the rejections in the most recent final Office action. See attached interview summary for further details.

   ☐ 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.

   ☒ 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.

   ☐ 5. Other:

   Examiner Note: Please attach an interview summary when necessary as described above.

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-14)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

# REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
## (Submitted Only via EFS-Web)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Application Number | 13976636 | Filing Date | 2013-09-25 | Docket Number (if applicable) | AMBZ-101US | Art Unit | 2644 |
| First Named Inventor | Steven W. Goldstein | | | Examiner Name | Myron Wyche | | |

**This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.**
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, to any international application that does not comply with the requirements of 35 U.S.C. 371, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV.

### SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☒ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☐ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☒ Other
Amendment After Final previously submitted on September 3, 2015.

### MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

### FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 504284

### SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-14)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

| Signature of Registered U.S. Patent Practitioner | | | |
|---|---|---|---|
| Signature | /pablo meles/ | Date (YYYY-MM-DD) | 2015-10-02 |
| Name | Pablo Meles | Registration Number | 33739 |

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

# Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appln. No: | 13/976636 |
| Applicant: | Steven W. Goldstein |
| Filed: | September 25, 2013 |
| Title: | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| T.C./A.U.: | 2644 |
| Examiner: | MYRON WYCHE |
| Confirmation No.: | 3839 |
| Docket No.: | AMBZ-101US |

**AMENDMENT**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Office Action dated June 3, 2015 and the Conference Call of September 2, 2015, please amend the above-identified application as follows:

☐ **Amendments to the Specification** begin on page __ of this paper.

☒ **Amendments to the Claims** are reflected in the listing of claims which begins on page **2** of this paper.

☐ **Amendments to the Drawings** begin on page __ of this paper and include an attached replacement sheet(s).

☐ **Amendments to the Abstract** are on page __ of this paper. A clean version of the Abstract is on page 6 of this paper.

☒ **Remarks/Arguments** begin on page **10** of this paper.

**Amendments to the Claims:** This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A ~~distributed~~ system comprising:

a device among a plurality of devices distributed in an environment,

~~each~~ the device having at least a communication capability for interchanging information with others ~~of~~ among the plurality of devices as part of a mobile ad hoc network and/or with a communication system, and

~~each of at least some of~~ the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events; ~~and~~

wherein one or more of the devices among the plurality including the device is configured as a controller on an ad hoc basis, the controller being configured to: select a subset of devices from among the plurality of devices for collection of sensor data, receive information based on the acquired sensor data of the selected subset using the mobile ad hoc network based on a predetermined characteristic of the environment and the location of the one or more devices, and ~~combine~~ aggregate the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices; and

wherein the system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, at least a biometric sensor among a heart rate sensor, a blood pressure sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor and at least one among a location sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, or a moisture sensor.

2. (Currently Amended) The system of claim 1, wherein the ~~distributed~~ system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, the biometric sensor, the location sensor and at least one among the light detection sensor, the proximity sensor, the gravity detection sensor, the magnetic field detection sensor, the electrical field detection sensor, the vibration sensor, the pressure sensor, the humidity sensor, or the moisture sensor.

3. (Previously Presented) The system of claim 1, wherein at least one of the devices includes at least one of a wireless device or a wired device and wherein the system enables the switching of a subset of devices on or off based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis.

4. (Original) The system of claim 1, wherein at least one of the devices includes at least one of a fixed device or a mobile device.

5. (Previously Presented) The system of claim 1, wherein at least one of the devices includes at least one of a mobile telephone device, an ear-piece, a hearing aid, a navigation device, a television remote, a car key fob, a portable game controller, GPS device, a computer or sensor module having at least one sensor.

6. (Currently Amended) The system of claim 1, wherein the one or more sensors includes the at least one ~~of a~~ microphone, the biometric sensor, and at least one among a motion-related sensor, a temperature sensor, ~~a biometric sensor,~~ a compass, or an image sensor~~, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor~~.

7. (Original) The system of claim 1, wherein at least one of the devices includes a position module for determining a position of the respective device.

8. (Currently Amended) The system of claim 1, wherein each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller selected by the ad hoc network for determining the characteristic of the environment.

9. (Currently Amended) The system of claim 8, wherein the local data analysis module includes an acoustic analysis module to process audio information including processing of speech and non-speech events.

10. (Original) The system of claim 8, wherein the local data analysis module includes a sensor analysis module to process non-audio related information.

11. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc network is configured to determine locations for at least some of the devices.

12. (Currently Amended) The system of claim 11, wherein the controller selected by the ad hoc network is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

13. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc network is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

14. (Previously Presented) The system of claim 1, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

15. (Previously Presented) The system of claim 2, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

16. (Currently Amended) The system of claim ~~15~~1, wherein the environment includes an audio scene and a characteristic of the audio scene includes at least one of speech events ~~or~~ and non-speech events to determine an emotional state.

17. (Currently Amended) The system of claim 16, wherein when the system is a distributed system that records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded.

18. (Original) The system of claim 1 wherein the distributed system further determines trend information across a population of users of the devices from the combined information.

19. (Original) The system of claim 1, wherein the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

20. (Original) The system of claim 1, wherein the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

21. (Original) The system of claim 20, wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

22. (Previously Presented) The system of claim 1, wherein at least one of the devices enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

23. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

24. (Currently Amended) An ad hoc controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network, the ad hoc controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the ad hoc controller comprising:

a selection/acquisition module configured on an ad hoc basis to select a subset of devices from among the plurality of devices using the mobile ad hoc network and the one or more sensors and for receiving information based on the acquired sensor data of the selected subset of devices, the acquired sensor data being acquired from at least one or more microphones used for detecting at least keywords, and from at least a biometric sensor among a heart rate sensor or a blood pressure sensor; and

a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

25. (Currently Amended) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to determine locations for at least some of the devices.

26. (Currently Amended) The ad hoc controller of claim 25, wherein the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

27. (Currently Amended) The ad hoc controller of claim 24, wherein the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

28. (Currently Amended) The ad hoc controller of claim 24, wherein the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module.

29. (Currently Amended) The ad hoc controller of claim 24, further comprising a sensor module including at least one ~~of~~ ~~a~~the one or more microphones, the biometric sensor, and at least one or more of a motion-related sensor, a temperature sensor, ~~a biometric sensor,~~ a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor.

30. (Currently Amended) The ad hoc controller of claim 29, further comprising a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment.

31. (Currently Amended) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment.

32. (Currently Amended) A method at an ad hoc controller for processing information from a plurality of devices in a mobile ad hoc network distributed in an environment, the method comprising:

selecting a subset of devices from among the plurality of devices by ~~a~~ the ad hoc controller on an ad hoc basis using the mobile ad hoc network and based on sensor data collected, the ad hoc controller including at least one of a communication system or a device, each device having at least a communication capability for interchanging information with others ~~of~~ among the devices and/or with the communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and at least a biometric sensor used for detecting heart rate or blood pressure;

acquiring sensor data by the selected subset of devices; receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network; and

combining, by the ad hoc controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices.

33. (Currently Amended) The method of claim 32, wherein the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the ad hoc controller for the information.

34. (Original) The method of claim 32, wherein the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment.

35. (Original) The method of claim 32, the method further including determining trend information across a population of users of the devices from the combined information.

36. (Original) The method of claim 32, the method further including monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

37. (Original) The method of claim 32, the method further including determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

38. (Original) The method of claim 32, the method further including adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment.

39. (Currently Amended) The method of claim 32, wherein the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the ad hoc controller.

**Remarks/Arguments:**

The Applicant wishes to acknowledge and thank the Examiner for the Conference call of September 2, 2015 where the previously amended claims were discussed. Although no agreement was made, additional references to Guarino and Chow and potential strategies for further amendments were briefly discussed.

Claims 1, 2, 6, 8, 9, 11-13, 16, 17, 23, 24, 25-31, 32, 33 and 39 have been amended. No new matter is introduced herein. Claims 1-39 are pending.

Claim Amendments

Claim 1 has been amended to include the aspect of comprising a device (having one or more sensors for acquiring sensor data) among a plurality of devices as part of a mobile ad hoc network where the device includes at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and further includes at least a biometric sensor among a heart rate sensor, blood pressure sensor, a toxin detection sensor, a nutrient detection sensor, or a pheromone detection sensor, and where one of the devices is configured as a controller on an ad hoc basis and configured to select a subset of devices for collection of sensor data of an audio scene and receive information based on acquired sensor data from the selected subset of devices using the mobile ad hoc network. No new matter is introduced herein.

Support for the amendments to claim 1 can be found throughout the specification and more particularly in paragraphs [0014], [0015], [0044], [0045], [0077], and [0132] of the specification (emphasis added):

> [0014] In some aspects of the present invention, the combination of characteristics of these devices provides a potentially rich source of information that may be combined in a way that generates valuable information that is not necessarily available to any individual device. As an illustrative example, **audio processed** locally at many different devices may be combined to identify geographic or social group trends **based on keywords spoken or other acoustic events (e.g., coughs) that are detected at the devices**.
>
> [0015] **Detection of coughs is an example where detection of non-speech acoustic events may be useful.** Because a cough is often a sudden and often repetitively occurring reflex, frequent coughing may indicate the presence of a disease (e.g., many viruses and bacteria benefit evolutionarily by causing the host to cough,

which helps to spread the disease to new hosts). Most of the time, coughing is caused by a respiratory tract infection but can be triggered by choking, smoking, air pollution, asthma, gastro-esophageal reflux disease, post-nasal drip, chronic bronchitis, lung tumors, heart failure and medications such as ACE inhibitors. Detection of such events in the vicinity of the devices may provide significant information.

[0044] In an exemplary embodiment, **acoustic analysis module 230 may preprocess the audio information to recog-nize speech, perform keyword spotting on speech information, and in addition build voice models of various speakers within the auditory range of the device**. The models may, for example, use classifiers 234 and machine learning methods to identify gender, probable age range, nationality and other demographic features from the speech signals.

[0045] In addition, there may be classifiers 234, for instance, to recognize any slurring due to the influence of alcohol or similar substances, accent classifiers to detect and identify accent patterns belonging to specific language groups, and emotion classifiers to classify speakers and speech into happy, sad, stressed, angry or other emotional states. **Thus, given any audio input that includes any speech, individual devices 120 or system 100 (FIG. 1) as a whole may be able to build an acoustic profile of each speech participant in that input, where the profile not only includes the keywords spotted, but also other data such as demographic data** about each speaker including gender, probable age, possible nationality etc., as well as classifier results about **emotional state**, and/or whether the speaker is under the influence

[0077] In yet another variant, the **system may be used to alert patients of breathing disorders such as sleep apnea.** Sleep apnea is a disorder that is characterized by abnormal low breathing or abnormal pauses in breathing during sleep, often accompanied by snoring. Often the snorer is not aware that they snore or that they could have a life threating **medical issue**, and they suffer from fatigue, daytime sleepiness and other symptoms, often for years and years. Diagnosis often requires an overnight sleep study in a special lab set up with sensors. Knowledge about snoring and having a record of snoring behavior can help in the diagnosis and remediation of this condition. System 100 may be trained to recognize snoring, and to distinguish it from other kinds of similar noises, and help in detecting and recording snoring behavior to help people with breathing disorders identify their problems and seek appropriate help.

[0132] In addition to the physical switch, **there may also be a software controlled switch that may empower authorized parties to turn on and off features such as** recording of sensors, **recognizing keywords and uploading appropriate information to the cloud where inferences can be made that aggregate over space and time.** Policies may eventually be determined regarding who is allowed to do what, and what is appropriate and what is not

See also paragraphs [0013] and [0034](emphasis added):

**[0013]** Personal wireless devices, as well as other types of computing or communication devices, have become ubiquitous in our environment. Generally, such devices have a number of sensors, which may include, for instance, microphones, cameras, accelerometers, and in some cases may even have sensors for **biometric information, such as heart rate**. Such devices also generally include one or more communication systems, for example, a cellular telephone radio system (e.g., Code Division Multiple access (CDMA) or Global System for Mobile Communications (GSM)), a wireless local area network system (e.g., Wi-Fi, IEEE 802.11), wired computer network connections (e.g., data network connections via USB cradles, possibly via desktop computer applications) and in some cases other systems based on radio frequency (e.g.,……

**[0034]** Device 120 may include sensor module 202 for the acquisition of sensor information. Sensor module 202 may include one or more microphones 222 for collecting acoustic information regarding audio scene 130 (FIG. 1). Sensor module 202 may also include one or more environmental sensors (such as a temperature sensor, a motion sensor such as an accelerometer) for collecting environmental information associated with device 120. Sensor module 202 may also include **one or more biometric sensors 226 (such as heart rate) for sensing biometric information regarding a user of device 120**. Sensor module 202 may also include camera 228 (i.e., an image sensor) for capturing still images and/or video of the surrounding environment of device 120. Sensor module 202 may also include a compass for providing location information. In general, sensor module 202 may include any sensor capable of measuring a physical quantity and converting it into a signal that may be used by system 100. For example,

§103 Rejections

The Office on page 2 of the Office Action, the Office concedes that Lane fails to disclose a mobile ad hoc network and a device among a plurality of devices that is configured as a controller on an ad hoc basis and relies on cited portions of Atwal at paragraph [0042] which only discloses "adaptation decisions may be made by a centralized controller, in a distributed manner, and the like." The Office on pages 2 and 3 further concedes that Lane and Atwal still fail to clearly disclose the remaining limitations of the claim. Applicant submits that Lane and Atwal fail to disclose a mobile ad hoc network and a device among a plurality of devices that is **configured as a controller on an ad hoc basis**. Nevertheless, the Office further relies on cited portions of Park et al. that the controller is configured to "…**determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling**." The selection of subsets of nodes are done for "**efficient multicast messages based on one- and two-hop topology information**." This is not the same purpose of the selection devices as recited in the claims in the Application herein. In contrast, as recited in amended claim 1, the section of the subset of devices is done for **collection of sensor data** and not for efficient multicast messages. Furthermore, none of the cited references including Lane, Atwal, Park, and Holapainen disclose or suggest one or more sensors for acquiring sensor data related to the environment proximate to the device including **at least one microphone used for detecting keywords and used for detecting non-speech acoustic events**. More particularly, with respect the cited portions of Holapeinen, although paragraph [0027] references mobile ad-hoc network (MANET), Holapeinen however still fails to disclose or suggest the use of such mobile ad hoc network and sensors to select a controller on an ad hoc basis among a plurality of devices in such network. Furthermore, in paragraph [0027] and [0071] of Holapeinen, although Holapeinen refers to "media" as "including audio, video, still images, pictures, etc.", and references a microphone for amplifying a speech signal in paragraph [0071], **nothing in the cited portions of Holapeinen suggests or discloses using a microphone for detecting keywords and for detecting non-speech acoustic events, a biometric sensor among a heart rate sensor, a blood pressure sensor, a toxin detection sensor, a nutrient detection sensor, or a pheromone detection sensor and at least one among a location sensor, a light**

**detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, or a moisture sensor**. There is no speech recognition or detecting of keyword and detecting of non-speech acoustic events disclosed or suggested by the cited portions of Holapeinen. Holapeinen in paragraph [0071] describes the used of a microphone and 1111 that feeds a coder/decoder (CODEC) 1113. This is not a device that detects keywords as claimed, but rather one that codes and decodes acoustic signal for efficient transmission and replay.

Additional references such as US Patent Publication No. 2009/0312660 to Guarino et al. (hereinafter "Guarino") describes use of a microphone or other sensors such accelerometers or EMGs (or electromyogram which detects the electrical potential generated by muscle cells when such cells are electrically or neurologically activated) for monitoring cough events. See paragraph [0043] of Guarino

> **[0043]** 2. For the acquisition a microphone, several microphones or the combination of a microphone(s) with other sensors (like EMG, accelerometer, . . . ), a camera, or the combination of camera and microphone (s), or other sensors available for monitoring cough events are used.

These sensors are specific for monitoring coughs and not part of a mobile ad hoc network that uses a microphone to detect keywords **and** non-speech acoustic events **as well as** other sensor data in the aggregate that includes specific biometric sensor data and other sensor data selected from an enumerated list.

Another reference such as US Patent No. 7860722 to Charles Chow (hereinafter Chow) describes the use of a microphone for keyword detection. Chow also fails to disclose the use of a microphone to detect both keywords and non-speech acoustic events as well as detection of other sensor data in the aggregate that includes specific biometric sensor data and other sensor data selected from an enumerated list.

Accordingly, Guarino, Chow, and Holapeinen fails to overcome the deficiencies of Lane, Atwal and Park. Lane, Atwal, Park, Guarino, Chow and Holapenein fail to render claim 1 obvious and therefore claim 1 is allowable. Claims 2-21 are allowable as being dependent on an allowable base claim. Other limitations in the dependent claims further distinguish over the cited art. For example, with respect to claim 2, none of the references configures the subset of devices according to triggering events detected at one or more the plurality of devices using the at least one microphone, the biometric sensor, the location sensor and at least one among the light detection sensor, the proximity sensor, the gravity detection sensor, the magnetic field detection sensor, the electrical field detection sensor, the vibration sensor, the pressure sensor, the humidity sensor, or the moisture sensor.

With respect to claim 6, none of the cited references disclose or suggest a system that includes the microphone (that detects keywords and detects non-speech acoustic events), the biometric sensors (e.g., heart rate sensor or blood pressure sensor) and further includes one or more of the enumerated sensors recited in the claim. With respect to claim 16, none of the cited references disclose a system where the audio scene includes at least one of speech events and non-speech events to determine an emotional state.

Claims 14, 15, and 22 were previously amended to include a mobile ad hoc network that is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network and in a broader sense that at least one of the devices in the mobile ad hoc network enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

With respect to claim 24, besides further clarifying or emphasizing that an ad hoc controller is used for interacting with a plurality of devices distributed in an environment, the claim has been further amended to recite that the selection/acquisition module is configured on an ad hoc basis to select a subset of devices from among the plurality of devices **using the mobile ad hoc network and the one or more sensors** and for receiving information based on the acquired sensor data of the selected subset of devices, **the acquired sensor data being acquired from at least one or more microphones used for detecting at least keywords**

**and from at least a biometric sensor among a heart rate sensor or a blood pressure sensor.** Again, note that the selection/acquisition module uses both the mobile ad hoc network and the one or more sensors as the basis of the selection of the subset for receiving information or acquiring sensor data. This is not the same as Park where the controller in Park is configured to "…**determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling**…." which is done for "….**efficient multicast messages based on one- and two-hop topology information**." Furthermore, none of the cited references discloses or suggests that the acquired sensor data is acquired from at least one or more microphones used for detecting keywords and from a biometric sensor such as a heart rate sensor or a blood pressure sensor. Atwal and Park (as well Guarino and Chow) fail to overcome the deficiencies of Lane. Accordingly, Lane, Atwal, Guarino, Chow and Park fail to render claim 24 obvious and therefore claim 24 is allowable. Claims 25-31 are allowable as being dependent on an allowable base claim.

Claim 32 has also incorporated the element of a mobile ad hoc network where selecting a subset of devices uses the mobile ad hoc network and the sensor data collected for making such selection, which is not found in the cited portions of Lane, Atwal or Park. Furthermore, none of the cited portions of Lane, Atwal, Guarino, Chow, or Park disclose or suggest a device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events AND at least a biometric sensor used for detecting heart rate or blood pressure. Accordingly, Lane, Atwal and Park fail to render claim 32 obvious and therefore claim 32 is allowable. Claims 33-39 are allowable as being dependent on an allowable base claim.

Conclusion

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

/pablo meles/
Pablo Meles, Reg. No. 33,739
Attorney for Applicants

The Director is hereby authorized to charge or credit Deposit Account No. **504284** for any additional fees, or any underpayment or credit for overpayment in connection herewith.

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 13976636 |
| **Filing Date:** | 01-Oct-2013 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Filer:** | Pablo Meles |
| **Attorney Docket Number:** | AMBZ-101US |

Filed as Small Entity

**Filing Fees for U.S. National Stage under 35 USC 371**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| Extension - 1 month with $0 paid | 2251 | 1 | 100 | 100 |
| **Miscellaneous:** | | | | |
| Request for Continued Examination | 2801 | 1 | 600 | 600 |
| | | **Total in USD ($)** | | **700** |

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 23681127 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 117822 |
| **Filer:** | Pablo Meles |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 02-OCT-2015 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 16:49:33 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

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| Submitted with Payment | yes |
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| Payment was successfully received in RAM | $700 |
| RAM confirmation Number | 3541 |
| Deposit Account | 504284 |
| Authorized User | MELES, PABLO |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Request for Continued Examination (RCE) | AMBZ-101US_RCE_sb0030efs.pdf | 1349909<br>b98ffdefc6bf09a583972a0a400086ba2e1d63bd | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Amendment Submitted/Entered with Filing of CPA/RCE | AMBZ-101US_FOAR_3Sept2015_FINAL.pdf | 227311<br>040c9d973ee5d6772ac88316a03f254163cc7985 | no | 16 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Fee Worksheet (SB06) | fee-info.pdf | 32818<br>d9f42a418231bae11cb9a4726b897ace312224dc | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 1610038 | | |

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**<u>New Applications Under 35 U.S.C. 111</u>**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**<u>National Stage of an International Application under 35 U.S.C. 371</u>**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**<u>New International Application Filed with the USPTO as a Receiving Office</u>**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| **PATENT APPLICATION FEE DETERMINATION RECORD**<br>Substitute for Form PTO-875 | Application or Docket Number<br>13/976,636 | Filing Date<br>10/01/2013 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY**: ☐ LARGE ☒ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = * | | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = * | | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

| AMENDMENT | 10/02/2015 | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * 39 | Minus | ** 39 | = 0 | X $40 = | 0 |
| | Independent (37 CFR 1.16(h)) | * 3 | Minus | ***3 | = 0 | X $210 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | **0** |

| AMENDMENT | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/DEBRA SAVOY/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | AMBZ-101US | 3839 |

117822 7590 11/05/2015

Personics Holdings, LLC.
4800 N Federal Hwy. Ste A205
Boca Raton, FL 33431

| EXAMINER |
|---|
| WYCHE, MYRON |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 11/05/2015 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

iepstein@personicslabs.com
personics_docketing@cardinal-ip.com
pmeles@personicslabs.com

| Office Action Summary | Application No. 13/976,636 | Applicant(s) GOLDSTEIN, STEVEN W. | |
|---|---|---|---|
| | Examiner MYRON K. WYCHE | Art Unit 2644 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10/2/15*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *1-39* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-39* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

**DETAILED ACTION**

***Response to Arguments***

Applicant's arguments filed 10/2/15 have been fully considered but they are not persuasive.

Applicant's primarily argued:

**(1)** Lane and Atwal fail to disclose a mobile ad hoc network and a plurality of devices configures as a controller on an ad hoc basis;

**(2)** Park et al. discloses a controller for a different purpose than claimed;

Regarding **argument (1)**, it is respectfully submitted that both Atwal and Park et al. were cited as disclosing these limitations and not Lane. In particular, Atwal discloses:

> **[0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like"**.

; and Park et al. discloses:

> **[0038]: "… routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8.**

That is, both Atwal and Park et al. disclose an "ad hoc network" and that the "centralized controller" of Atwal suggests the claimed: "ad hoc controller." In view of the above, it is respectfully submitted that **argument (1)** is moot.

With respect to **argument (2)**, it is noted the KSR rationales allow one to cite applicable art that may have originally been applied to another purpose to the problem at hand. In particular, it is respectfully submitted that the following rationales from the **KSR** decision would provide further support for the use of Park et al. in the outstanding obviousness rejection:

> **(E)** "Obvious to try"- choosing from a finite number of identified, predicatable solutions, with a reasonable expectation of success; or
>
> **(F)** Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predicatable to one of ordinary skill in the art.

That is, in accordance with rationales (E) and (F) above, as set out in **KSR** International Co. V. Telflex Inc. 82 USPQ2d 1385, 1395-97 (2007), Park et al. is applicable to the outstanding obviousness rejections. Thus, In view of the above, it is respectfully submitted that **argument (2)** is moot.

In addition, Applicant's remaining arguments with respect to claims 1-39 have been considered but are moot in view of new grounds of rejection necessitated by the present amendment. The new rejections are provided below.

***Claim Rejections - 35 USC § 103***

Claims 1-13 and 32 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over US Patent Application Publication No. 20090085873 (Betts et al.) in view of US Patent Application Publication No. 20100316033 (Atwal) and US Patent Application Publication No. 20100040079 (Park et al).

Regarding claim 1, Betts et al. discloses: "a device **(FIG. 7: 300a)** among a plurality of devices distributed in an environment **(FIG. 7: 300a - 300d; [0103]: "…multiple cooperating PEDs 300a, 300b and 300c may detect the event and triangulation between the multiple cooperating PEDs 300a, 300b and 300c can determine the target location 740 with greater accuracy")**, the device having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, wherein the system adaptively enables or configure the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, at least a biometric sensor among a heart rate sensor, a blood pressure sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor and at least one among a location sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor a vibration sensor, a humidity sensor, or a moisture sensor **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input**

**devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**, select a subset of devices from among the plurality of devices for collection of sensor data and aggregate the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices" **([0104]: "Upon detection of the selected event in one or more PEDs 300, the GPS receiver 374 (FIG. 2) in the detecting PED 300 can accurately identify the location and time of detection at the detecting PED 300. Correlation of three or more detecting PEDs 300 will allow an accurate position determination of the source of the event. If the source is moving, then the direction of travel can be determined by computing the vector between successive positions. Each PED 300 can calculate and display the location of the event. This process can be used to locate the source and motion of any signals such as a toxic cloud, alarm signal, wireless signal, weapons discharge, lightning strike, tornado, or person talking. A team of individuals can locate a missing person or child by coordinating their PEDs 300 in a search for the voice print of the missing person or child)**.

However, Betts et al. does not clearly disclose the remaining limitations of the claim. To that end, Atwal discloses: "the device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network")** and "one or more of the devices among the plurality including the device is configured as a controller on an ad hoc basis" **([0042]: "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**; and "adaptively enables" **([0042]:"… a plurality of mobile devices interact as nodes in a mobile ad hoc network and in which packets are IP routable to the individual device independent of fixed infrastructure elements; enhancing MBRI operation through the use of dynamic adaptation"; In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

It is respectfully submitted that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Betts et al. with the invention of Atwal in order to provide a mobile ad hoc network with adaptive control (e.g., *see* Atwal @ **[0042]**).

However, the combination of Betts et al. and Atwal does not clearly disclose the remaining limitations of the claim. To that end, Park et al. discloses: "the controller being configured to: select **(ABSTRACT: "…determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling")** a subset of devices **(FIG. 7)** from among the plurality of devices **(FIG. 6)** for collection of sensor data, receive information based on the acquired sensor data of the selected subset using the mobile ad hoc network based on a predetermined characteristic of the environment and the location of the one or more of the device" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**; and "configures

the subset of device according to triggering events detected at one or more of the plurality of devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the combination of Betts et al. and Atwal with the invention of Park et al. in order to provide efficient message routing in a mobile ad hoc network (e.g., *see* Park et al. @ **[0038]**).

With respect to claim 2, Betts et al. discloses: "using at least one microphone, the biometric sensor, the location sensor and at least one among the light detection sensor, the proximity sensor, the gravity detection sensor, the magnetic field detection sensor, the electrical field detection sensor, the vibration sensor, the pressure sensor, the humidity sensor, or the moisture sensor" **(FIG. 1: 105, 130; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference**

**signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**.

In addition, Atwal discloses: "adaptively enables" **([0042]:"… a plurality of mobile devices interact as nodes in a mobile ad hoc network and in which packets are IP routable to the individual device independent of fixed infrastructure elements; enhancing MBRI operation through the use of dynamic adaptation"; In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

In addition, Park et al. discloses: "configures the subset of device according to triggering events detected at one or more of the plurality of devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

Regarding claim 3, Betts et al. discloses: "at least one of the devices includes at least one of a wireless device or a wired device" **([0002]: "… transport with them one or more personal electronic devices (PEDs) that demand their attention and further increase the complexity of their environment. Personal digital assistants (PDA's), global positioning system (GPS) navigators, portable computers, calculators, digital cameras, hearing aids, radios, tape, CD, DVD, and/or MP3 players, video games, and wireless (e.g., cellular) telephones are good examples of PEDs)**.

In addition, Park et al. discloses: "the system enables the switching of a subset of devices on **(FIG. 6)** or off **(FIG. 7)**, based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis"

**([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information").**

With respect to claim 4, Betts et al. discloses: "at least one of the devices includes at least one of a fixed device or a mobile device" **([0002]: "… transport with them one or more personal electronic devices (PEDs) that demand their attention and further increase the complexity of their environment. Personal digital assistants (PDA's), global positioning system (GPS) navigators, portable computers, calculators, digital cameras, hearing aids, radios, tape, CD, DVD, and/or MP3 players, video games, and wireless (e.g., cellular) telephones are good examples of PEDs).**

Regarding claim 5, Betts et al. discloses: "at least one of the devices includes at least one of a mobile telephone device, an earpiece, a hearing aid, a navigation device, a television remote, a car key fob, a portable game controller, GPS device, a computer a sensor module having at least one sensor" **" ([0002]: "… transport with them one or more personal electronic devices (PEDs) that demand their attention and further increase the complexity of their environment. Personal digital assistants (PDA's), global positioning system (GPS) navigators, portable computers, calculators, digital cameras, hearing aids, radios, tape, CD, DVD, and/or MP3 players, video games, and wireless (e.g., cellular) telephones are good examples of PEDs).**

With respect to claim 6, Betts et al. discloses: "the one or more sensors includes the at least one microphone, the biometric sensor, and at least one among a motion-related sensor, a temperature sensor a compass, or an image sensor" **(FIG. 1: 105, 130; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as**

**shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**.

Regarding claim 7, Betts et al. discloses: "at least one of the devices includes a position module for determining a position of the respective device" **(FIG. 2: "GPS Receiver 374")**.

With respect to claim 8, Betts et al. discloses: "each of at least some of the devices include a local data analysis module **(FIG. 2: 215)** for processing the acquired sensor data to determine at least one event, the event being used by the controller selected by the ad hoc network for determining the characteristic of the environment" **(FIG. 1: 105, FIG. 2: 215; [0021]: "The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events. The detection engine 215 can be implemented in hardware, software, or a combination thereof, but is preferably implemented in software executed by a computer based architecture")**.

In addition, Atwal discloses: "the controller selected by the ad hoc network" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In**

**embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 9, Betts et al. discloses: "the local data analysis module includes an acoustic analysis module to process audio information including processing of speech and non-speech events" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**.

With respect to claim 10, Betts et al. discloses: "the local data analysis module includes a sensor analysis module to process non-audio related information" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not**

**limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**.

Regarding claim 11, Betts et al. discloses: "to determine locations for at least some of the devices" **(Fig. 2: 374; [0063]: "The GPS receiver 374 is another optional element. GPS receiver 374 receives position information from global positioning system satellites via an antenna 376. The position information is transferred directly to the baseband subsystem 340 for processing. The GPS receiver 374 can use the independent antenna 376 or share the common antenna 380. U.S. Pat. No. 6,975,277, titled "Wireless communications device pseudo-fractal antenna," which is incorporated herein by reference, describes an antenna for operating in the GPS and cellular telephone bands, and such antenna can be implemented in the PED 300. Many of the GPS functions, such as coordinate transformation, can be implemented in GPS receiver 374 or DSP 360. Position information from the GPS receiver 374 can be used to alert the operator of proximity to various locations, including those that are hazardous or dangerous. GPS receiver 374 can provide dynamic inputs of speed, direction, and distance traveled to the SE system 100")**.

With respect to claim 12, Betts et al. discloses: "the controller selected by the ad hoc network is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices" **([0101]: "Multiple cooperating PEDs 300 can simultaneously monitor for selected environmental events as illustrated in FIG. 7"; [0102]: "COOPERATIVE DEVICES screen 462 (FIG. 3) is used to coordinate two or more PEDs 300. The VOLUNTEER command allows the operator to volunteer the PED 300 for cooperative operation with other PEDs 300 in the area. A volunteer signal will be sent to other PEDs 300 identifying the PED 300, its location, and the sensors that are available")**.

In addition, Atwal discloses: "the controller selected by the ad hoc network" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 13, Betts et al. discloses: "pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices" " **([0101]: "Multiple cooperating PEDs 300 can simultaneously monitor for selected environmental events as illustrated in FIG. 7"; [0102]: "COOPERATIVE DEVICES screen 462 (FIG. 3) is used to coordinate two or more PEDs 300. The VOLUNTEER command allows the operator to volunteer the PED 300 for cooperative operation with other PEDs 300 in the area. A volunteer signal will be sent to other PEDs 300 identifying the PED 300, its location, and the sensors that are available")**.

In addition, Atwal discloses: "the controller selected by the ad hoc network" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 32, Betts et al. discloses: "each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and at least a biometric sensor used for detecting heart rate or blood pressure" and "based on sensor

data collected" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120").**

In addition, Atwal discloses: "each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"),** "an ad hoc controller" and "one or more of the devices is configured as a controller on an ad hoc basis" **([0042]: "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Further, Park et al. discloses: "selecting a subset of devices by the ad hoc controller **(FIG. 7)** from among the plurality of devices by a controller on a ad hoc basis using the mobile ad hoc network **(FIG. 6;**

**ABSTRACT: "…determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling")**, acquiring sensor data by the selected subset of devices ; receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network; and combining, by the ad hoc controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

Claims 18-21 and 23-31, 33-39 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Betts et al. in view of Atwal, Park et al. and "A Survey of Mobile Phone Sensing" (Lane).

Claim 18 is dependent upon claim 1. As discussed above, claim 1 is disclosed by Betts et al., Atwal and Park et al. Thus, those limitations of claim 1 that are recited in claim 18 are also disclosed by Betts et al., Atwal and Park et al.

However, Betts et al., Atwal and Park et al. do not clearly disclose the remaining limitations of the claims. To that end with respect to claim 18, Lane discloses: "the distributed system further determines trend information across a population of users of the devices from the combined information" **(pg. 134, FIG. 3; pg. 144: "learn", FIG. 4)**. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the combination of Betts et al., Atwal and Park et al. with the invention of Lane in order to learn trend information in the combined information (e.g., see Lane @ **FIG. 3**; **pg. 144: "learn", FIG. 4**).

Regarding claim 19, Lane discloses: "the distributed system further monitors at least one of

localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information" **(pg. 142; pg. 143; pg. 144, FIG. 4)**.

With respect to claim 20, Lane discloses: "the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information **(pg. 140: col. 1, para. 3; pg. 141: "sensors"; pg. 145)**.

Regarding claim 21, Lane discloses: "the aggregated motion-related characteristics comprise human or vehicle flow characteristics" **(pg. 140: col. 1, para. 3: "humans"; para. 141: "sensors")**.

Regarding claim 23, Lane discloses: "the controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller" **(pg. 145: "inform", "share", "persuasion")**.

In addition, Atwal discloses: "the controller selected by the ad hoc network" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 24, Betts et al. discloses: "acquired sensor data being acquired from at least one or more microphones used for detecting at least keywords and rom at lest a biometric sensor among heart rate sensor or a blood pressure sensor" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video**

**camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**.

In addition, Lane discloses: "a plurality of devices distributed in an environment, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device" **(ABSTRACT, pg. 140, pg. 141: "sensors"; pg. 142: "social networking"; FIG. 2; pg. 143, FIG. 3; pg. 144-145: "Learn, Inform, Share, and Persuasion")**.

Further, Atwal discloses: "each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network") "**an ad hoc controller" and "one or more of the devices is configured as a controller on an ad hoc basis" **([0042]: "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Furthermore, Park et al. discloses: "the controller comprising: a selection/acquisition module configured on an ad hoc basis to select **(ABSTRACT: "…determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling")** a subset of devices **(FIG. 7)** from among the plurality of devices using the mobile ad hoc network **(FIG. 6)** and for receiving information based on the acquired sensor data of the selected subset of devices; and a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices"

**([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

Regarding claim 25, Betts et al. discloses: "to determine locations for at least some of the devices" **([0101]: "Multiple cooperating PEDs 300 can simultaneously monitor for selected environmental events as illustrated in FIG. 7"; [0102]: "COOPERATIVE DEVICES screen 462 (FIG. 3) is used to coordinate two or more PEDs 300. The VOLUNTEER command allows the operator to volunteer the PED 300 for cooperative operation with other PEDs 300 in the area. A volunteer signal will be sent to other PEDs 300 identifying the PED 300, its location, and the sensors that are available")**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 26, Lane discloses: "the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices" **(pg. 142, FIG. 2)**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 27, Lane discloses: "the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices" **(pg. 142)**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 28, Lane discloses: "the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module" **(pg. 142, FIG. 2)**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 29, Betts et al. discloses: "a sensor module including at least one the one or more microphones, the biometric sensor, and at least one or more of a a motion-related sensor, a temperature sensor, a compass, an image sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke**

**detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120"), select a subset of devices from among the plurality of devices for collection of sensor data and aggregate the received information from the selected subset to determine a characteristic of the environment proximate to one or more of the devices" ([0104]: "Upon detection of the selected event in one or more PEDs 300, the GPS receiver 374 (FIG. 2) in the detecting PED 300 can accurately identify the location and time of detection at the detecting PED 300. Correlation of three or more detecting PEDs 300 will allow an accurate position determination of the source of the event. If the source is moving, then the direction of travel can be determined by computing the vector between successive positions. Each PED 300 can calculate and display the location of the event. This process can be used to locate the source and motion of any signals such as a toxic cloud, alarm signal, wireless signal, weapons discharge, lightning strike, tornado, or person talking. A team of individuals can locate a missing person or child by coordinating their PEDs 300 in a search for the voice print of the missing person or child).**

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like").**

With respect to claim 30, Lane discloses: "a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment" **(pg. 141: "sensors"; pg. 144: "mobile phone sensing architecture").**

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation**

**decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 31, Lane discloses: "at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment" **(pg. 143, FIG. 3)**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 33, Lane discloses: "the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the controller for the information" **(pg. 142; pg. 143; pg. 144: "learn")**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 34, Lane discloses: "the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment" **(pg. 14`: "sensors"; pg. 144: "learn")**.

Regarding claim 35, Lane discloses: "determining trend information across a population of users of the devices from the combined information" **(pg. 143; FIG. 3; FIG. 4; pg. 144: "learn")**.

With respect to claim 36, Lane discloses: "monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information" **(pg. 142; pg. 143; pg. 144, FIG. 4)**.

Regarding claim 37, Lane discloses: "determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information" **(pg. 140: col. 1, para. 3; pg. 141: "sensors"; pg. 145)**.

With respect to claim 38, Lane discloses: "adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment" **(pg. 143, FIG. 3)**.

Regarding claim 39, Lane discloses: "the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller" **(pg. 145: "inform", "share", "persuasion")**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Claims 14-16 and 22 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Betts et al. in view of Atwal, Park et al. and US Patent Application Publication No. 20110143728 (Holoapainen et al).

Claims 14 -16 and 22 are ultimately dependent upon claim 1. As discussed above, claim 1 is disclosed by Betts et al., Atwal and Park et al. Thus, those limitations of claim 1 recited in claims 14, 15 and 22 are also disclosed by Betts et al., Atwal and Park et al.

However, the combination of Betts et al., Atwal and Park et al. does not clearly disclose the remaining limitations of the claims. To that end, Holapainen et al. discloses: "a mobile ad hoc network **(FIG.1: 105; [0027]: "By way of example, the communication network 105 of system 100 includes one or more networks such as … mobile ad-hoc network (MANET)")** is used to fine tune acoustical characteristics **(FIG. 3; FIG. 5; [0044]: "FIG. 5 is a flowchart of a process for acquiring additional media to verify a matched target expression, according to one embodiment"; "When acquiring media with expression as shown in step 303 of FIG. 3, additional media may be acquired to enhance the matching of the target expressions")** …. based on data acquired from at least a subset of devices form the mobile ad hoc network" **(FIG. 1; 101a-101n; [0027]: "…UEs 101a-101n includes a component to acquire media (e.g., an image, a sound recording, etc.), such as a digital camera/camcorder, a scanning device, a sound recording device, or any other sensors that may be used to capture media data. The UEs 101a-101n also have connectivity to one another as well as to the communication service 103 via a communication network 105")**. The disclosed: "additional

media may be acquired to enhance the matching", as disclosed by Holapeinen et al. and corresponds to the claimed: "fine tuning." In addition, it is noted that it would have been obvious to collect sound media in the claimed: "concert hall" of claims 14 and 15. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art to further modify the combination of Betts et al, Atwal and Park et al. with the invention of Holapeinen et al. in order to provide a sound recording device sensor to collect acoustical data (e.g., see Holapeinen et al. @ **[0027]**).

With respect to claim 16, Holapeinen et al. discloses: "environment includes an audio scene **([0026]: "As used herein, the term "media" refers to various forms of media, including audio, video, still images, pictures, etc")** and a characteristic of the audio scene includes at least one of speech events or non-speech events" **([0071]: "…audio function circuitry 1109 includes a microphone 1111 and microphone amplifier that amplifies the speech signal output from the microphone 1111")**. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art that a keyword (e.g., an excited utterance) or a monitored heart rate could be used to perform the claimed: "determine an emotional state."

With respect to claim 22, Park et al. discloses: "using a subset of devices **(FIG. 7)** from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

In addition, Holapeinen et al., as discussed above, discloses: "enables the fine tuning of an acoustical characteristic" (i.e., "he disclosed: "additional media may be acquired to enhance the matching", as disclosed by Holapeinen et al. corresponds to the claimed: "fine tuning").

Claim 17 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Betts et al. in view of Atwal, Park et al., Holoapainen et al. and Lane.

Claim 17 is dependent upon claim 16. As discussed above, Claim 16 is disclosed by over Betts et al., Atwal, Park et al., and Holoapainen et al. Thus, those limitations of claim 16 that are recited in claim 17 are also disclosed by Betts et al. in view of Atwal, Park et al., and Holoapainen et al.

However, the combination of Betts et al. in view of Atwal, Park et al., and Holoapainen et al. does not clearly disclose the remaining limitations of the claim. To that end, regarding claim 17, Lane discloses: "when the system is a distributed system that records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded" **(pg. 144; col. 1, para. 1-2; pg. 145: "inform", "share", and "persuasion"; pg. 149: "privacy")**. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Betts et al. in view of Atwal, Park et al., and Holoapainen et al. with the invention of Lane in order to provide an indication that privacy is not present since the audio information is recorded (e.g., *see* Lane @ **page 144-145**).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MYRON K. WYCHE whose telephone number is (571)272-3390. The examiner can normally be reached on M-F- 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Myron Wyche/ 11/2/15
Primary Patent Examiner
AU 2644

| Notice of References Cited | Application/Control No. 13/976,636 | Applicant(s)/Patent Under Reexamination GOLDSTEIN, STEVEN W. | |
|---|---|---|---|
| | Examiner MYRON K. WYCHE | Art Unit 2644 | Page 1 of 1 |

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| * | B | US-2011/0143728 A1 | 06-2011 | HOLOPAINEN; Jussi | G06K9/00308 | 455/414.1 |
| * | C | US-2010/0316033 A1 | 12-2010 | Atwal; Peter | H04W74/002 | 370/338 |
| * | D | US-2010/0040079 A1 | 02-2010 | Park; Sung I. | H04L12/1881 | 370/432 |
| | E | US- | | | | |
| | F | US- | | | | |
| | G | US- | | | | |
| | H | US- | | | | |
| | I | US- | | | | |
| | J | US- | | | | |
| | K | US- | | | | |
| | L | US- | | | | |
| | M | US- | | | | |

**FOREIGN PATENT DOCUMENTS**

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|---|---|---|---|---|---|---|
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**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | Nicholas D. Lane, "A Survey of Mobile Phone Sensing, September 2010, IEEE Press |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | Examiner | Art Unit |
| | MYRON K WYCHE | 2644 |

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|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 01/12/2015 | 05/31/2015 | 11/02/2015 | | | | | | |
| | 1 | ✓ | ✓ | ✓ | | | | | | |
| | 2 | ✓ | ✓ | ✓ | | | | | | |
| | 3 | ✓ | ✓ | ✓ | | | | | | |
| | 4 | ✓ | ✓ | ✓ | | | | | | |
| | 5 | ✓ | ✓ | ✓ | | | | | | |
| | 6 | ✓ | ✓ | ✓ | | | | | | |
| | 7 | ✓ | ✓ | ✓ | | | | | | |
| | 8 | ✓ | ✓ | ✓ | | | | | | |
| | 9 | ✓ | ✓ | ✓ | | | | | | |
| | 10 | ✓ | ✓ | ✓ | | | | | | |
| | 11 | ✓ | ✓ | ✓ | | | | | | |
| | 12 | ✓ | ✓ | ✓ | | | | | | |
| | 13 | ✓ | ✓ | ✓ | | | | | | |
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| | 15 | ✓ | ✓ | ✓ | | | | | | |
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| | 18 | ✓ | ✓ | ✓ | | | | | | |
| | 19 | ✓ | ✓ | ✓ | | | | | | |
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| | 21 | ✓ | ✓ | ✓ | | | | | | |
| | 22 | ✓ | ✓ | ✓ | | | | | | |
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| | 28 | ✓ | ✓ | ✓ | | | | | | |
| | 29 | ✓ | ✓ | ✓ | | | | | | |
| | 30 | ✓ | ✓ | ✓ | | | | | | |
| | 31 | ✓ | ✓ | ✓ | | | | | | |
| | 32 | ✓ | ✓ | ✓ | | | | | | |
| | 33 | ✓ | ✓ | ✓ | | | | | | |
| | 34 | ✓ | ✓ | ✓ | | | | | | |
| | 35 | ✓ | ✓ | ✓ | | | | | | |
| | 36 | ✓ | ✓ | ✓ | | | | | | |

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
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| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 01/12/2015 | 05/31/2015 | 11/02/2015 | | | | | | |
| | 37 | ✓ | ✓ | ✓ | | | | | | |
| | 38 | ✓ | ✓ | ✓ | | | | | | |
| | 39 | ✓ | ✓ | ✓ | | | | | | |

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S1 | 1 | (13/976636).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:11 |
| S2 | 165 | Goldstein-Steven-W.in. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:13 |
| S3 | 128 | S2 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:13 |
| S4 | 0 | S3 AND Ambientz | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:14 |
| S5 | 13 | S2 AND Ambientz | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:14 |
| S6 | 0 | S5 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:15 |
| S7 | 1006009 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:25 |
| S8 | 731073 | S7 AND @AD < "20101230" | US-PGPUB; | OR | OFF | 2015/01/12 |

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| S10 | 18 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |
| S11 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |
| S12 | 33 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:29 |
| S13 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
| S14 | 33 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
| S15 | 29 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
| S16 | 3127 | ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT | OR | OFF | 2015/01/12 00:31 |

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| | | | IBM_TDB | | | |
| S17 | 335 | S8 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S18 | 17109 | ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S19 | 7 | S10 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S20 | 14 | S12 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S21 | 1899 | S16 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S22 | 10366 | S18 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:33 |
| S23 | 9 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
| S24 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
| S25 | 5 | S23 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; | OR | OFF | 2015/01/12 00:36 |

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| S26 | 1 | (13/976636).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 10:53 |
| S27 | 1 | S26 AND "ad hoc" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 10:53 |
| S28 | 9576 | "mobile ad hoc network" OR MANET | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:01 |
| S29 | 5329 | S28 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:01 |
| S30 | 0 | ("mobile ad hoc network" OR MANET) SAME adaptively SAME configure | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:02 |
| S31 | 0 | ("mobile ad hoc network" OR MANET) SAME adaptively SAME events | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:03 |
| S32 | 0 | ("mobile ad hoc network" OR MANET) SAME adaptively SAME trigger | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:03 |
| S33 | 0 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME trigger | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:04 |
| S34 | 256 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) | US-PGPUB; USPAT; | OR | OFF | 2015/02/12 11:04 |

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| S36 | 2 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME configure | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:05 |
| S37 | 2 | S36 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:05 |
| S38 | 95 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME topology | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:06 |
| S39 | 85 | S38 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:06 |
| S40 | 305 | S39 AND H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:07 |
| S41 | 0 | S39 AND "H04W 64/00" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:07 |
| S42 | 0 | S39 AND H04W64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:08 |

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| S43 | 12 | S39 AND "455".clas. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 11:08 |
| S44 | 0 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME topology SAME sensor | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:49 |
| S45 | 0 | ("mobile ad hoc network" OR MANET) SAME (adaptively or adaptive) SAME topology SAME sensors | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:49 |
| S46 | 302 | ("mobile ad hoc network" OR MANET) SAME sensors | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:49 |
| S47 | 240 | ("mobile ad hoc network" OR MANET) SAME sensors SAME topology | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:49 |
| S48 | 0 | ("mobile ad hoc network" OR MANET) SAME sensors SAME topology SAME adaptive | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:50 |
| S49 | 0 | ("mobile ad hoc network" OR MANET) SAME sensors SAME topology SAME configure | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/02/12 12:50 |
| S50 | 10017 | mobile WITH "ad hoc network" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:13 |
| S51 | 6430 | "mobile ad hoc network" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2015/05/31 06:13 |

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| | | | DERWENT; IBM_TDB | | | |
| S52 | 0 | "mobile ad hoc network" WITH "plurality of devices" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:14 |
| S53 | 0 | "mobile ad hoc network" SAME "plurality of devices" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:14 |
| S54 | 535 | "mobile ad hoc network" WITH "plurality" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:15 |
| S55 | 2 | "mobile ad hoc network" WITH "plurality" WITH phone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:15 |
| S56 | 0 | "mobile ad hoc network" WITH "plurality" WITH phones | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:15 |
| S57 | 86 | "mobile ad hoc network" WITH "plurality" WITH devices | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:15 |
| S58 | 0 | "mobile ad hoc network" SAME "plurality of mobile" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:16 |
| S59 | 73 | S57 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:16 |
| S60 | 0 | ("mobile ad hoc network" SAME "plurality of mobile") SAME controller | US-PGPUB; USPAT; USOCR; | OR | OFF | 2015/05/31 06:21 |

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| | | | FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| S61 | 12 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME controller | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:22 |
| S62 | 11 | S61 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:22 |
| S63 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME ((switch or switching) WITH (on or off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:36 |
| S64 | 1 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME ((switch or switching)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:37 |
| S65 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:38 |
| S66 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME (trigger or triggers) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:41 |
| S67 | 3 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:41 |
| S68 | 3 | S67 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:42 |
| S69 | 11 | ("mobile ad hoc network" WITH | US-PGPUB; | OR | OFF | 2015/05/31 |

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| | | "plurality" WITH devices) SAME power | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 06:46 |
| S70 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME "power conservation" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:46 |
| S71 | 0 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME ("power" WITH (on or off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:46 |
| S72 | 9 | S69 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:47 |
| S73 | 9 | ("mobile ad hoc network" WITH "plurality" WITH devices) SAME battery | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:49 |
| S74 | 8 | S73 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:49 |
| S75 | 1 | ("mobile ad hoc network") SAME ((switch or switching) WITH (on OR off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:52 |
| S76 | 0 | S75 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:52 |
| S77 | 132 | ("mobile ad hoc network" OR MANET) SAME ((switch or switching) WITH (on OR off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT | OR | OFF | 2015/05/31 06:53 |

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| | | | IBM_TDB | | | |
| S78 | 2 | S77 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 06:54 |
| S79 | 4 | ("mobile ad hoc network" OR MANET) SAME "power conservation" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 07:03 |
| S80 | 3 | S79 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 07:03 |
| S81 | 123 | ("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 11:59 |
| S82 | 96 | S81 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 12:00 |
| S83 | 35 | ("mobile ad hoc network" OR MANET) WITH (power WITH (conservation OR consumption)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 12:00 |
| S84 | 30 | S83 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 12:00 |
| S85 | 2 | ("mobile ad hoc network" OR MANET) WITH (power WITH (conservation OR consumption)) SAME (on OR off) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 12:03 |
| S86 | 2 | S85 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; | OR | OFF | 2015/05/31 12:03 |

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| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S87 | 123 | ("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:25 |
| S88 | 14 | ("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:26 |
| S89 | 9 | S88 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:26 |
| S90 | 132 | ("mobile ad hoc network" OR MANET) SAME ((switch or switching) WITH (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:31 |
| S91 | 2 | S90 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:31 |
| S92 | 181 | ("mobile ad hoc network" OR MANET) SAME ((switch or switching or turn or turning or shut or shutting) WITH (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:32 |
| S93 | 21 | S92 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:32 |
| S94 | 19 | S93 NOT S91 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:32 |
| S95 | 33 | ("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR | US-PGPUB; USPAT; | OR | OFF | 2015/05/31 13:46 |

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| | | subset)) | USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| S96 | 22 | S95 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:46 |
| S97 | 3 | ("mobile ad hoc network" OR MANET) SAME (select WITH subset) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:55 |
| S98 | 2 | S97 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 13:55 |
| S99 | 5 | ("mobile ad hoc network" OR MANET) SAME (acoustical) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:32 |
| S100 | 0 | S99 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:32 |
| S101 | 63 | ("mobile ad hoc network" OR MANET) SAME (acoustical or sound) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:33 |
| S102 | 0 | ("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) WITH hall) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:33 |
| S103 | 0 | ("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) WITH characteristics) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:34 |

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| S104 | 0 | ("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:34 |
| S105 | 63 | ("mobile ad hoc network" OR MANET) SAME ((acoustical or sound)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:34 |
| S106 | 5 | S105 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 16:34 |
| S107 | 1061128 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:07 |
| S108 | 1061128 | H04W 84/02 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:07 |
| S109 | 367997 | H04J 3/26 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:08 |
| S110 | 740927 | S107 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:08 |
| S111 | 740935 | S108 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:08 |
| S112 | 330035 | S109 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2015/05/31 19:08 |

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| | | | DERWENT; IBM_TDB | | | |
| S113 | 3 | S110 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:10 |
| S114 | 3 | S111 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:10 |
| S115 | 2 | S112 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:10 |
| S116 | 0 | S110 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:11 |
| S117 | 0 | S111 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:11 |
| S118 | 0 | S112 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:11 |
| S119 | 0 | S110 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| S120 | 0 | S111 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| S121 | 0 | S112 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; | OR | OFF | 2015/05/31 19:12 |

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| | | | FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| S122 | 0 | S110 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| S123 | 0 | S111 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| S124 | 0 | S112 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:12 |
| S125 | 1 | S110 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:13 |
| S126 | 1 | S111 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:13 |
| S127 | 0 | S112 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:13 |
| S128 | 0 | S110 AND (("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:14 |
| S129 | 0 | S111 AND (("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/05/31 19:14 |
| S130 | 0 | S112 AND (("mobile ad hoc network" | US-PGPUB; | OR | OFF | 2015/05/31 |

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| | | WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers)) | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 19:14 |
| S131 | 1102867 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:28 |
| S132 | 1102866 | H04W 84/02 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:29 |
| S133 | 374379 | H04J 3/26 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:29 |
| S134 | 754757 | S131 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:29 |
| S135 | 754765 | S132 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:30 |
| S136 | 333612 | S133 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:30 |
| S137 | 3 | S134 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:31 |
| S138 | 3 | S135 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT | OR | OFF | 2015/08/24 22:31 |

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| | | | IBM_TDB | | | |
| S139 | 2 | S136 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:31 |
| S140 | 3 | S134 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:32 |
| S141 | 3 | S135 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:32 |
| S142 | 2 | S136 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:32 |
| S143 | 0 | S134 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:37 |
| S144 | 0 | S135 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:37 |
| S145 | 0 | S136 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:37 |
| S146 | 0 | S134 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:38 |
| S147 | 0 | S135 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; | OR | OFF | 2015/08/24 22:38 |

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| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S148 | 0 | S136 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:39 |
| S149 | 0 | S134 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:40 |
| S150 | 0 | S135 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:40 |
| S151 | 0 | S136 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:40 |
| S152 | 1 | S134 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:41 |
| S153 | 1 | S135 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:41 |
| S154 | 0 | S136 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:41 |
| S155 | 0 | S134 AND (("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:43 |
| S156 | 0 | S135 AND (("mobile ad hoc network" WITH "plurality" WITH devices) SAME | US-PGPUB; USPAT; | OR | OFF | 2015/08/24 22:43 |

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| | | (sensor or sensors) SAME (trigger or triggers)) | USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| S157 | 0 | S136 AND (("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/24 22:43 |
| S187 | 1 | (14/291574).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/25 15:06 |
| S188 | 1 | (14/448581).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/25 15:11 |
| S189 | 1 | (14/494983).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/25 15:13 |
| S190 | 1 | (14/509104).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/25 15:14 |
| S191 | 1 | (14/400601).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/25 15:16 |
| S192 | 1 | (14/538851).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/25 15:17 |
| S193 | 1 | (14/539769).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/25 15:20 |

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| S194 | 1 | (14/540005).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/08/25 15:22 |
| S195 | 1 | (13/976636).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:14 |
| S196 | 0 | S195 AND (controller SAME "ad hoc") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:26 |
| S197 | 1 | S195 AND ("ad hoc") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:26 |
| S198 | 1942 | sensor SAME "ad hoc network" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:48 |
| S199 | 1115 | sensor WITH "ad hoc network" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:48 |
| S200 | 209 | sensor WITH "mobile ad hoc network" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:48 |
| S201 | 0 | sensor WITH (("mobile ad hoc network") OR MANET) WITH microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:49 |
| S202 | 5 | sensor SAME (("mobile ad hoc network") OR MANET) SAME microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2015/09/02 08:49 |

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| | | | DERWENT; IBM_TDB | | | |
| S203 | 5 | S202 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:50 |
| S204 | 5 | audio SAME (("mobile ad hoc network") OR MANET) SAME microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:57 |
| S205 | 2 | S204 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:57 |
| S206 | 0 | concert SAME (("mobile ad hoc network") OR MANET) SAME microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:59 |
| S207 | 11 | acoustic SAME (("mobile ad hoc network") OR MANET) SAME microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 08:59 |
| S208 | 4 | S207 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:00 |
| S209 | 7 | sensors SAME (("mobile ad hoc network") OR MANET) SAME microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:02 |
| S210 | 3 | S209 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:02 |
| S211 | 13 | (acoustic OR acoustical or sound or audio) SAME (("mobile ad hoc network") OR MANET) SAME sensors | US-PGPUB; USPAT; USOCR; | OR | OFF | 2015/09/02 09:04 |

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| | | | FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| S212 | 7 | S211 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:04 |
| S213 | 827 | (data WITH (collection or collecting)) SAME (MANET or "ad hoc network") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:23 |
| S214 | 238 | S213 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:23 |
| S215 | 355 | (data WITH (collection or collecting)) SAME (MANET or "mobile ad hoc network") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:24 |
| S216 | 71 | S215 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:24 |
| S217 | 0 | (data WITH (collection or collecting)) SAME (MANET or "mobile ad hoc network") SAME (acoustic or acoustical or sound) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:24 |
| S218 | 0 | (data WITH (collection or collecting)) SAME (MANET or "mobile ad hoc network") SAME (microphone) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:25 |
| S219 | 0 | (data WITH (collection or collecting)) SAME (MANET or "mobile ad hoc network") SAME audio | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:25 |
| S220 | 2 | (12/452398).APP. | US-PGPUB; | OR | OFF | 2015/09/02 |

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| | | | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 09:46 |
| S221 | 310 | sensors SAME (("mobile ad hoc network") OR MANET) SAME (collection or collecting) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:49 |
| S222 | 303 | sensors SAME (("mobile ad hoc network") OR MANET) SAME (data WITH (collection or collecting))\ | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:49 |
| S223 | 303 | sensors SAME (("mobile ad hoc network") OR MANET) SAME (data WITH (collection or collecting)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:49 |
| S224 | 37 | S223 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:49 |
| S225 | 906 | sensor WITH audio WITH (collection or collecting) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:54 |
| S226 | 317 | S225 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:54 |
| S227 | 0 | (sensor WITH audio WITH (collection or collecting)) SAME MANET | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:54 |
| S228 | 236 | (sensor WITH audio WITH (collection or collecting)) SAME microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT | OR | OFF | 2015/09/02 09:55 |

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| | | | IBM_TDB | | | |
| S229 | 74 | S228 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:55 |
| S230 | 310 | (sensor WITH (audio or acoustic) WITH (collection or collecting)) SAME microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:55 |
| S231 | 125 | S230 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 09:56 |
| S232 | 2 | microphone WITH "key word" WITH (detect or detection) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:02 |
| S233 | 3 | microphone SAME "key word" SAME (detect or detection) SAME audio | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:03 |
| S234 | 14 | microphone SAME "key word" SAME (detect or detection) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:04 |
| S235 | 9 | S234 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:05 |
| S236 | 33 | proximate SAME ((keyword or "key word") WITH detection) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:10 |
| S237 | 11 | S236 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; | OR | OFF | 2015/09/02 10:10 |

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| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S238 | 2105 | keyword WITH detection | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:13 |
| S239 | 65 | (keyword WITH detection) SAME microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:13 |
| S240 | 36 | S239 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:13 |
| S241 | 1 | (13/976636).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:22 |
| S242 | 1 | S241 AND "non-speech acoustic events" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:23 |
| S243 | 99 | ((keyword or cough) WITH detection) SAME microphone | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:24 |
| S244 | 0 | S243 AND "non-speech acoustic events" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:24 |
| S245 | 52 | S243 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:24 |
| S246 | 2 | ("20100316033").PN. | US-PGPUB; USPAT; | OR | OFF | 2015/09/02 10:44 |

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| | | | USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| S247 | 1 | S246 AND controller | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:47 |
| S248 | 2 | S246 AND "ad hoc" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/09/02 10:49 |
| S249 | 1147827 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:05 |
| S250 | 1147824 | H04W 84/02 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:06 |
| S251 | 380030 | H04J 3/26 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:06 |
| S252 | 1 | (13/976636).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:08 |
| S253 | 763040 | S249 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:09 |
| S254 | 763040 | S249 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:10 |

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| S255 | 763048 | S250 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:10 |
| S256 | 335395 | S251 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:11 |
| S257 | 3 | S254 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:13 |
| S258 | 3 | S255 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:13 |
| S259 | 2 | S256 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:13 |
| S260 | 0 | S254 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:15 |
| S261 | 0 | S255 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:15 |
| S262 | 0 | S256 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:16 |
| S263 | 0 | S254 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2015/11/01 17:17 |

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| | | | DERWENT; IBM_TDB | | | |
| S264 | 0 | S255 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:17 |
| S265 | 0 | S256 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:17 |
| S266 | 0 | S254 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:18 |
| S267 | 0 | S255 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:19 |
| S268 | 0 | S256 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:19 |
| S269 | 1 | S254 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:20 |
| S270 | 1 | S255 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:20 |
| S271 | 0 | S256 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:21 |
| S272 | 29 | (microphone WITH ("biometric sensor")) WITH ("heart rate" OR "blood prssure" OR "toxin detection" | US-PGPUB; USPAT; USOCR; | OR | OFF | 2015/11/01 17:30 |

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| | | OR "nutrient detection" OR "pheromone detection") WITH ("location sensor" OR "light detection" OR proximity OR "gravity detection" OR "magnetic field" OR "electrical field" OR "vibration sensor" OR "pressure sensor" OR "humidity sensor" OR "moisture sensor") | FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| S273 | 2 | S272 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/11/01 17:31 |

**EAST Search History (Interference)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S158 | 107696 | H04W 64/00 | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:33 |
| S159 | 107692 | H04W 84/02 | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:33 |
| S160 | 40857 | H04J 3/26 | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:33 |
| S161 | 98110 | "I3" AND @AD < "20101230" | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:34 |
| S162 | 43734 | S158 AND @AD < "20101230" | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:34 |
| S163 | 43731 | S159 AND @AD < "20101230" | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:34 |
| S164 | 32960 | S160 AND @AD < "20101230" | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:34 |
| S165 | 0 | "I7" AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:35 |

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| S166 | 3 | S162 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:35 |
| S167 | 3 | S163 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:35 |
| S168 | 2 | S164 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:35 |
| S169 | 3 | S162 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:36 |
| S170 | 3 | S163 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:36 |
| S171 | 2 | S164 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:36 |
| S172 | 0 | S162 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:37 |
| S173 | 0 | S163 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:38 |
| S174 | 0 | S164 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:38 |
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| S176 | 0 | S163 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:39 |
| S177 | 0 | S164 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:39 |

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| S182 | 1 | S163 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:42 |
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| S185 | 0 | S163 AND (("mobile ad hoc network" WITH "plurality" WITH devices) SAME (sensor or sensors) SAME (trigger or triggers)) | US-PGPUB; USPAT; * No UPAD | OR | OFF | 2015/08/24 22:43 |
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| S274 | 114880 | H04W 64/00 | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:06 |
| S275 | 114874 | H04W 84/02 | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:06 |
| S276 | 41773 | H04J 3/26 | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:07 |
| S277 | 44223 | S274 AND @AD < "20101230" | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:11 |
| S278 | 44220 | S275 AND @AD < "20101230" | US-PGPUB; | OR | OFF | 2015/11/01 17:12 |

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|---|---|---|---|---|---|---|
| | | | USPAT | | | |
| S279 | 33035 | S276 AND @AD < "20101230" | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:12 |
| S280 | 3 | S277 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:14 |
| S281 | 3 | S278 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:14 |
| S282 | 2 | S279 AND (("mobile ad hoc network" OR MANET) SAME (select WITH (plurality OR subset))) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:14 |
| S283 | 0 | S277 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:16 |
| S284 | 0 | S278 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:16 |
| S285 | 0 | S279 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:16 |
| S286 | 0 | S277 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:17 |
| S287 | 0 | S278 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:17 |
| S288 | 0 | S279 AND(("mobile ad hoc network" SAME "plurality of mobile") SAME controller) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:17 |
| S289 | 0 | S277 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:19 |
| S290 | 0 | S278 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:20 |
| S291 | 0 | S279 AND (("mobile ad hoc network" OR MANET) SAME ((acoustical or sound) SAME tune)) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:20 |
| S292 | 1 | S277 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:21 |
| S293 | 1 | S278 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:21 |
| S294 | 0 | S279 AND (("mobile ad hoc network" OR MANET) SAME (power WITH (conservation OR consumption)) SAME (on OR Off)) | US-PGPUB; USPAT | OR | OFF | 2015/11/01 17:21 |

**11/2/2015 4:35:04 AM**
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| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | Examiner | Art Unit |
| | MYRON K WYCHE | 2644 |

| CPC- SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| H04W 64/00 | 1/12/15 | MW |
| H04W 64/00 | 5/31/15 | MW |
| H04W 84/02 | 5/31/15 | MW |
| H04J 3/26 | 5/31/15 | MW |
| Updated search H04W 64/00 | 11/1/15 | MW |
| Updated search H04W 84/02 | 11/1/15 | MW |
| Updated search H04J 3/26 | 11/1/15 | MW |

| CPC COMBINATION SETS - SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
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| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Inventor NAME Search | 1/12/15 | MW |
| WORD Search | 1/12/15 | MW |
| Updated WORD Search | 5/31/15 | MW |
| Updated WORD Search | 11/1/15 | MW |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
| H04W 64/00 | | 11/1/15 | MW |
| H04W 84/02 | | 11/1/15 | MW |
| H04J 3/26 | | 11/1/15 | MW |

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appln. No: | 13/976636 |
| Applicant: | Steven W. Goldstein |
| Filed: | September 25, 2013 |
| Title: | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| T.C./A.U.: | 2644 |
| Examiner: | MYRON WYCHE |
| Confirmation No.: | 3839 |
| Docket No.: | AMBZ-101US |

**AMENDMENT**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Office Action dated November 5, 2015, please amend the above-identified application as follows:

☐ **Amendments to the Specification** begin on page __ of this paper.

☒ **Amendments to the Claims** are reflected in the listing of claims which begins on page **2** of this paper.

☐ **Amendments to the Drawings** begin on page __ of this paper and include an attached replacement sheet(s).

☐ **Amendments to the Abstract** are on page __ of this paper. A clean version of the Abstract is on page 6 of this paper.

☒ **Remarks/Arguments** begin on page **10** of this paper.

**Amendments to the Claims:** This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A system comprising:

a device among a plurality of devices distributed in an environment,

the device having at least a communication capability for interchanging information with others among the plurality of devices as part of a mobile ad hoc network and/or with a communication system, and

the device having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords ~~and~~ or used for detecting non-speech acoustic events;

wherein one or more of the devices among the plurality including the device is configured as a controller on an ad hoc basis, the controller being configured to: select a subset of devices from among the plurality of devices for collection of sensor data, receive information based on the acquired sensor data of the selected subset using the mobile ad hoc network ~~based on a predetermined characteristic of the environment~~ and the location of the one or more devices, and aggregate the received information including audio information from the at least one microphone for detecting keywords or non-speech acoustic events and at least sensor data from at least one non-acoustic sensor from the selected subset to determine a characteristic of the environment proximate to one or more of the devices; and

wherein the system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, and at least a biometric sensor among a heart rate sensor, a blood pressure sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor ~~and~~ or at least one among a location sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, or a moisture sensor.

2. (Previously Presented) The system of claim 1, wherein the system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, the biometric sensor, the location sensor and at least one among the light detection sensor, the proximity sensor, the

gravity detection sensor, the magnetic field detection sensor, the electrical field detection sensor, the vibration sensor, the pressure sensor, the humidity sensor, or the moisture sensor.

3. (Previously Presented) The system of claim 1, wherein at least one of the devices includes at least one of a wireless device or a wired device and wherein the system enables the switching of a subset of devices on or off based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis.

4. (Original) The system of claim 1, wherein at least one of the devices includes at least one of a fixed device or a mobile device.

5. (Previously Presented) The system of claim 1, wherein at least one of the devices includes at least one of a mobile telephone device, an ear-piece, a hearing aid, a navigation device, a television remote, a car key fob, a portable game controller, GPS device, a computer or sensor module having at least one sensor.

6. (Previously Presented) The system of claim 1, wherein the one or more sensors includes the at least one microphone, the biometric sensor, and at least one among a motion-related sensor, a temperature sensor, a compass, or an image sensor.

7. (Original) The system of claim 1, wherein at least one of the devices includes a position module for determining a position of the respective device.

8. (Previously Presented) The system of claim 1, wherein each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller selected by the ad hoc network for determining the characteristic of the environment.

9. (Previously Presented) The system of claim 8, wherein the local data analysis module includes an acoustic analysis module to process audio information including processing of speech and non-speech events.

10. (Original) The system of claim 8, wherein the local data analysis module includes a sensor analysis module to process non-audio related information.

11. (Previously Presented) The system of claim 1, wherein the controller selected by the ad hoc network is configured to determine locations for at least some of the devices.

12. (Currently Amended) The system of claim 11, wherein the controller selected by the ad hoc network is configured to select the subset of devices according to at least ~~one of~~ the determined locations ~~or~~ and the received information aggregated from among the plurality of devices.

13. (Previously Presented) The system of claim 1, wherein the controller selected by the ad hoc network is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

14. (Previously Presented) The system of claim 1, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

15. (Previously Presented) The system of claim 2, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

16. (Previously Presented) The system of claim 1, wherein the environment includes an audio scene and a characteristic of the audio scene includes at least one of speech events and non-speech events to determine an emotional state.

17. (Previously Presented) The system of claim 16, wherein when the system is a distributed system that records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded.



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18. (Original) The system of claim 1 wherein the distributed system further determines trend information across a population of users of the devices from the combined information.

19. (Original) The system of claim 1, wherein the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

20. (Original) The system of claim 1, wherein the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

21. (Original) The system of claim 20, wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

22. (Previously Presented) The system of claim 1, wherein at least one of the devices enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

23. (Previously Presented) The system of claim 1, wherein the controller selected by the ad hoc controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

24. (Currently Amended) An ad hoc controller for interacting with a plurality of devices distributed in an environment, each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network, the ad hoc controller and/or with a communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device, the ad hoc controller comprising:

a selection/acquisition module configured on an ad hoc basis to select a subset of devices from among the plurality of devices using the mobile ad hoc network and the one or more sensors and for receiving information based on the acquired sensor data of the selected subset of devices, the acquired sensor data being acquired from at least one or more microphones used for detecting at least keywords, and from at least a biometric sensor among a heart rate sensor or a blood pressure sensor; and

a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices and configured to adjust the subset of devices based on the information combined from the at least one or more microphones and the biometric sensor.

25. (Previously Presented) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to determine locations for at least some of the devices.

26. (Previously Presented) The ad hoc controller of claim 25, wherein the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices.

27. (Previously Presented) The ad hoc controller of claim 24, wherein the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices.

28. (Previously Presented) The ad hoc controller of claim 24, wherein the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module.

29. (Currently Amended) The ad hoc controller of claim 24, further comprising a sensor module including at least one the one or more microphones, the biometric sensor, and at least one or more of ~~a motion related sensor, a temperature sensor, a compass, an image sensor, a light detection sensor, a proximity sensor,~~ a gravity detection sensor~~, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, a moisture sensor, a toxin detection sensor, a nutrient detection sensor~~ or a pheromone detection sensor.

30. (Previously Presented) The ad hoc controller of claim 29, further comprising a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment.

31. (Previously Presented) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment.

32. (Currently Amended) A method at an ad hoc controller for processing information from a plurality of devices in a mobile ad hoc network distributed in an environment, the method comprising:

selecting a subset of devices from among the plurality of devices by the ad hoc controller on an ad hoc basis using the mobile ad hoc network and based on sensor data collected, the ad hoc controller including at least one of a communication system or a device, each device having at least a communication capability for interchanging information with others among the devices and/or with the communication system, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and at least a biometric sensor ~~used for detecting heart rate or blood pressure~~;

acquiring sensor data by the selected subset of devices;

receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network; ~~and~~

combining, by the ad hoc controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices; and

adjusting the selected subset of devices based on an aggregation of the acquired sensor data from the at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and the biometric sensor.

33. (Previously Presented) The method of claim 32, wherein the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the ad hoc controller for the information.

34. (Original) The method of claim 32, wherein the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment.

35. (Original) The method of claim 32, the method further including determining trend information across a population of users of the devices from the combined information.

36. (Original) The method of claim 32, the method further including monitoring at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information.

37. (Original) The method of claim 32, the method further including determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

38. (Original) The method of claim 32, the method further including adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment.

39. (Previously Presented) The method of claim 32, wherein the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the ad hoc controller.

**Remarks/Arguments:**

Claims 1, 2, 12, 24, 29 and 32 have been amended. No new matter is introduced herein. Claims 1-39 are pending.

Claim Amendments

Claim 1 has been amended for clarification purposes and to include the aspect of a device among the plurality of devices being configured as a controller on an ad hoc basis to **select** a subset of devices for collection of sensor data, **receive** information **based on the acquired sensor data of the selected subset using the mobile ad hoc network and the location** of the one or more devices, and **aggregate** the received information including audio information from the at lest one microphone for detecting keywords or non-speech acoustic events and at least sensor data from at least one non-acoustic sensor from the selected subset to determine a characteristic of the environment proximate to one or more the devices.

Claim 2 has been amended to specify that the triggering events detected use at least one **microphone**, the **biometric** sensor, the **location** sensor, **and at least one among** the **light** sensor, the **gravity** detection sensor, **or** the **pheromone** detection sensors.

Claim 12 has been amended to recite that **the controller selected** by the ad hoc network **is configured to select the subset of devices** according to at least the determined **locations and** the received information **aggregated** from among the plurality of devices.

Claim 24 has been amended to recite **a scene analysis module configured to combine the information received from the selected subset of devices** to determine a characteristic of the environment proximate to one or more of the devices **and configured to adjust the subset of devices based on the information combined from the at least one or more microphones and the biometric sensor.**

Claim 29 has been amended to recite a sensor module including at least one the one or more **microphones**, the **biometric** sensor, **and** at least **one or more of** a **gravity** detection sensor or a **pheromone** detection sensor.

§103 Rejections

Applicants respectfully disagree with the Office assessment regarding "one or more of the devices among the plurality including the device is configured as a controller on an ad hoc basis." The "centralized controller" Atwal and the ad hoc networks Park do not appear to configure a device as a controller on an ad hoc basis, but rather describe generically "adaptation decisions" that may be made by a centralized controller. The Office appears to be reading too much into the teachings of Atwal and we continue to reserve the right to argue and contest this point in future office action responses or other related matters.

Notwithstanding the above and in efforts to expedite prosecution, Applicants believe the claims as amended further include other non-obvious distinguishing elements over the cited references.

Claims 1-13 and 32 were rejected under 35 USC Section 103(a) as being unpatentable over US Patent Publication No. 200900865873 to Betts et al (hereinafter "Betts") in view of Atwal and Park. Betts discloses the use of multiple cooperating PEDs that may detect an event and where triangulation between the multiple PEDs can determine the target location with greater accuracy and Betts further discloses devices with multiple sensors. However, Betts does not specifically disclose or suggest aggregating the received information including audio information from at least one microphone for detecting keywords or non-speech acoustic events and at least sensor data from at least one non-acoustic sensor where **the system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, and at least a biometric sensor** among a heart rate sensor, a blood pressure sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor **or at least one among a location sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, or a moisture sensor**. Futhermore, the selection of one-hop neighbors in Park is not a system that adaptively enables or configures the subset of devices according to triggering events using at least one microphone and a biometric sensor or other enumerated sensor as recited in claim 1.

Simply put, the cited portions of Betts, Atwal and Park, alone or in combination, fail to disclose or suggest a system that **adaptively enables or configures the subset of devices according to triggering events detected at one or more of the devices using at least a microphone and** a biometric sensor or other enumerated sensor. Accordingly, Betts, Atwal and Park fail to render claim 1 obvious and therefore claim 1 is allowable. Claims 2-13 are allowable as being dependent on an allowable base claims.

With respect to claim 2, again, Betts, Atwal and Park, alone or in combination, fail to disclose or suggest a system that **adaptively enables or configures the subset of devices according to triggering events detected at one or more of the devices using at least one microphone, the biometric sensor, the location sensor, and at least one among the plurality of enumerated sensors** (e.g.,light detection sensor, the proximity sensor, the gravity detection sensor, the magnetic field detection sensor, the electrical field detection sensor, the vibration sensor, the pressure sensor, the humidity sensor, or the moisture sensor). Although multiple sensors are shown in Betts, they are clearly not used in combination **to adaptively enable or configure the subset of devices according to triggering events**. The multiple sensors in Betts might be used for other purposes, but not for enabling or configuring the subset of device in our mobile ad hoc network. Thus, Betts, Atwal, and Park fail to render claim 2 obvious and therefore claim 2 is allowable as noted above.

With respect to claim 32, the cited portions of Betts, Atwal, and Park fail to disclose or suggest combining, by an ad hoc controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices and **adjusting the selected subset of devices based on an aggregation of the acquired sensor data from the at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and the biometric sensor**. There is no adjustment of the selected subset of devices based on the aggregation of the acquired sensor data in Betts, Atwal or Park and particularly from acquired sensor data from a microphone and a biometric sensor as recited in amended claim 32. Accordingly, Betts, Atwal, and Park fail render claim 32 obvious and therefore claim 32 is allowable. Claims 33-39 are allowable as being dependent on an allowable base claim.

Claims 18-21, 23-31, and 33-39 were rejected as being unpatentable over Betts, Atwal, Park, and "A Survey of Mobile Phone Sensing" by Lane. However, Lane fails to overcome the deficiencies of Betts, Atwal and Park explained above. Namely, Lane fails to disclose or suggest a **system that adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, and at least a biometric sensor….or at least one among ...."** a number of enumerated sensors as recited in independent claims 1, 24 or 32. Accordingly, the cited portions of Betts, Atwal, Park and Lane fail to render claims 18-21, 23-31, and 33-39 obvious. Therefore, claims 18-21, 23-31, and 33-39 are allowable.

With respect to claim 24, besides further clarifying or emphasizing that an ad hoc controller is used for interacting with a plurality of devices distributed in an environment, the claim has been previously amended to recite that the selection/acquisition module is configured on an ad hoc basis to select a subset of devices from among the plurality of devices **using the mobile ad hoc network and the one or more sensors** and for receiving information based on the acquired sensor data of the selected subset of devices, **the acquired sensor data being acquired from at least one or more microphones used for detecting at least keywords and from at least a biometric sensor among a heart rate sensor or a blood pressure sensor.** Again, note that the selection/acquisition module uses both the mobile ad hoc network and the one or more sensors **as the basis of the selection of the subset for receiving information or acquiring sensor data**. This is not the same as the cited portions of Betts where a number of sensors are certainly disclosed, but they are not used as the basis of the selection of the subset. Furthermore, none of the cited references discloses or suggests a **scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices and configured to adjust the subset of devices based on the information combined from the at least one or more microphones and the biometric sensor**. Accordingly, Betts, Atwal, Park and Lane fail to render claim 24 obvious and therefore claim 24 is allowable. Claims 25-31 are allowable as being dependent on an allowable base claim.

Claims 14-16 and 22 were rejected as being unpatentable over Betts, Atwal, Park, and further in view of US Patent Application No. 20110143728 to Holoapainen et al (Holoapainen). More particularly, with respect the cited portions of Holoapainen, although paragraph [0027] references mobile ad-hoc network (MANET), Holoapainen however still fails to disclose or suggest the use of such mobile ad hoc network and sensors to select a controller on an ad hoc basis among a plurality of devices in such network. Furthermore, in paragraph [0027] and [0071] of Holoapainen, although Holoapainen refers to "media" as "including audio, video, still images, pictures, etc.", and references a microphone for amplifying a speech signal in paragraph [0071], **nothing in the cited portions of Holapeinen suggests or discloses using a microphone for detecting keywords or for detecting non-speech acoustic events and a biometric sensor or at least one among** a number of other enumerated sensors **(such as a location sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, or a moisture sensor)**. Furthermore, the cited portions of Holoapainen fail to disclose or suggest a **system that adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, and at least a biometric sensor….or at least one among ...."** a number of enumerated sensors as recited in independent claims 1, 24 or 32. Accordingly, the cited portions of Betts, Atwal, Park and Holoapainen fail to render claims 14-16 and 22 obvious. Therefore, claims 14-16 and 22 are allowable.

Furthermore, Claims 14, 15, and 22 were previously amended to include a mobile ad hoc network that is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network and in a broader sense that at least one of the devices in the mobile ad hoc network enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network. Even if the "additional media…acquired to enhance the matching" in Holapeinen can be viewed as being similar to the "fine tuning" recited in claims 14, 15, and 22, the cited portions of Holoapeinen still fails to disclose or suggest a system that adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using

the at least one microphone, and at least a biometric sensor or another sensor as recited in the independent claim 1.

Conclusion

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

/pablo meles/
Pablo Meles, Reg. No. 33,739
Attorney for Applicants

The Director is hereby authorized to charge or credit Deposit Account No. **504284** for any additional fees, or any underpayment or credit for overpayment in connection herewith.

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 24843709 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 117822 |
| **Filer:** | Pablo Meles |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 05-FEB-2016 |
| **Filing Date:** | 01-OCT-2013 |
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| **Application Type:** | U.S. National Stage under 35 USC 371 |

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## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | AMBZ-101US_NFOAR_5Feb2016.pdf | 147176<br>33f3c25716ef4178b49f3a8d8bab63a7f94427f1 | yes | 15 |

| | Multipart Description/PDF files in .zip description | | |
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| | **Document Description** | **Start** | **End** |
| | Amendment/Req. Reconsideration-After Non-Final Reject | 1 | 1 |
| | Claims | 2 | 9 |
| | Applicant Arguments/Remarks Made in an Amendment | 10 | 15 |
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**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
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PTO/SB/06 (09-11)
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| **PATENT APPLICATION FEE DETERMINATION RECORD**<br>Substitute for Form PTO-875 | Application or Docket Number<br>13/976,636 | Filing Date<br>10/01/2013 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY**: ☐ LARGE ☒ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

| AMENDMENT | 02/05/2016 | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * 39 | Minus | ** 39 | = 0 | X $40 = | 0 |
| | Independent (37 CFR 1.16(h)) | * 3 | Minus | ***3 | = 0 | X $210 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | **0** |

| AMENDMENT | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/TRINA STEPTOE/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | AMBZ-101US | 3839 |

117822 7590 05/19/2016

Personics Holdings, LLC.
4800 N Federal Hwy. Ste A205
Boca Raton, FL 33431

| EXAMINER | |
|---|---|
| WYCHE, MYRON | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 05/19/2016 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

iepstein@personicslabs.com
personics_docketing@cardinal-ip.com
pmeles@personicslabs.com

| Office Action Summary | Application No. 13/976,636 | Applicant(s) GOLDSTEIN, STEVEN W. | |
|---|---|---|---|
| | Examiner MYRON K. WYCHE | Art Unit 2644 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *2/5/16*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *1-39* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-39* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

**DETAILED ACTION**

***Response to Arguments***

Applicant's arguments filed 2/5/16 have been fully considered but they are not persuasive. In addition, Applicant's arguments with respect to the claims have been considered but are moot due to new grounds of rejection necessitated by the present amendment.

Applicant's primarily argued:

**(1)** Atwal and Park et al. do not appear to disclose: "one or more of the devices among the plurality including the device is configured as a controller on an ad hoc basis," as recited in amended claim 1;

**(2)** Betts does not specifically disclose or suggest: "aggregating the received information including audio information from at least one microphone for detecting keywords or non-speech acoustic events and at least sensor data from at least one non-acoustic sensor," as recited in amended claim 1;

**(3)** Park et al. is not a "system that adaptively enables or configures the subset of devices according to triggering events using at least one microphone and a biometric sensor or other enumerated sensors";

**(4)** although multiple sensors are shown in Betts, they are clearly not used in combination to adaptively enable or configure the subset of devices according to triggering events," as recited in claim 2;

**(5)** the cited portions of Betts, Atwal and Park et al. fail to disclose or suggest the newly added of: "adjusting the selected subset of devices based on an aggregation of the acquired sensor data from the at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and the biometric sensor," as recited in amended claim 32;

**(6)** although the cited portions of Betts disclose a numbers of sensors, they are not used as the basis of the selection of the subset;

**(7)** none of the cited references discloses or suggests: "a scene analysis module configured to combine information received from the selected subset of devices to determine a characteristic of the

environment proximate to one or more of the devices and configured to adjust the subset of devices based on the information combined from the at least one or more microphones and the biometric sensor," as recited in amended claim 24; and

**(8)** Holopainen fails to disclose or suggest the use of a mobile ad hoc network and sensors to select a controller on an ad hoc basis among a plurality devices in such a network or to adaptively enable or configure the subset of devices according to triggering events.

Regarding **argument (1)**, Atwal discloses:

> **[0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like"**;

and Park et al. discloses:

> **[0038]: "… routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8.**

That is, both Atwal and Park et al. disclose a: "**mobile ad hoc network (MANET)**" and that the "**adaptation**" of the "**centralized controller**" of Atwal suggests the claimed limitation of: "configured as a controller on an ad hoc basis." In view of the above discussion, it is respectfully submitted that **argument (1)** is moot.

With respect to **argument (2)**, Betts discloses:

> **[0020] … an audio microphone 130** as shown, etc., for receiving one or more reference signatures that are **used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions** (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heartbeat, oxygen level, etc.), **for example but not limited to, an audio microphone,** video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, **barometric pressure sensor**, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, **biometric sensor, etc**.
>
> **[0038]** … Multiple SE systems 100 can **perform correlations** with their individual sets of stored references and **communicate shared results**.
>
> **[0104]** … **Upon detection of the selected event in one or more PEDs 300**, the GPS receiver 374 (FIG. 2) in the detecting PED 300 can accurately identify the location and time of detection at the detecting PED 300. **The position and time of detection at each detecting PED**

> **300 can be communicated to all participating PEDs 300 by wireless signals**, such as Bluetooth, IEEE 802.11 or ordinary text messaging between cell phones. **Correlation of three or more detecting PEDs 300 will allow an accurate position determination of the source of the event** … **This process can be used to locate the source and motion of any signals such as a toxic cloud, alarm signal, wireless signal, weapons discharge, lightning strike, tornado, or person talking. … A team of individuals can locate a missing person or child by coordinating their PEDs 300 in a search for the voice print of the missing person or child.**

That is, "**perform correlations**" and "**communicate shared results**" in **[0038]** and "**detection of the selected event in one or more PEDs 300**"; "**detection at each detecting PED 300 can be communicated to all participating PEDs 300**"; and "**Correlation of three or more detecting PEDs 300**" of **[0104]** suggests the limitation of "aggregate the received information." In addition, "**an audio microphone 130**" and "**used to identify environmental events**" in **[0020]**; and "**This process can be used to locate the source and motion of any signals such as a toxic cloud, alarm signal, wireless signal, weapons discharge, lightning strike, tornado, or person talking**"; and "**A team of individuals can locate a missing person or child by coordinating their PEDs 300 in a search for the voice print of the missing person or child**" in **[0104]** suggests the newly added limitation of: "including audio information from at least one microphone for detecting keywords or non-speech acoustic events." Further, "**The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions**" in **[0020]** suggests the newly added limitation of: "at least sensor data from at least one non-acoustic sensor." Thus, in view of the above discussion, it is respectfully submitted that **argument (2)** is moot.

Regarding **argument (3)**, it is respectfully submitted that Park et al. is not cited as disclosing the indicated limitations or to cure them as deficiencies in other cited references. Instead, those limitations are indicated as being disclosed by Betts and Atwal. In response to applicant's arguments against the references individually (i.e., Park et al.), **one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references**. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Thus, in view of the above discussion, it is respectfully submitted that **argument (3)** is moot.

With respect to **argument (4)**, as indicated above Betts disclosure of: "**an audio microphone 130**" and "**used to identify environmental events**" and "**The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions**" in **[0020]**; and the disclosure of: "**detection of the selected event in one or more PEDs 300**"; "**detection at each detecting PED 300 can be communicated to all participating PEDs 300**"; and "**Correlation of three or more detecting PEDs 300**" in **[0104]** suggests the limitation of: "or configure the subset of devices according to triggering events." Thus, in view of the above discussion, it is respectfully submitted that **argument (4)** is moot.

Regarding **argument (5)**, Betts discloses: "**perform correlations**" and "**communicate shared results**" in **[0038]** and "**detection of the selected event in one or more PEDs 300**"; "**detection at each detecting PED 300 can be communicated to all participating PEDs 300**"; and "**Correlation of three or more detecting PEDs 300**" of **[0104]** suggests the newly added limitation of "adjusting the selected subset of devices based on an aggregation of the acquired sensor data." In addition, Betts discloses: "**an audio microphone 130**" and "**used to identify environmental events**" and "**The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions**" in **[0020]** and "**This process can be used to locate the source and motion of any signals such as a toxic cloud, alarm signal, wireless signal, weapons discharge, lightning strike, tornado, or person talking. … A team of individuals can locate a missing person or child by coordinating their PEDs 300 in a search for the voice print of the missing person or child**" in **[0104]** the newly added limitation of claim 32 of "data from the at least one microphone used for detecting keywords and used for detecting non-speech acoustic events and a biometric sensor". Thus, in view of the above discussion, it is respectfully submitted that **argument (5)** is moot.

With respect to **argument (6)**, Betts discloses: "**detection of the selected event in one or more PEDs 300**"; "**detection at each detecting PED 300 can be communicated to all participating PEDs 300**"; and "**Correlation of three or more detecting PEDs 300**" of **[0104]** suggests a numbers of sensors

**are** used as the basis of the selection of the subset. Thus, in view of the above discussion, it is respectfully submitted that **argument (6)** is moot.

Regarding **argument (7)**, Betts discloses: "**perform correlations**" and "**communicate shared results**" in **[0038]** and "**detection of the selected event in one or more PEDs 300**"; "**detection at each detecting PED 300 can be communicated to all participating PEDs 300**"; and "**Correlation of three or more detecting PEDs 300 will allow an accurate position determination of the source of the event**" of **[0104]** suggests the limitation of "a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more devices" and the newly added limitation in claim 24 of: "configured to adjust the subset of devices based on the information combined." In addition, Betts discloses: "**an audio microphone 130**" and "**used to identify environmental events**" and "**The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions**" in **[0020]** the newly added limitation of claim 24 of: "information combined from the at least one or more microphones and the biometric sensor". Thus, in view of the above discussion, it is respectfully submitted that **argument (7)** is moot.

Regarding **argument (8)**, it is respectfully submitted that Holopainen is not cited as disclosing the indicated limitations or to cure them as deficiencies in other cited references. In response to applicant's arguments against the references individually (i.e., Holopainen), **one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references**. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Thus, in view of the above discussion, it is respectfully submitted that **argument (8)** is moot.

Therefore, in view of the above discussion, it is respectfully submitted that the applied art discloses the claimed invention. Rejections taking into account the present amendment are provided below.

***Claim Rejections - 35 USC § 103***

Claims 1-13 and 32 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over US Patent Application Publication No. 20090085873 (Betts et al.) in view of US Patent Application Publication No. 20100316033 (Atwal) and US Patent Application Publication No. 20100040079 (Park et al).

Regarding claim 1, Betts et al. discloses: "a device **(FIG. 7: 300a)** among a plurality of devices distributed in an environment **(FIG. 7: 300a - 300d; [0103]: "…multiple cooperating PEDs 300a, 300b and 300c may detect the event and triangulation between the multiple cooperating PEDs 300a, 300b and 300c can determine the target location 740 with greater accuracy")**, the device having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords or used for detecting non-speech acoustic events, wherein the system adaptively enables or configure the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone and at least a biometric sensor among a heart rate sensor, a blood pressure sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor or at least one among a location sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor a vibration sensor, a humidity sensor, or a moisture sensor **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric**

**sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**, select a subset of devices from among the plurality of devices for collection of sensor data and aggregate the received information **([0038] … Multiple SE systems 100 can perform correlations with their individual sets of stored references and communicate shared results")** including audio information from the at least one microphone for detecting keywords or non-speech acoustic events and at least sensor data from at least one non-acoustic sensor **()** from the selected subset to determine a characteristic of the environment proximate to one or more of the devices" **([0104]: "Upon detection of the selected event in one or more PEDs 300, the GPS receiver 374 (FIG. 2) in the detecting PED 300 can accurately identify the location and time of detection at the detecting PED 300. Correlation of three or more detecting PEDs 300 will allow an accurate position determination of the source of the event. If the source is moving, then the direction of travel can be determined by computing the vector between successive positions. Each PED 300 can calculate and display the location of the event. This process can be used to locate the source and motion of any signals such as a toxic cloud, alarm signal, wireless signal, weapons discharge, lightning strike, tornado, or person talking. A team of individuals can locate a missing person or child by coordinating their PEDs 300 in a search for the voice print of the missing person or child")**.

However, Betts et al. does not clearly disclose the remaining limitations of the claim. To that end, Atwal discloses: "the device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network")** and "one or more of the devices among the plurality including the device is configured as a controller on an ad hoc basis" **([0042]: "In embodiments, adaptation decisions may be made by a centralized**

**controller, in a distributed manner, and the like")**; and "adaptively enables" **([0042]:"… a plurality of mobile devices interact as nodes in a mobile ad hoc network and in which packets are IP routable to the individual device independent of fixed infrastructure elements; enhancing MBRI operation through the use of dynamic adaptation"; In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

It is respectfully submitted that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Betts et al. with the invention of Atwal in order to provide a mobile ad hoc network with adaptive control (e.g., *see* Atwal @ **[0042]**).

However, the combination of Betts et al. and Atwal does not clearly disclose the remaining limitations of the claim. To that end, Park et al. discloses: "the controller being configured to: select **(ABSTRACT: "…determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling")** a subset of devices **(FIG. 7)** from among the plurality of devices **(FIG. 6)** for collection of sensor data, receive information based on the acquired sensor data of the selected subset using the mobile ad hoc network and the location of the one or more of the device" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**; and "configures the subset of device according to triggering events detected at one or more of the plurality of devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**. It is respectfully submitted that it would have been obvious

to one of ordinary skill in the art at the time of the invention to further modify the combination of Betts et al. and Atwal with the invention of Park et al. in order to provide efficient message routing in a mobile ad hoc network (e.g., *see* Park et al. @ **[0038])**.

With respect to claim 2, Betts et al. discloses: "using at least one microphone, the biometric sensor, the location sensor and at least one among the light detection sensor, the proximity sensor, the gravity detection sensor, the magnetic field detection sensor, the electrical field detection sensor, the vibration sensor, the pressure sensor, the humidity sensor, or the moisture sensor" **(FIG. 1: 105, 130; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120"; [0038]** … Multiple SE systems 100 can **perform correlations** with their individual sets of stored references and **communicate shared results**.).

In addition, Atwal discloses: "adaptively enables" **([0042]:"… a plurality of mobile devices interact as nodes in a mobile ad hoc network and in which packets are IP routable to the individual device independent of fixed infrastructure elements; enhancing MBRI operation through the use of dynamic adaptation"; In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

In addition, Park et al. discloses: "configures the subset of device according to triggering events detected at one or more of the plurality of devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

Regarding claim 3, Betts et al. discloses: "at least one of the devices includes at least one of a wireless device or a wired device" **([0002]: "… transport with them one or more personal electronic devices (PEDs) that demand their attention and further increase the complexity of their environment. Personal digital assistants (PDA's), global positioning system (GPS) navigators, portable computers, calculators, digital cameras, hearing aids, radios, tape, CD, DVD, and/or MP3 players, video games, and wireless (e.g., cellular) telephones are good examples of PEDs)**.

In addition, Park et al. discloses: "the system enables the switching of a subset of devices on **(FIG. 6)** or off **(FIG. 7)**, based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology**

**information")**.

With respect to claim 4, Betts et al. discloses: "at least one of the devices includes at least one of a fixed device or a mobile device" **([0002]: "… transport with them one or more personal electronic devices (PEDs) that demand their attention and further increase the complexity of their environment. Personal digital assistants (PDA's), global positioning system (GPS) navigators, portable computers, calculators, digital cameras, hearing aids, radios, tape, CD, DVD, and/or MP3 players, video games, and wireless (e.g., cellular) telephones are good examples of PEDs)**.

Regarding claim 5, Betts et al. discloses: "at least one of the devices includes at least one of a mobile telephone device, an earpiece, a hearing aid, a navigation device, a television remote, a car key fob, a portable game controller, GPS device, a computer a sensor module having at least one sensor" **" ([0002]: "… transport with them one or more personal electronic devices (PEDs) that demand their attention and further increase the complexity of their environment. Personal digital assistants (PDA's), global positioning system (GPS) navigators, portable computers, calculators, digital cameras, hearing aids, radios, tape, CD, DVD, and/or MP3 players, video games, and wireless (e.g., cellular) telephones are good examples of PEDs)**.

With respect to claim 6, Betts et al. discloses: "the one or more sensors includes the at least one microphone, the biometric sensor, and at least one among a motion-related sensor, a temperature sensor a compass, or an image sensor" **(FIG. 1: 105, 130; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video**

**camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**.

Regarding claim 7, Betts et al. discloses: "at least one of the devices includes a position module for determining a position of the respective device" **(FIG. 2: "GPS Receiver 374")**.

With respect to claim 8, Betts et al. discloses: "each of at least some of the devices include a local data analysis module **(FIG. 2: 215)** for processing the acquired sensor data to determine at least one event, the event being used by the controller selected by the ad hoc network for determining the characteristic of the environment" **(FIG. 1: 105, FIG. 2: 215; [0021]: "The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events. The detection engine 215 can be implemented in hardware, software, or a combination thereof, but is preferably implemented in software executed by a computer based architecture")**.

In addition, Atwal discloses: "the controller selected by the ad hoc network" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 9, Betts et al. discloses: "the local data analysis module includes an acoustic analysis module to process audio information including processing of speech and non-speech events" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of**

**the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**.

With respect to claim 10, Betts et al. discloses: "the local data analysis module includes a sensor analysis module to process non-audio related information" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate,**

**sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**.

Regarding claim 11, Betts et al. discloses: "to determine locations for at least some of the devices" **(Fig. 2: 374; [0063]: "The GPS receiver 374 is another optional element. GPS receiver 374 receives position information from global positioning system satellites via an antenna 376. The position information is transferred directly to the baseband subsystem 340 for processing. The GPS receiver 374 can use the independent antenna 376 or share the common antenna 380. U.S. Pat. No. 6,975,277, titled "Wireless communications device pseudo-fractal antenna," which is incorporated herein by reference, describes an antenna for operating in the GPS and cellular telephone bands, and such antenna can be implemented in the PED 300. Many of the GPS functions, such as coordinate transformation, can be implemented in GPS receiver 374 or DSP 360. Position information from the GPS receiver 374 can be used to alert the operator of proximity to various locations, including those that are hazardous or dangerous. GPS receiver 374 can provide dynamic inputs of speed, direction, and distance traveled to the SE system 100")**. With respect to claim 12, Betts et al. discloses: "the controller selected by the ad hoc network is configured to select the subset of devices according to at least the determined locations or the received information aggregated from among the plurality of devices" **([0038]** … Multiple SE systems 100 can **perform correlations** with their individual sets of stored references and **communicate shared results**"; **[0101]: "Multiple cooperating PEDs 300 can simultaneously monitor for selected environmental events as**

**illustrated in FIG. 7"; [0102]: "COOPERATIVE DEVICES screen 462 (FIG. 3) is used to coordinate two or more PEDs 300. The VOLUNTEER command allows the operator to volunteer the PED 300 for cooperative operation with other PEDs 300 in the area. A volunteer signal will be sent to other PEDs 300 identifying the PED 300, its location, and the sensors that are available")**.

In addition, Atwal discloses: "the controller selected by the ad hoc network" **([0042]: "... a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 13, Betts et al. discloses: "pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices" " **([0101]: "Multiple cooperating PEDs 300 can simultaneously monitor for selected environmental events as illustrated in FIG. 7"; [0102]: "COOPERATIVE DEVICES screen 462 (FIG. 3) is used to coordinate two or more PEDs 300. The VOLUNTEER command allows the operator to volunteer the PED 300 for cooperative operation with other PEDs 300 in the area. A volunteer signal will be sent to other PEDs 300 identifying the PED 300, its location, and the sensors that are available")**.

In addition, Atwal discloses: "the controller selected by the ad hoc network" **([0042]: "... a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 32, Betts et al. discloses: "each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and at least a biometric sensor" and "based on sensor data collected" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet**

**110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120").**

In addition, Betts discloses: adjusting the selected subset of devices based on an aggregation of the acquired sensor data" **([0038]:** "**perform correlations**" and "**communicate shared results**"; **[0104]:** "**detection of the selected event in one or more PEDs 300**"; "**detection at each detecting PED 300 can be communicated to all participating PEDs 300**"; and "**Correlation of three or more detecting PEDs 300**"**)** and data from the at least one microphone used for detecting keywords and used for detecting non-speech acoustic events and a biometric sensor **([0020]:** "**an audio microphone 130**" and "**used to identify environmental events**" and "**The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions"**).

Further, Atwal discloses: "each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"),** "an ad hoc controller" and "one or more of the devices is configured as a

controller on an ad hoc basis" **([0042]: "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Furthermore, Park et al. discloses: "selecting a subset of devices by the ad hoc controller **(FIG. 7)** from among the plurality of devices by a controller on a ad hoc basis using the mobile ad hoc network **(FIG. 6; ABSTRACT: "…determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling")**, acquiring sensor data by the selected subset of devices ; receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network; and combining, by the ad hoc controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

Claims 18-21 and 23-31, 33-39 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Betts et al. in view of Atwal, Park et al. and "A Survey of Mobile Phone Sensing" (Lane).

Claim 18 is dependent upon claim 1. As discussed above, claim 1 is disclosed by Betts et al., Atwal and Park et al. Thus, those limitations of claim 1 that are recited in claim 18 are also disclosed by Betts et al., Atwal and Park et al.

However, Betts et al., Atwal and Park et al. do not clearly disclose the remaining limitations of the claims. To that end with respect to claim 18, Lane discloses: "the distributed system further determines trend information across a population of users of the devices from the combined information" **(pg. 134, FIG. 3; pg. 144: "learn", FIG. 4)**. It is respectfully submitted that it would have been obvious to one of

ordinary skill in the art at the time of the invention to further modify the combination of Betts et al., Atwal and Park et al. with the invention of Lane in order to learn trend information in the combined information (e.g., see Lane @ **FIG. 3**; **pg. 144: "learn", FIG. 4**).

Regarding claim 19, Lane discloses: "the distributed system further monitors at least one of localization of events, tracking of events, topics and triggering events across a population of users of the devices from the combined information" **(pg. 142; pg. 143; pg. 144, FIG. 4)**.

With respect to claim 20, Lane discloses: "the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the combined information **(pg. 140: col. 1, para. 3; pg. 141: "sensors"; pg. 145)**.

Regarding claim 21, Lane discloses: "the aggregated motion-related characteristics comprise human or vehicle flow characteristics" **(pg. 140: col. 1, para. 3: "humans"; para. 141: "sensors")**.

Regarding claim 23, Lane discloses: "the controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller" **(pg. 145: "inform", "share", "persuasion")**.

In addition, Atwal discloses: "the controller selected by the ad hoc network" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 24, Betts et al. discloses: "acquired sensor data being acquired from at least one or more microphones used for detecting at least keywords and from at least a biometric sensor among heart rate sensor or a blood pressure sensor" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are**

**used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120")**; and a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more devices" and "configured to adjust the subset of devices based on the information combined" (**[0038]:** "**perform correlations**" and "**communicate shared results**"; **[0104]:** "**detection of the selected event in one or more PEDs 300**"; "**detection at each detecting PED 300 can be communicated to all participating PEDs 300**"; and "**Correlation of three or more detecting PEDs 300 will allow an accurate position determination of the source of the event**"); and information combined from the at least one or more microphones and the biometric sensor" **([0020]:** "**an audio microphone 130**" and "**used to identify environmental events**" and "**The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions**").

In addition, Lane discloses: "a plurality of devices distributed in an environment, each of at least some of the devices having one or more sensors for acquiring sensor data related to the environment proximate to the device" **(ABSTRACT, pg. 140, pg. 141: "sensors"; pg. 142: "social networking"; FIG. 2; pg. 143, FIG. 3; pg. 144-145: "Learn, Inform, Share, and Persuasion")**.

Further, Atwal discloses: "each device having at least a communication capability for interchanging information with others of the devices as part of a mobile ad hoc network and/or with a communication system" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network") "**an ad hoc controller" and "one or more of the devices is configured as a controller on an ad hoc basis" **([0042]: "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Furthermore, Park et al. discloses: "the controller comprising: a selection/acquisition module configured on an ad hoc basis to select **(ABSTRACT: "…determining using a processor a least amount of relay nodes for use in multicasting a message to nodes in the network by using a neighbor matrix of a source node used in Node Activation Multiple Access (NAMA) scheduling")** a subset of devices **(FIG. 7)** from among the plurality of devices using the mobile ad hoc network **(FIG. 6)** and for receiving information based on the acquired sensor data of the selected subset of devices" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8. MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

Regarding claim 25, Betts et al. discloses: "to determine locations for at least some of the devices" **([0101]: "Multiple cooperating PEDs 300 can simultaneously monitor for selected environmental events as illustrated in FIG. 7"; [0102]: "COOPERATIVE DEVICES screen 462 (FIG. 3) is used to coordinate two or more PEDs 300. The VOLUNTEER command allows the operator to volunteer the PED 300 for cooperative operation with other PEDs 300 in the area. A volunteer signal will be sent to other PEDs 300 identifying the PED 300, its location, and the sensors that are available")**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation**

**decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 26, Lane discloses: "the selection/acquisition module is configured to select the subset of devices according to at least one of the determined locations or the received information from among the plurality of devices" **(pg. 142, FIG. 2)**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 27, Lane discloses: "the selection/acquisition module is further configured to pass configuration information to the devices for at least one of acquiring the sensor data or processing of the sensor data at the respective devices" **(pg. 142)**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 28, Lane discloses: "the selection/acquisition module is configured to adjust at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment determined by the scene analysis module" **(pg. 142, FIG. 2)**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 29, Betts et al. discloses: "a sensor module including at least one the one or more microphones, the biometric sensor" **(FIG. 1: 105, 130; FIG. 2: 215; [0020]: "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to**

**identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc"; FIG. 2: 215, 348; [0021]: The system 100 further comprises a detection engine 215 that stores the one or more reference signatures that are used to identify environmental events, that correlates sensed environmental signals with the reference signatures, and that detects occurrences of the environmental events"; [0024]: "Reference signatures, such as bird calls, a human voice, registered emergency signals (e.g., a police car siren or fire truck siren), etc. can be collected from the Internet 110 or another source by the computer 120"), select a subset of devices from among the plurality of devices for collection of sensor data and aggregate the received information () from the selected subset to determine a characteristic of the environment proximate to one or more of the devices" ([0104]: "Upon detection of the selected event in one or more PEDs 300, the GPS receiver 374 (FIG. 2) in the detecting PED 300 can accurately identify the location and time of detection at the detecting PED 300. Correlation of three or more detecting PEDs 300 will allow an accurate position determination of the source of the event. If the source is moving, then the direction of travel can be determined by computing the vector between successive positions. Each PED 300 can calculate and display the location of the event. This process can be used to locate the source and motion of any signals such as a toxic cloud, alarm signal, wireless signal, weapons discharge, lightning strike, tornado, or person talking. A team of individuals can locate a missing person or child by coordinating their PEDs 300 in a search for the voice print of the missing person or child).**

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like").**

Further, the Examiner takes Official Notice that the claimed: "at least one or more of a gravity detection sensor or a pheromone detection sensor", is well known in the art.

With respect to claim 30, Lane discloses: "a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment" **(pg. 141: "sensors"; pg. 144: "mobile phone sensing architecture")**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 31, Lane discloses: "at least one of mitigate, amplify or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment" **(pg. 143, FIG. 3)**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Regarding claim 33, Lane discloses: "the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the controller for the information" **(pg. 142; pg. 143; pg. 144: "learn")**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

With respect to claim 34, Lane discloses: "the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment" **(pg. 14`: "sensors"; pg. 144: "learn")**.

Regarding claim 35, Lane discloses: "determining trend information across a population of users of the devices from the combined information" **(pg. 143; FIG. 3; FIG. 4; pg. 144: "learn")**.

With respect to claim 36, Lane discloses: "monitoring at least one of localization of events,

tracking of events, topics and triggering events across a population of users of the devices from the combined information" **(pg. 142; pg. 143; pg. 144, FIG. 4)**.

Regarding claim 37, Lane discloses: "determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information" **(pg. 140: col. 1, para. 3; pg. 141: "sensors"; pg. 145)**.

With respect to claim 38, Lane discloses: "adjusting at least one of a selection of devices in the subset of devices or a configuration of the devices in the subset responsive to the characteristic of the environment" **(pg. 143, FIG. 3)**.

Regarding claim 39, Lane discloses: "the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller" **(pg. 145: "inform", "share", "persuasion")**.

In addition, Atwal discloses: "the ad hoc controller" **([0042]: "… a method for a plurality of mobile devices interact as nodes in a mobile ad hoc network"; "In embodiments, adaptation decisions may be made by a centralized controller, in a distributed manner, and the like")**.

Claims 14-16 and 22 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Betts et al. in view of Atwal, Park et al. and US Patent Application Publication No. 20110143728 (Holopainen et al).

Claims 14 -16 and 22 are ultimately dependent upon claim 1. As discussed above, claim 1 is disclosed by Betts et al., Atwal and Park et al. Thus, those limitations of claim 1 recited in claims 14, 15 and 22 are also disclosed by Betts et al., Atwal and Park et al.

However, the combination of Betts et al., Atwal and Park et al. does not clearly disclose the remaining limitations of the claims. To that end, Holopainen et al. discloses: "a mobile ad hoc network **(FIG.1: 105; [0027]: "By way of example, the communication network 105 of system 100 includes one or more networks such as … mobile ad-hoc network (MANET)")** is used to fine tune acoustical characteristics **(FIG. 3; FIG. 5; [0044]: "FIG. 5 is a flowchart of a process for acquiring additional**

**media to verify a matched target expression, according to one embodiment"; "When acquiring media with expression as shown in step 303 of FIG. 3, additional media may be acquired to enhance the matching of the target expressions")** .... based on data acquired from at least a subset of devices form the mobile ad hoc network" **(FIG. 1; 101a-101n; [0027]: "...UEs 101a-101n includes a component to acquire media (e.g., an image, a sound recording, etc.), such as a digital camera/camcorder, a scanning device, a sound recording device, or any other sensors that may be used to capture media data. The UEs 101a-101n also have connectivity to one another as well as to the communication service 103 via a communication network 105")**. The disclosed: "additional media may be acquired to enhance the matching", as disclosed by Holopainen et al. and corresponds to the claimed: "fine tuning." In addition, it is noted that it would have been obvious to collect sound media in the claimed: "concert hall" of claims 14 and 15. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art to further modify the combination of Betts et al, Atwal and Park et al. with the invention of Holopainen et al. in order to provide a sound recording device sensor to collect acoustical data (e.g., see Holopainen et al. @ **[0027]**).

With respect to claim 16, Holopainen et al. discloses: "environment includes an audio scene **([0026]: "As used herein, the term "media" refers to various forms of media, including audio, video, still images, pictures, etc")** and a characteristic of the audio scene includes at least one of speech events or non-speech events" **([0071]: "...audio function circuitry 1109 includes a microphone 1111 and microphone amplifier that amplifies the speech signal output from the microphone 1111")**. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art that a keyword (e.g., an excited utterance) or a monitored heart rate could be used to perform the claimed: "determine an emotional state."

With respect to claim 22, Park et al. discloses: "using a subset of devices **(FIG. 7)** from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network" **([0038]: "Referring to FIG. 7, a Multipoint Using Neighbor Information (MUNIcast) uses the neighbor information (a neighbor matrix) stored in NAMA, for example, in achieving efficient multicast message routing in Mobile Ad hoc NETwork (MANET) as will be described in FIG. 8.**

**MUNIcast achieves efficient multicast message routing by allowing each node to select only a subset of one-hop neighbors in relaying multicast messages based on one- and two-hop topology information")**.

In addition, Holopainen et al., as discussed above, discloses: "enables the fine tuning of an acoustical characteristic" (i.e., "he disclosed: "additional media may be acquired to enhance the matching", as disclosed by Holopainen et al. corresponds to the claimed: "fine tuning").

Claim 17 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Betts et al. in view of Atwal, Park et al., Holopainen et al. and Lane.

Claim 17 is dependent upon claim 16. As discussed above, Claim 16 is disclosed by over Betts et al., Atwal, Park et al., and Holopainen et al. Thus, those limitations of claim 16 that are recited in claim 17 are also disclosed by Betts et al. in view of Atwal, Park et al., and Holapainen et al.

However, the combination of Betts et al. in view of Atwal, Park et al., and Holopainen et al. does not clearly disclose the remaining limitations of the claim. To that end, regarding claim 17, Lane discloses: "when the system is a distributed system that records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded" **(pg. 144; col. 1, para. 1-2; pg. 145: "inform", "share", and "persuasion"; pg. 149: "privacy")**. It is respectfully submitted that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Betts et al. in view of Atwal, Park et al., and Holopainen et al. with the invention of Lane in order to provide an indication that privacy is not present since the audio information is recorded (e.g., *see* Lane @ **page 144-145**).

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MYRON K. WYCHE whose telephone number is (571)272-3390. The examiner can normally be reached on M-F- 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Myron Wyche/ 5/15/16
Primary Patent Examiner
AU 2644

| Notice of References Cited | Application/Control No. 13/976,636 | Applicant(s)/Patent Under Reexamination GOLDSTEIN, STEVEN W. | |
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| | Examiner MYRON K. WYCHE | Art Unit 2644 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | CPC Classification | US Classification |
|---|---|---|---|---|---|---|
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| * | B | US-2011/0143728 A1 | 06-2011 | HOLOPAINEN; Jussi | G06K9/00308 | 455/414.1 |
| * | C | US-2010/0316033 A1 | 12-2010 | Atwal; Peter | H04W74/002 | 370/338 |
| * | D | US-2010/0040079 A1 | 02-2010 | Park; Sung I. | H04L12/1881 | 370/432 |
| | E | US- | | | | |
| | F | US- | | | | |
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| | L | US- | | | | |
| | M | US- | | | | |

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**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
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| | U | |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| L1 | 2 | ("20110143728").PN. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:38 |
| L2 | 1223034 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:51 |
| L3 | 1223031 | H04W 84/02 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:51 |
| L4 | 387023 | H04J 3/26 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:51 |
| L5 | 774953 | l2 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:52 |
| L6 | 774961 | l3 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:52 |
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| L8 | 0 | l5 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:54 |
| L9 | 0 | l6 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:56 |
| L10 | 0 | l7 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:56 |

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| L11 | 32 | I5 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:57 |
| L12 | 32 | I6 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:57 |
| L13 | 10 | I7 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:57 |
| L14 | 368 | I5 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:58 |
| L15 | 368 | I6 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:58 |
| L16 | 115 | I7 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:58 |
| L17 | 0 | I5 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 16:00 |
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| S1 | 1 | (13/976636).APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:11 |
| S2 | 165 | Goldstein-Steven-W.in. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:13 |
| S3 | 128 | S2 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:13 |

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| S4 | 0 | S3 AND Ambientz | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:14 |
| S5 | 13 | S2 AND Ambientz | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:14 |
| S6 | 0 | S5 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:15 |
| S7 | 1006009 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:25 |
| S8 | 731073 | S7 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:25 |
| S9 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |
| S10 | 18 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |
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| S15 | 29 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |

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| S16 | 3127 | ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S17 | 335 | S8 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S18 | 17109 | ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S19 | 7 | S10 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
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| S21 | 1899 | S16 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S22 | 10366 | S18 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:33 |
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| S25 | 5 | S23 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
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| S28 | 2 | ("20100316033").PN. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 03:02 |
| S29 | 2 | S28 AND MBRI | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 03:03 |
| S30 | 1 | S28 AND (adaptation or adaptive or adaptively) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 03:33 |
| S31 | 0 | S26 AND (adaptation or adaptive or adaptively) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 04:25 |
| S32 | 3 | ("20100040079").PN. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 04:27 |
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**EAST Search History (Interference)**

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| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 01/12/2015 | 05/31/2015 | 11/02/2015 | 05/15/2016 | | | | | |
| | 1 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 2 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 3 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 4 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 5 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 6 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 7 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 8 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 9 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 10 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 11 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 12 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 13 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 14 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 15 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 16 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 17 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 18 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 19 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 20 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 21 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 22 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 23 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 24 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 25 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 26 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 27 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 28 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 29 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 30 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 31 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 32 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 33 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 34 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 35 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 36 | ✓ | ✓ | ✓ | ✓ | | | | | |

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 01/12/2015 | 05/31/2015 | 11/02/2015 | 05/15/2016 | | | | | |
| | 37 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 38 | ✓ | ✓ | ✓ | ✓ | | | | | |
| | 39 | ✓ | ✓ | ✓ | ✓ | | | | | |

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | Examiner | Art Unit |
| | MYRON K WYCHE | 2644 |

| CPC- SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| H04W 64/00 | 1/12/15 | MW |
| H04W 64/00 | 5/31/15 | MW |
| H04W 84/02 | 5/31/15 | MW |
| H04J 3/26 | 5/31/15 | MW |
| Updated search H04W 64/00 | 11/1/15 | MW |
| Updated search H04W 84/02 | 11/1/15 | MW |
| Updated search H04J 3/26 | 11/1/15 | MW |
| Update search for H04W 64/00 | 5/15/16 | MW |
| Update search for H04W 84/02 | 5/15/16 | MW |
| Update search for H04J 3/26 | 5/15/16 | MW |

| CPC COMBINATION SETS - SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Inventor NAME Search | 1/12/15 | MW |
| WORD Search | 1/12/15 | MW |
| Updated WORD Search | 5/31/15 | MW |
| Updated WORD Search | 11/1/15 | MW |
| Updated WORD search | 5/15/16 | MW |

| INTERFERENCE SEARCH |
|---|

| | |
|---|---|
| | |

| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
|---|---|---|---|
| H04W 64/00 | | 11/1/15 | MW |
| H04W 84/02 | | 11/1/15 | MW |
| H04J 3/26 | | 11/1/15 | MW |

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www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | AMBZ-101US | 3839 |

117822 7590 11/30/2016

Personics Holdings, LLC.
4800 N Federal Hwy. Ste A205
Boca Raton, FL 33431

| EXAMINER |
|---|
| WYCHE, MYRON |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 11/30/2016 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

iepstein@personicslabs.com
personics_docketing@cardinal-ip.com
pmeles@personicslabs.com

| Notice of Abandonment | Application No. | Applicant(s) |
|---|---|---|
| | 13/976,636 | GOLDSTEIN, STEVEN W. |
| | Examiner | Art Unit |
| | MYRON K. WYCHE | 2644 |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--***

This application is abandoned in view of:

1. ☒ Applicant's failure to timely file a proper reply to the Office letter mailed on *19 May 2016*.
   (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____ ), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
   (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 to the final rejection.
   (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) if this is utility or plant application, a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. Note that RCEs are not permitted in design applications.)
   (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
   (d) ☒ No reply has been received.

2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
   (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
   (b) ☐ The submitted fee of $_____ is insufficient. A balance of $_____ is due.
   The issue fee required by 37 CFR 1.18 is $_____. The publication fee, if required by 37 CFR 1.18(d), is $_____.
   (c) ☐ The issue fee and publication fee, if applicable, has not been received.

3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
   (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
   (b) ☐ No corrected drawings have been received.

4. ☐ The letter of express abandonment which is signed by the attorney or agent of record or other party authorized under 37 CFR 1.33(b). See 37 CFR 1.138(b).

5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34) upon the filing of a continuing application.

6. ☐ The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. ☐ The reason(s) below:

| /Myron Wyche/<br>Primary Examiner<br>AU 2644 | 11/27/16 | |
|---|---|---|

Petitions to revive under 37 CFR 1.137, or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

PTO/AIA/122 (08-12)
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# CHANGE OF CORRESPONDENCE ADDRESS
***Application***

Address to:
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

| | |
|---|---|
| Application Number | 13/976,636 |
| Filing Date | 10-01-2013 |
| First Named Inventor | Steven W. Goldstein |
| Art Unit | 2644 |
| Examiner Name | WYCHE, MYRON |
| Attorney Docket Number | AMBZ-101US |

Please change the Correspondence Address for the above-identified patent application to:

☒ The address associated with Customer Number: 150139

***OR***

☐ Firm or Individual Name

Address

| City | State | Zip |
|---|---|---|
| | | |

Country

| Telephone | Email |
|---|---|
| | |

This form cannot be used to change the data associated with a Customer Number. To change the data associated with an existing Customer Number use "Request for Customer Number Data Change" (PTO/SB/124).

I am the:

☐ Applicant

☒ Attorney or agent of record. Registration Number 56389.

☐ Registered practitioner named in the application transmittal papers who acts in a representative capacity under 37 CFR 1.34. See 37 CFR 1.33(a)(1). Registration Number _____.

Signature /John P Keady/

Typed or Printed Name John P. Keady

| Date | Telephone |
|---|---|
| 1 Aug 2017 | 576061291 |

NOTE: This form must be signed in accordnace with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications.
Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____forms are submitted.

This collection of information is required by 37 CFR 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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# Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 29955499 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 117822 |
| **Filer:** | John Patrick Keady |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | AMBZ-101US |
| **Receipt Date:** | 02-AUG-2017 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 01:18:34 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Change of Address | CCA_150139_13976636_3839.pdf | 201371<br>e84a5299421616bb7d59fb51a76e03177c25f44f | no | 2 |

**Warnings:**

| Information: | |
|---|---|
| Total Files Size (in bytes): | 201371 |

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

PTO/SB/80 (11-08)
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# POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 150139

*OR*

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

| Name | Registration Number | Name | Registration Number |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 150139

*OR*

| | | | |
|---|---|---|---|
| ☐ Firm or Individual Name | | | |
| Address | | | |
| City | | State | Zip |
| Country | | | |
| Telephone | | Email | |

Assignee Name and Address:

Staton Techiya LLC. 16193 Bridlewood Circle, Delray Beach, FL 33445

**A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.**

**SIGNATURE of Assignee of Record**

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

| | | | |
|---|---|---|---|
| Signature | [signature] | Date | 8-14-17 |
| Name | DANIEL C - STATON | Telephone | 573-404-0099 |
| Title | MANAGING MEMBER | | |

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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# STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: STATON TECHIYA, LLC

Application No./Patent No.: 13976636 Filed/Issue Date: 10/01/2013

Titled: Information Processing Using A Population Of Data Acquisition Devices

STATON TECHIYA, LLC, a limited liability company

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Steven W. Goldstein To: AMBIENTZ

   The document was recorded in the United States Patent and Trademark Office at

   Reel 031317, Frame 0448, or for which a copy thereof is attached.

2. From: Steven W. Goldstein To: PERSONICS HOLDINGS, INC.

   The document was recorded in the United States Patent and Trademark Office at

   Reel 045000, Frame 0236, or for which a copy thereof is attached.



This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**.

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PTO/AIA/96 (08-12)
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## STATEMENT UNDER 37 CFR 3.73(c)

3. From: PERSONICS HOLDINGS, INC. To: PERSONICS HOLDINGS, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 032189, Frame 0304, or for which a copy thereof is attached.

4. From: PERSONICS HOLDINGS, INC, PERSONICS HOLDINGS, LLC To: DM STATON FAMILY LIMITED PARTNERSHIP

The document was recorded in the United States Patent and Trademark Office at
Reel 045000, Frame 0390, or for which a copy thereof is attached.

5. From: DM STATON FAMILY LIMITED PARTNERSHIP To: STATON TECHIYA, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 045000, Frame 0446, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

| | |
|---|---|
| /Peter A. Chiabotti/ | February 28, 2018 |
| Signature | Date |
| Peter A. Chiabotti | 54,603 |
| Printed or Typed Name | Title or Registration Number |

# Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 31923779 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 150139 |
| **Filer:** | Peter Allen Chiabotti |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | 11472-15_AMBZ-101US |
| **Receipt Date:** | 28-FEB-2018 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 18:00:50 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Power of Attorney | 11472-15_POA-Executed.PDF | 70455<br>9d3afa5a708e2fb10c4b14a54f13a57914976f12 | no | 1 |

**Warnings:**

| Information: | | | | | |
|---|---|---|---|---|---|
| 2 | Assignee showing of ownership per 37 CFR 3.73 | 11472-15_CFR_Statement.PDF | 123106<br>0e0350bad991f57fe529b927eb73133de65271a5 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | | **Total Files Size (in bytes):** | 193561 | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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# REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
## (Submitted Only via EFS-Web)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Application Number | 13976636 | Filing Date | 2013-10-01 | Docket Number (if applicable) | 11472-15_AMBZ-101US | Art Unit | 2644 |
| First Named Inventor | Steven Wayne Goldstein | | | Examiner Name | WYCHE, MYRON | | |

**This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.**
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

### SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

### MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

### FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 500951

### SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

| Signature of Registered U.S. Patent Practitioner | | | |
|---|---|---|---|
| Signature | /Mammen P. Zachariah, Jr./ | Date (YYYY-MM-DD) | 2018-03-07 |
| Name | Mammen P. Zachariah, Jr./ | Registration Number | 67376 |

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | | |
|---|---|---|---|
| APPLICATION NO. | : | 13/976,636 | CONFIRMATION NO. 3839 |
| APPLICATION OF | : | GOLDSTEIN, Steven Wayne, et al | |
| DATE FILED | : | October 1, 2013 | |
| EXAMINER | : | WYCHE, MYRON | |
| TC/A.U. | : | 2644 | |
| DOCKET | : | 11472-15_AMBZ-101US | |
| TITLE | : | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES | |

**RESPONSE TO OFFICE ACTION**

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Date: March 7, 2018

Sir:

These remarks are filed in response to the Final Office Action dated May 19, 2016 along with a Request for Continued Examination. Please amend the above-identified patent application as follows:

- **Amendments to the Claims** begin on page 2 of this paper; and
- **Remarks/Arguments** begin on page 10 of this paper.

## AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1. (Currently Amended) A system comprising:

a device among a plurality of devices distributed in an environment, wherein the device ~~having at least~~ has a communication capability for interchanging information with others among the plurality of devices as part of a mobile ad hoc network, ~~and/or with~~a communication system, or a combination thereof, and

wherein the device ~~having one or more sensors~~ has a sensor for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords or used for detecting non-speech acoustic events;

wherein one or more of the devices among the plurality including the device is configured as a controller on an ad hoc basis, wherein the controller performs operations comprising: ~~being configured to~~:

~~select~~ selecting a subset of devices from among the plurality of devices for collection of the sensor data,

~~receive~~ receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network and [[the]]a location of the one or more devices, and

~~aggregate~~ aggregating the received information including audio information from the at least one microphone for detecting keywords or non-speech acoustic events and at least sensor data from at least one non-acoustic sensor from the selected subset of devices to determine a characteristic of the environment proximate to the one or more of the devices;

adjusting a manner in which the subset of devices operate based on the characteristic of the environment and the information aggregated from the at least one microphone and the at least one non-acoustic sensor; and

wherein the system adaptively enables or configures the selected subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, and at least a biometric sensor among a heart rate sensor, a blood pressure sensor, a toxin detection sensor, a nutrient detection sensor or a pheromone detection sensor or at least one among a location sensor, a light detection sensor, a proximity sensor, a gravity detection sensor, a magnetic field detection sensor, an electrical field detection sensor, a vibration sensor, a pressure sensor, a humidity sensor, or a moisture sensor.

2. (Previously Presented) The system of claim 1, wherein the system adaptively enables or configures the subset of devices according to triggering events detected at one or more of the plurality of devices using the at least one microphone, the biometric sensor, the location sensor and at least one among the light detection sensor, the proximity sensor, the gravity detection sensor, the magnetic field detection sensor, the electrical field detection sensor, the vibration sensor, the pressure sensor, the humidity sensor, or the moisture sensor.

3. (Previously Presented) The system of claim 1, wherein at least one of the devices includes at least one of a wireless device or a wired device and wherein the system enables the switching of a subset of devices on or off based on information about context, including position, orientation in space, social-graph membership, and demographics and the processing and analyzing of information obtained from the sensors, and further setting of triggers to enable or disable sensing, processing or analysis.

4. (Currently Amended) The system of claim 1, wherein at least one of the devices includes ~~at least one of~~ a fixed device [[or]], a mobile device, or a combination thereof.

5. (Currently Amended) The system of claim 1, wherein at least one of the devices includes ~~at least one of~~ a mobile telephone device, an ear-piece, a hearing aid, a navigation device, a television remote, a car key fob, a portable game controller, GPS device, a computer or sensor module having at least one sensor, or a combination thereof.

6. (Currently Amended) The system of claim 1, wherein the sensor ~~one or more sensors~~ includes the at least one microphone, the biometric sensor, and at least one among a motion-related sensor, a temperature sensor, a compass, or an image sensor.

7. (Original) The system of claim 1, wherein at least one of the devices includes a position module for determining a position of the respective device.

8. (Previously Presented) The system of claim 1, wherein each of at least some of the devices include a local data analysis module for processing the acquired sensor data to determine at least one event, the event being used by the controller selected by the ad hoc network for determining the characteristic of the environment.

9. (Previously Presented) The system of claim 8, wherein the local data analysis module includes an acoustic analysis module to process audio information including processing of speech and non-speech events.

10. (Original) The system of claim 8, wherein the local data analysis module includes a sensor analysis module to process non-audio related information.

11. (Previously Presented) The system of claim 1, wherein the controller selected by the ad hoc network is configured to determine locations for at least some of the devices.

12. (Previously Presented) The system of claim 11, wherein the controller selected by the ad hoc network is configured to select the subset of devices according to at least the determined locations and the received information aggregated from among the plurality of devices.

13. (Currently Amended) The system of claim 1, wherein the controller selected by the ad hoc network is further configured to pass configuration information to the devices for ~~at least one of~~ acquiring the sensor data, [[or]] processing of the sensor data at the respective devices, or a combination thereof.

14. (Previously Presented) The system of claim 1, wherein the mobile ad hoc network is used to fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network.

15. (Currently Amended) The system of claim 2, wherein the mobile ad hoc network is used to estimate traffic flow from noise occurring the environment ~~fine tune acoustical characteristics in a concert hall based on data acquired from at least a subset of devices from the mobile ad hoc network~~.

16. (Currently Amended) The system of claim 1, wherein the environment includes an audio scene and a characteristic of the audio scene includes ~~at least one of~~ speech events, ~~and~~ non-speech events to determine an emotional state, or a combination thereof.

17. (Previously Presented) The system of claim 16, wherein when the system is a distributed system that records speech from a user not associated with the distributed system, the distributed system provides a warning indication to all devices in a vicinity of the device recording the speech to indicate that audio information is being recorded.

18. (Currently Amended) The system of claim 17, wherein the distributed system further determines trend information across a population of users of the devices from the aggregated ~~combined~~ information.

19. (Currently Amended) The system of claim 17, wherein the distributed system further monitors ~~at least one of~~ localization of events, tracking of events, topics and triggering events, or a combination thereof, across a population of users of the devices from the aggregated ~~combined~~ information.

20. (Currently Amended) The system of claim 17, wherein the distributed system further determines aggregated motion-related characteristics related to multiple ones of the devices from the ~~combined~~ aggregated information.

21. (Original) The system of claim 20, wherein the aggregated motion-related characteristics comprise human or vehicle flow characteristics.

22. (Previously Presented) The system of claim 1, wherein at least one of the devices enables the fine tuning of an acoustical characteristic using a subset of devices from the ad hoc network according to a triggering event detected at one or more of the devices of the mobile ad hoc network.

23. (Previously Presented) The system of claim 1, wherein the controller selected by the ad hoc controller receives the information from at least one of the devices in the subset of devices responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the controller.

24. (Currently Amended) An ad hoc controller for interacting with a plurality of devices distributed in an environment, wherein each device ~~having at least~~ has a communication

capability for interchanging information with others of the devices as part of a mobile ad hoc network, the ad hoc controller, ~~and/or~~ with a communication system, or a combination thereof, wherein each of at least some of the devices has a sensor ~~having one or more sensors~~ for acquiring sensor data related to the environment proximate to the device, wherein the ad hoc controller comprises ~~comprising~~:

a selection/acquisition module configured on an ad hoc basis to select a subset of devices from among the plurality of devices using the mobile ad hoc network and the sensor ~~one or more sensors~~ and to receive ~~for receiving~~ information based on the acquired sensor data of the selected subset of devices, the acquired sensor data being acquired from at least one or more microphones used for detecting at least keywords, and from at least a biometric sensor among a heart rate sensor or a blood pressure sensor; and

a scene analysis module configured to combine the information received from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices and configured to adjust a manner in which the subset of devices operate based on the characteristic of the environment and the information combined from the at least one or more microphones and the biometric sensor.

25. (Previously Presented) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to determine locations for at least some of the devices.

26. (Currently Amended) The ad hoc controller of claim 25, wherein the selection/acquisition module is configured to select the subset of devices according to ~~at least one of~~ the determined locations, [[or]] the received information from among the plurality of devices, or a combination thereof.

27. (Currently Amended) The ad hoc controller of claim 24, wherein the selection/acquisition module is further configured to pass configuration information to the devices for ~~at least one of~~ acquiring the sensor data, [[or]] processing of the sensor data at the respective devices, or a combination thereof.

28. (Currently Amended) The ad hoc controller of claim 24, wherein the selection/acquisition module is configured to adjust ~~at least one of~~ a selection of devices in the subset of devices, [[or]] a configuration of the devices in the subset, or a combination thereof, ~~responsive~~ in response to the characteristic of the environment determined by the scene analysis module.

29. (Currently Amended) The ad hoc controller of claim 24, further comprising a sensor module including at least one of the one or more microphones, the biometric sensor, and ~~at least one or more of~~ a gravity detection senor [[or]], a pheromone detection sensor, or a combination thereof.

30. (Previously Presented) The ad hoc controller of claim 29, further comprising a local data analysis module for processing sensor data from the sensor module, the processed sensor data being combined with the information received from the selected subset of devices to determine the characteristic of the environment.

31. (Currently Amended) The ad hoc controller of claim 24, wherein the ad hoc controller is configured to ~~at least one of~~ mitigate, amplify, or pass-through information to one or more of the plurality of devices responsive to the characteristic of the environment.

32. (Currently Amended) A method at an ad hoc controller for processing information from a plurality of devices in a mobile ad hoc network distributed in an environment, the method comprising:

selecting a subset of devices from among the plurality of devices by the ad hoc controller on an ad hoc basis using the mobile ad hoc network and based on sensor data collected, wherein the ad hoc controller includes ~~including at least one of~~ a communication system, [[or]] a device, or a combination thereof, wherein each device has ~~having at least~~ a communication capability for interchanging information with others among the devices ~~and/or with~~ the communication system, or a combination thereof, wherein each of at least some of the devices has a sensor ~~having one or more sensors~~ for acquiring sensor data related to the environment proximate to the device including at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and at least a biometric sensor;

acquiring sensor data by the selected subset of devices;

receiving information based on the acquired sensor data of the selected subset of devices using the mobile ad hoc network;

combining, by the ad hoc controller, the received information from the selected subset of devices to determine a characteristic of the environment proximate to one or more of the devices; and

adjusting a manner in which the selected subset of devices operate based on the characteristic of the environment, an aggregation of the acquired sensor data from the at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and the biometric sensor.

33. (Previously Presented) The method of claim 32, wherein the receiving of the information includes receiving the information buffered at the devices prior to receiving a request from the ad hoc controller for the information.

34. (Original) The method of claim 32, wherein the acquiring of the sensor data includes processing the acquired sensor data to determine at least one event, the processed data being used to determine the characteristic of the environment.

35. (Original) The method of claim 32, the method further including determining trend information across a population of users of the devices from the combined information.

36. (Currently Amended) The method of claim 32, the method further including monitoring ~~at least one of~~ localization of events, tracking of events, topics and triggering events, or a combination thereof, across a population of users of the devices from the combined information.

37. (Original) The method of claim 32, the method further including determining aggregated motion-related characteristics related to multiple ones of the devices from the combined information.

38. (Currently Amended) The method of claim 32, the method further including adjusting ~~at least one of~~ a selection of devices in the subset of devices, [[or]] a configuration of the devices in the subset, or a combination thereof, responsive to the characteristic of the environment.

39. (Previously Presented) The method of claim 32, wherein the information from at least one of the devices in the subset of devices is received responsive to a confirmation indication from the respective device, the confirmation indication indicating an allowance to release the respective information to the ad hoc controller.

## REMARKS

The foregoing amendments and the following remarks are made in response to the Final Office Action (hereinafter "the Office Action") dated May 19, 2016 and are being filed with a Request for Continued Examination (RCE). Additionally, a Petition for Revival of an Application for Patent Abandoned Unintentionally pursuant to 37 CF 1.137(a) is filed concurrently herewith. The Commissioner is hereby authorized to charge the required fees for the RCE, charge the fees for the petition, charge any deficiency, or credit any overpayment, to Deposit Account No. 50-0951.

At the time of the Office Action, the Examiner noted that claims 1-39 were pending. The Examiner rejected claims 1-39 Under 35 U.S.C. § 103 as discussed in further detail below. Claims 1, 4-6, 13, 15-16, 18-20, 24, 26-29, 31-32, 36 and 38 have been amended. Support for the amendments to the independent claims may be found in at least paragraphs [0064]-[0069].

In view of the arguments set forth below, claims 1-39 are allowable, and the Examiner is respectfully requested to withdraw the rejection and issue a Notice of Allowance.

### I. Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 1-13 and 32 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2009/0085873 to *Betts et al (*hereinafter *Betts)* in view of U.S. Patent Publication No. 2010/0316033 to *Atwal* (hereinafter *Atwal*) and U.S. Patent Publication No. 2010/0040079 to *Park et al.* (hereinafter *Park*). In addition, Claims 18-21, 23-31, and 33-39 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Betts* in view of *Atwal, Park* and "A Survey of Mobile Phone Sensing" to *Lane* (hereinafter *Lane*). Claims 14-16 and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Betts* in view of *Atwal*, *Park* and U.S. Patent Application Publication No. 2011/0143728 to *Holopainen et al.* (hereinafter *Holopainen*). Lastly, claim 17 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Betts* in view of *Atwal*, *Park*, *Holopainen* and *Lane*. In

particular, the Examiner stated that *Betts* discloses several of the claim recitations recited in claim 1, but admitted that *Betts* fails to disclose several of the remaining claim recitations recited in claim 1. Instead, the Examiner relied upon *Atwal* and *Park* and stated that *Atwal* and *Park* discloses the claim recitations that the Examiner stated that *Betts* does not disclose. In the interest of expediting prosecution, the independent claims have been amended further.

In particular, *Betts*, alone or in combination with *Atwal* and *Park*, fail to disclose "adjusting a manner in which the selected subset of devices operate based on the characteristic of the environment, an aggregation of the acquired sensor data from the at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and the biometric sensor," as claimed in amended claim 32. (emphasis added). Instead, the cited portions of *Betts* merely state:

> "In a second alternative embodiment, multiple correlators can be used to simultaneously correlate multiple reference signatures. Each stored reference can have a dedicated correlator or several correlators can each process its own set of stored references. Multiple SE systems 100 can perform correlations with their individual sets of stored references and communicate shared results. Dispersed portable PEDs having the SE systems 100 can sense over a wider geographical range and increase effective processing speed." See *Betts*, paragraph [0038]. (emphasis added).

> "Upon detection of the selected event in one or more PEDs 300, the GPS receiver 374 (FIG. 2) in the detecting PED 300 can accurately identify the location and time of detection at the detecting PED 300. The position and time of detection at each detecting PED 300 can be communicated to all participating PEDs 300 by wireless signals, such as Bluetooth, IEEE 802.11 or ordinary text messaging between cell phones. Correlation of three or more detecting PEDs 300 will allow an accurate position determination of the source of the event. If the source is moving, then the direction of travel can be determined by computing the vector between successive positions. Each PED 300 can calculate and display the location of the event. This process can be used to locate the source and motion of any signals such as a toxic cloud, alarm signal, wireless signal, weapons discharge, lightning strike, tornado, or person talking. A team of individuals can locate a missing person or child by coordinating their PEDs 300 in a search for the voice print of the missing person or child. U.S. Pat. No. 6,232,882, titled "Warning System and Method for Detection of Tornadoes," which is incorporated herein by reference, describes a method for detecting, differentiating, and locating lightning strikes and tornado generated electromagnetic signals. U.S. Pat. No. 6,944,466, titled "Mobile Location Estimation in a Wireless Communication

> System," which is incorporated herein by reference, describes a method for locating the source of a wireless signal based on signals received at multiple receiver stations. Such systems/methods can be implemented in the portable cooperating PEDs 300." See *Betts*, paragraph [0104]. (emphasis added).
>
> "FIG. 1 is a block diagram of an example implementation of the sensory enhancement (SE) system in accordance with the present invention and is generally denoted by reference numeral 100. As is shown in FIG. 1, the SE system 100 includes one or more input devices 105, such as but not limited to, a computer 120 as shown that can be communicatively coupled to the Internet 110, an audio microphone 130 as shown, etc., for receiving one or more reference signatures that are used to identify environmental events. The input devices 105 can be any transducer for sensing acoustic, thermal, optical, electromagnetic, chemical, dynamic, wireless, atmospheric, or biometric conditions (e.g., a body function, such as blood pressure, body temperature, heart rate, sugar level, heart beat, oxygen level, etc.), for example but not limited to, an audio microphone, video camera, Hall Effect magnetic field detector, flux gate compass, electromagnetic field detector, accelerometer, barometric pressure sensor, thermometer, ionization detector, smoke detector, gaseous detector, radiation detector, biometric sensor, etc." See *Betts*, paragraph [0020]. (emphasis added).

In other words, the cited portions of *Betts* merely state that multiple correlators can be used to simultaneously correlate multiple reference signatures, and that multiple SE systems can perform correlations with their individual sets of stored references and communicate shared results. See *Betts*, paragraph [0038]. *Betts* goes on to state that the position and time of detection at each detecting PED can be communicated to all participating PEDs, and that correlation of three or more PEDs allows an accurate position determination of the source of the event. See *Betts*, paragraph [0104]. Finally, *Betts* states that *Betts's* input devices receive one or more reference signatures that are used to identify environmental events. See *Betts*, paragraph [0020]. Notably, however, the cited portions of *Betts* fail to disclose the concept of adjusting a manner in which a selected subset of devices operate based on a characteristic of an environment. Instead, *Betts* merely discusses the concept of using PEDs to determining the source of an event and utilizing signatures to identify environmental events. The cited portions of *Betts* do not disclose actually adjusting a manner in which a device operates specifically based on a characteristic on an environment. Indeed, the cited portions of *Betts* fail to disclose the more general concept of adjusting a device's operation based on characteristics. Still further, the cited portions of *Betts* do

not disclose adjusting the manner in which a device operates based on an aggregation of sensor data acquired from a microphone. Moreover, the cited portions of *Atwal* and *Park* fail to make up for the deficiencies of *Betts* in this regard. Thus, *Betts*, alone or in combination with *Atwal* and *Park*, fail to disclose "adjusting a manner in which the selected subset of devices operate based on the characteristic of the environment, an aggregation of the acquired sensor data from the at least one microphone used for detecting keywords and used for detecting non-speech acoustic events, and the biometric sensor," as claimed in amended claim 32.

Claims 1 and 24 were rejected by the Examiner for similar reasons and include similar features as found in claim 32. The arguments for the patentability of claim 32 are hereby applied to the rejections of claims 1 and 24. Thus, *Betts*, alone or in combination with *Atwal* and *Park* fail to disclose the features as recited in claims 1, 24 and 32. Additionally, *Lane*, which is also relied upon for rejecting claim 24, fails to make up for the deficiencies of *Betts*, *Atwal*, and *Park*. Therefore, for at least these reasons, independent claims 1, 24 and 32 and those claims depending therefrom, are allowable, and the Examiner is respectfully requested to withdraw the rejections under 35 U.S.C. § 103 and issue a Notice of Allowance.

## II. Conclusion

For at least the reasons given above, claims 1-39 are allowable, and the Examiner is respectfully requested to withdraw all rejections. Should the Examiner believe that anything further is necessary, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Respectfully submitted,

**AKERMAN LLP**

Date: March 7, 2018

/Mammen P. Zachariah, Jr./

Mammen P. Zachariah, Jr.
Reg. No. 67,376
Peter A. Chiabotti
Reg. No. 54,603
P.O. Box 3188
West Palm Beach, FL 33402-3188
Tel: 561-653-5000

| Doc Code: PET.AUTO<br>Document Description: Petition automatically granted by EFS-Web | PTO/SB/64<br>U.S. Patent and Trademark Office<br>Department of Commerce |
|---|---|

| | |
|---|---|
| Electronic Petition Request | **PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT ABANDONED UNINTENTIONALLY UNDER 37 CFR 1.137(a)** |
| Application Number | 13976636 |
| Filing Date | 01-Oct-2013 |
| First Named Inventor | Steven Goldstein |
| Attorney Docket Number | 11472-15_AMBZ-101US |
| Title | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |

The above-identified application became abandoned for failure to file a timely and proper reply to a notice or action by the United States Patent and Trademark Office. The date of abandonment is the day after the expiration date of the period set for reply in the office notice or action plus any extensions of time actually obtained.

APPLICANT HEREBY PETITIONS FOR REVIVAL OF THIS APPLICATION

NOTE: A grantable petition requires the following items:
(1) Petition fee;
(2) Reply and/or issue fee;
(3) Terminal disclaimer with disclaimer fee - required for all utility and plant applications filed before June 8, 1995; and for all design applications; and
(4) Statement that the entire delay was unintentional

Petition Fee

- (◉) Small Entity
- ( ) Micro Entity
- ( ) Regular Undiscounted

2. Reply and/or fee

( ) I certify, in accordance with 37 CFR 1.4(d)(4) that the amendment and response have already been filed in the above-identified application on

( ) Amendment and response are attached

RCE request,submission, and fee.

( ) I certify, in accordance with 37 CFR 1.4(d)(4) that the RCE Request, Submission, and Fee have already been filed in the above-identified application on

(◉) RCE Request, Submission, and Fee are attached

Notice of Appeal

( ) I certify, in accordance with 37 CFR 1.4(d)(4) that the Notice of Appeal and Fee have already been filed in the above-identified application on

| |
|---|
| ○ Notice of Appeal and Fee are attached<br><br>3. Terminal Disclaimer is not required, since the Electronic Petition format is not support for Design applications and applications filed before June 8, 1995. Please file using regular petition format for review by the Office of Petitions.<br><br>☒ STATEMENT: The entire delay in filing the required reply from the due date for the required reply until the filing of a grantable petition under 37 CFR 1.137(a) was unintentional. |
| THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES<br><br>I certify, in accordance with 37 CFR 1.4(d)(4) that I am:<br><br>◉ An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application.<br><br>○ An attorney or agent registered to practice before the Patent and Trademark Office, acting in a representative capacity.<br><br>○ A sole inventor<br><br>○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application<br><br>○ A joint inventor; all of whom are signing this e-petition |

| | |
|---|---|
| Signature | /Mammen P. Zachariah, Jr./ |
| Name | Mammen P. Zachariah, Jr. |
| Registration Number | 67376 |

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 13976636 |
| **Filing Date:** | 01-Oct-2013 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Filer:** | Mammen P. Zachariah Jr. |
| **Attorney Docket Number:** | 11472-15_AMBZ-101US |

Filed as Small Entity

**Filing Fees for U.S. National Stage under 35 USC 371**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| PET. REVIVE ABANDON APP, DELAY PYMT-RESP | 2453 | 1 | 1000 | 1000 |
| RCE- 2ND AND SUBSEQUENT REQUEST | 2820 | 1 | 950 | 950 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |
| Miscellaneous: | | | | |
| | | Total in USD ($) | | 1950 |

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Decision Date March 7, 2018

In re Application of Steven Goldstein

Application No. 13976636

Filed: 01-Oct-2013

DECISION ON PETITION

UNDER CFR 1.137(a)

Attorney Docket No. 11472-15_AMBZ

This is an electronic decision on the petition under 37 CFR 1.137(a), March 7, 2018 , to revive the above-identified application.

The petition is GRANTED.

The above-identified application became abandoned for failure to reply in a timely manner to the outstanding final Office action. The date of abandonment is the day after the last day of the period set for reply in the Office action plus any applicable extensions of time properly requested.

The electronic petition satisfies the conditions for revival pursuant to the provisions of 37 CFR 1.137(a) in that (1) the reply in the form of an amendment and/or response, Request for Continued Examination, and the filing fee required under 37 CFR 1.17(e); (2) the petition fee as set forth in 37 CFR 1.17 (m); and (3) the required statement of unintentional delay have been received. Accordingly, the Request for Continued Examination and the amendment and/or response are accepted as having been unintentionally delayed.

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

This application file is being directed to the Technology Center.

Office of Petitions

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 31986024 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 150139 |
| **Filer:** | Mammen P. Zachariah Jr. |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | 11472-15_AMBZ-101US |
| **Receipt Date:** | 07-MAR-2018 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 16:13:07 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | DA |
| Payment was successfully received in RAM | $1950 |
| RAM confirmation Number | 030818INTEFSW00002657500951 |
| Deposit Account | 500951 |
| Authorized User | Mammen Zachariah |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:<br>37 CFR 1.17 (Patent application and reexamination processing fees)<br>37 CFR 1.19 (Document supply fees) | |

37 CFR 1.21 (Miscellaneous fees and charges)

37 CFR 1.492(a) (Basic national fee only)

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Request for Continued Examination (RCE) | 11472-15_AMBZ-101US_RCE.PDF | 737555<br>9c2387c1ab23a0c96fb29b6465e3b9c434b78840 | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | | 11472-15_AMBZ-101US_RFOA.PDF | 200558<br>4868c4c3c2fcef496c52920de57d8ae16b116775 | yes | 15 |
| | **Multipart Description/PDF files in .zip description** | | | | |
| | **Document Description** | | **Start** | **End** | |
| | Amendment Submitted/Entered with Filing of CPA/RCE | | 1 | 1 | |
| | Claims | | 2 | 10 | |
| | Applicant Arguments/Remarks Made in an Amendment | | 11 | 15 | |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Petition automatically granted by EFS | petition-request.pdf | 33885<br>22999cd04d8b97b7c87ef0d52ef28ee2580b3790 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 4 | Fee Worksheet (SB06) | fee-info.pdf | 32314<br>cabbf41264ab39df862d903a8d66ad8e436d6de0 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 1004312 | | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| **PATENT APPLICATION FEE DETERMINATION RECORD**<br>Substitute for Form PTO-875 | Application or Docket Number<br>13/976,636 | Filing Date<br>10/01/2013 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY:** ☐ LARGE ☑ SMALL ☐ MICRO

## APPLICATION AS FILED - PART I

| | (Column 1) | (Column 2) | | | |
|---|---|---|---|---|---|
| FOR | NUMBER FILED | NUMBER EXTRA | | RATE ($) | FEE ($) |
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | | x $40 = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | | x $210 = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | | TOTAL | |

## APPLICATION AS AMENDED - PART II

| | | (Column 1) | | (Column 2) | (Column 3) | | | |
|---|---|---|---|---|---|---|---|---|
| AMENDMENT | 03/07/2018 | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | | RATE ($) | ADDITIONAL FEE ($) |
| | Total (37 CFR 1.16(i)) | * 39 | Minus | ** 39 | = 0 | | x $50 = | 0 |
| | Independent (37 CFR 1.16(h)) | * 3 | Minus | *** 3 | = 0 | | x $230 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | |
| | | | | | | | TOTAL ADD'L FEE | 0 |

| | | (Column 1) | | (Column 2) | (Column 3) | | | |
|---|---|---|---|---|---|---|---|---|
| AMENDMENT | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | | RATE ($) | ADDITIONAL FEE ($) |
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | | x $ 0 = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | | x $ 0 = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | |
| | | | | | | | TOTAL ADD'L FEE | |

| | |
|---|---|
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3. | LIE |
| ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". | Marquita D Jones |
| *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". | |
| The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1. | |

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | 11472-15_AMBZ-101US |

**CONFIRMATION NO. 3839**

150139
Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

**POA ACCEPTANCE LETTER**

*OC000000097867413*

Date Mailed: 03/08/2018

## NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/28/2018.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/qnguyen/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | 11472-15_AMBZ-101US |

**CONFIRMATION NO. 3839**

150139
Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

**POWER OF ATTORNEY NOTICE**

*OC000000097867365*

Date Mailed: 03/08/2018

## NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/28/2018.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/qnguyen/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

# NOTICE OF ALLOWANCE AND FEE(S) DUE

150139 7590 04/05/2018

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

| EXAMINER |
|---|
| WYCHE, MYRON |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

DATE MAILED: 04/05/2018

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | 11472-15_AMBZ-101US | 3839 |

TITLE OF INVENTION: INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

| APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | SMALL | $500 | $0 | $0 | $500 | 07/05/2018 |

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

**HOW TO REPLY TO THIS NOTICE:**

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.**

## PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail** **Mail Stop ISSUE FEE**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**
**or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

150139 7590 04/05/2018

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

| |
|---|
| (Depositor's name) |
| (Signature) |
| (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | 11472-15_AMBZ-101US | 3839 |

TITLE OF INVENTION: INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

| APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | SMALL | $500 | $0 | $0 | $500 | 07/05/2018 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|---|---|---|
| WYCHE, MYRON | 2644 | 455-456100 |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____ 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____



PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 10/01/2013 | Steven W. Goldstein | 11472-15_AMBZ-101US | 3839 |

150139 7590 04/05/2018

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

| EXAMINER | |
|---|---|
| WYCHE, MYRON | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

DATE MAILED: 04/05/2018

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

## Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

| Notice of Allowability | Application No. 13/976,636 | Applicant(s) GOLDSTEIN, STEVEN W. | |
|---|---|---|---|
| | Examiner MYRON K. WYCHE | Art Unit 2644 | AIA (First Inventor to File) Status No |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--***

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *RCE filed 3/8/18*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-39*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   **Certified copies:**

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**.

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   **Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☒ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/Myron Wyche/ 3/23/18
Primary Examiner
AU 2644

The present application is being examined under the pre-AIA first to invent provisions.

## DETAILED ACTION

### *Allowable Subject Matter*

Claims 1-39 are allowed.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MYRON K. WYCHE whose telephone number is (571)272-3390. The examiner can normally be reached on M-F- 7:00 - 3:30.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathy Wang-Hurst can be reached on 571-270-5371. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Myron Wyche/ 3/23/18
Primary Examiner
AU 2644

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| L1 | 1636411 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:40 |
| L2 | 1636402 | H04W 84/02 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:41 |
| L3 | 430928 | H04J 3/26 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:41 |
| L7 | 817656 | l1 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:43 |
| L8 | 817664 | l2 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:44 |
| L9 | 342568 | l3 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:44 |
| L13 | 0 | l7 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:47 |
| L14 | 0 | l8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:47 |
| L15 | 0 | l9 AND ("sensor data" SAME (communication or communicate) | US-PGPUB; USPAT; | OR | OFF | 2018/03/23 07:47 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | SAME controller SAME characteristic SAMe position) | USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| L19 | 0 | ("mobile ad hoc network" WITH information WITH device) SAME (sensor WITH proximate WITH detect WITH keyword) SAME (controller WITH "ad hoc") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:54 |
| L20 | 0 | l7 AND ("mobile ad hoc network" WITH information WITH device) SAME (sensor WITH proximate WITH detect WITH keyword) SAME (controller WITH "ad hoc") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:55 |
| L21 | 0 | l8 AND ("mobile ad hoc network" WITH information WITH device) SAME (sensor WITH proximate WITH detect WITH keyword) SAME (controller WITH "ad hoc") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:55 |
| L22 | 0 | l9 AND ("mobile ad hoc network" WITH information WITH device) SAME (sensor WITH proximate WITH detect WITH keyword) SAME (controller WITH "ad hoc") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 07:55 |
| L26 | 0 | subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor" | USPAT | OR | OFF | 2018/03/23 07:58 |
| L27 | 0 | l7 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | USPAT | OR | OFF | 2018/03/23 07:58 |
| L28 | 0 | l8 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | USPAT | OR | OFF | 2018/03/23 07:58 |
| L29 | 0 | l9 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | USPAT | OR | OFF | 2018/03/23 07:58 |
| L33 | 0 | subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:01 |
| L34 | 0 | l7 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:01 |
| L35 | 0 | l8 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2018/03/23 08:01 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | DERWENT; IBM_TDB | | | |
| L36 | 0 | l9 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:01 |
| L40 | 0 | l7 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:03 |
| L41 | 0 | l8 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:03 |
| L42 | 0 | l9 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:03 |
| L46 | 0 | aggregate WITH audio WITH information WITH keyword WITH "non-speech acoustic" WITH event WITH sensor WITH proximate | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:08 |
| L47 | 0 | l7 AND (aggregate WITH audio WITH information WITH keyword WITH "non-speech acoustic" WITH event WITH sensor WITH proximate) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:08 |
| L48 | 0 | l8 AND (aggregate WITH audio WITH information WITH keyword WITH "non-speech acoustic" WITH event WITH sensor WITH proximate) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:08 |
| L49 | 0 | l9 AND (aggregate WITH audio WITH information WITH keyword WITH "non-speech acoustic" WITH event WITH sensor WITH proximate) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2018/03/23 08:08 |
| S1 | 1 | ("13976636").PN. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:11 |
| S2 | 165 | Goldstein-Steven-W.in. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2015/01/12 00:13 |

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|---|---|---|---|---|---|---|
| | | | DERWENT; IBM_TDB | | | |
| S3 | 128 | S2 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:13 |
| S4 | 0 | S3 AND Ambientz | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:14 |
| S5 | 13 | S2 AND Ambientz | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:14 |
| S6 | 0 | S5 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:15 |
| S7 | 1006009 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:25 |
| S8 | 731073 | S7 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:25 |
| S9 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |
| S10 | 18 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |
| S11 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:28 |
| S12 | 33 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2015/01/12 00:29 |

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|---|---|---|---|---|---|---|
| | | | DERWENT; IBM_TDB | | | |
| S13 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
| S14 | 33 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
| S15 | 29 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:30 |
| S16 | 3127 | ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S17 | 335 | S8 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S18 | 17109 | ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:31 |
| S19 | 7 | S10 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S20 | 14 | S12 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S21 | 1899 | S16 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:32 |
| S22 | 10366 | S18 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2015/01/12 00:33 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | DERWENT; IBM_TDB | | | |
| S23 | 9 | ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
| S24 | 0 | S8 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
| S25 | 5 | S23 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2015/01/12 00:36 |
| S26 | 3 | ("20090085873").PN. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 02:03 |
| S27 | 1 | S26 AND correlate | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 02:24 |
| S28 | 2 | ("20100316033").PN. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 03:02 |
| S29 | 2 | S28 AND MBRI | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 03:03 |
| S30 | 1 | S28 AND (adaptation or adaptive or adaptively) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 03:33 |
| S31 | 0 | S26 AND (adaptation or adaptive or adaptively) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 04:25 |
| S32 | 3 | ("20100040079").PN. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2016/05/15 04:27 |

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| | | | DERWENT; IBM_TDB | | | |
| S33 | 0 | S32 AND (adaptation or adaptive or adaptively) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 04:27 |
| S34 | 2 | ("20110143728").PN. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:38 |
| S35 | 1223034 | H04W 64/00 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:51 |
| S36 | 1223031 | H04W 84/02 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:51 |
| S37 | 387023 | H04J 3/26 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:51 |
| S38 | 774953 | S35 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:52 |
| S39 | 774961 | S36 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:52 |
| S40 | 335772 | S37 AND @AD < "20101230" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:53 |
| S41 | 0 | S38 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:54 |
| S42 | 0 | S39 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2016/05/15 15:56 |

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|---|---|---|---|---|---|---|
| | | | DERWENT; IBM_TDB | | | |
| S43 | 0 | S40 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAME environment) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:56 |
| S44 | 32 | S38 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:57 |
| S45 | 32 | S39 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:57 |
| S46 | 10 | S40 AND ("sensor data" SAME (communication or communicate) SAME controller) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:57 |
| S47 | 368 | S38 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:58 |
| S48 | 368 | S39 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:58 |
| S49 | 115 | S40 AND ("sensor data" SAME (communication or communicate)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 15:58 |
| S50 | 0 | S38 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 16:00 |
| S51 | 0 | S39 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | OR | OFF | 2016/05/15 16:00 |
| S52 | 0 | S40 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; | OR | OFF | 2016/05/15 16:00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | DERWENT; IBM_TDB | | | |

**EAST Search History (Interference)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| L4 | 215420 | H04W 64/00 | US-PGPUB; USPAT | OR | OFF | 2018/03/23 07:42 |
| L5 | 215408 | H04W 84/02 | US-PGPUB; USPAT | OR | OFF | 2018/03/23 07:42 |
| L6 | 53794 | H04J 3/26 | US-PGPUB; USPAT | OR | OFF | 2018/03/23 07:42 |
| L10 | 26408 | l4 AND @AD < "20101230" | USPAT | OR | OFF | 2018/03/23 07:44 |
| L11 | 26407 | l5 AND @AD < "20101230" | USPAT | OR | OFF | 2018/03/23 07:45 |
| L12 | 20495 | l6 AND @AD < "20101230" | USPAT | OR | OFF | 2018/03/23 07:45 |
| L16 | 0 | l10 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | USPAT | OR | OFF | 2018/03/23 07:47 |
| L17 | 0 | l11 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | USPAT | OR | OFF | 2018/03/23 07:47 |
| L18 | 0 | l12 AND ("sensor data" SAME (communication or communicate) SAME controller SAME characteristic SAMe position) | USPAT | OR | OFF | 2018/03/23 07:48 |
| L23 | 0 | l10 AND ("mobile ad hoc network" WITH information WITH device) SAME (sensor WITH proximate WITH detect WITH keyword) SAME (controller WITH "ad hoc") | USPAT | OR | OFF | 2018/03/23 07:55 |
| L24 | 0 | l11 AND ("mobile ad hoc network" WITH information WITH device) SAME (sensor WITH proximate WITH detect WITH keyword) SAME (controller WITH "ad hoc") | USPAT | OR | OFF | 2018/03/23 07:55 |
| L25 | 0 | l12 AND ("mobile ad hoc network" WITH information WITH device) SAME (sensor WITH proximate WITH detect WITH keyword) SAME (controller WITH "ad hoc") | USPAT | OR | OFF | 2018/03/23 07:55 |
| L30 | 0 | l10 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | USPAT | OR | OFF | 2018/03/23 07:58 |
| L31 | 0 | l11 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | USPAT | OR | OFF | 2018/03/23 07:58 |
| L32 | 0 | l12 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | USPAT | OR | OFF | 2018/03/23 07:59 |

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| L37 | 0 | l10 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT | OR | OFF | 2018/03/23 08:02 |
| L38 | 0 | l11 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT | OR | OFF | 2018/03/23 08:02 |
| L39 | 0 | l12 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT | OR | OFF | 2018/03/23 08:02 |
| L43 | 0 | l10 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT | OR | OFF | 2018/03/23 08:03 |
| L44 | 0 | l11 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT | OR | OFF | 2018/03/23 08:04 |
| L45 | 0 | l12 AND (subset WITH device WITH characteristic WITH environment WITH aggregate WITH microphone WITH "non-acoustic sensor") | US-PGPUB; USPAT | OR | OFF | 2018/03/23 08:04 |
| L50 | 0 | l10 AND (aggregate WITH audio WITH information WITH keyword WITH "non-speech acoustic" WITH event WITH sensor WITH proximate) | USPAT | OR | OFF | 2018/03/23 08:08 |
| L51 | 0 | l11 AND (aggregate WITH audio WITH information WITH keyword WITH "non-speech acoustic" WITH event WITH sensor WITH proximate) | USPAT | OR | OFF | 2018/03/23 08:08 |
| L52 | 0 | l12 AND (aggregate WITH audio WITH information WITH keyword WITH "non-speech acoustic" WITH event WITH sensor WITH proximate) | USPAT | OR | OFF | 2018/03/23 08:08 |

**3/23/2018 8:10:17 AM**
**C:\Users\mwyche\Documents\EAST\Workspaces\13_976636_3_23_18.wsp**

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

| CPC | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Symbol** | | | | | | **Type** | **Version** |
| H04W | | 64 | / | 00 | | F | 2013-01-01 |
| G06F | | 11 | / | 3013 | | A | 2013-01-01 |
| G06F | | 11 | / | 3058 | | A | 2013-01-01 |
| H04M | | 1 | / | 72522 | | A | 2013-01-01 |
| H04M | | 2250 | / | 12 | | A | 2013-01-01 |
| G16H | | 40 | / | 63 | | I | 2018-01-01 |
| G16H | | 50 | / | 80 | | I | 2018-01-01 |
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| CPC Combination Sets | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Symbol** | | | | | **Type** | **Set** | **Ranking** | **Version** |
| | | | / | | | | | |
| | | | / | | | | | |

| NONE | | **Total Claims Allowed:** | |
|---|---|---|---|
| (Assistant Examiner) | (Date) | 39 | |
| /MYRON K WYCHE/ 3/23/18<br>Primary Examiner.Art Unit 2644 | | O.G. Print Claim(s) | O.G. Print Figure |
| (Primary Examiner) | (Date) | 1 | 1 |

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

| US ORIGINAL CLASSIFICATION | | INTERNATIONAL CLASSIFICATION | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLASS | SUBCLASS | CLAIMED | | | | | NON-CLAIMED | | | | | |
| | | H | 0 | 4 | W | 64 / 00 (2009.01.01) | | | | | | |
| CROSS REFERENCE(S) | | | | | | | | | | | | |
| CLASS | SUBCLASS (ONE SUBCLASS PER BLOCK) | | | | | | | | | | | |
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|---|---|---|---|
| NONE | | **Total Claims Allowed:** | |
| (Assistant Examiner) | (Date) | 39 | |
| /MYRON K WYCHE/ Primary Examiner.Art Unit 2644 | 3/23/18 | O.G. Print Claim(s) | O.G. Print Figure |
| (Primary Examiner) | (Date) | 1 | 1 |

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 17 | 17 | 33 | 33 | | | | | | | | | | |
| 2 | 2 | 18 | 18 | 34 | 34 | | | | | | | | | | |
| 3 | 3 | 19 | 19 | 35 | 35 | | | | | | | | | | |
| 4 | 4 | 20 | 20 | 36 | 36 | | | | | | | | | | |
| 5 | 5 | 21 | 21 | 37 | 37 | | | | | | | | | | |
| 6 | 6 | 22 | 22 | 38 | 38 | | | | | | | | | | |
| 7 | 7 | 23 | 23 | 39 | 39 | | | | | | | | | | |
| 8 | 8 | 24 | 24 | | | | | | | | | | | | |
| 9 | 9 | 25 | 25 | | | | | | | | | | | | |
| 10 | 10 | 26 | 26 | | | | | | | | | | | | |
| 11 | 11 | 27 | 27 | | | | | | | | | | | | |
| 12 | 12 | 28 | 28 | | | | | | | | | | | | |
| 13 | 13 | 29 | 29 | | | | | | | | | | | | |
| 14 | 14 | 30 | 30 | | | | | | | | | | | | |
| 15 | 15 | 31 | 31 | | | | | | | | | | | | |
| 16 | 16 | 30 | 32 | | | | | | | | | | | | |

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| NONE<br><br>(Assistant Examiner) (Date) | **Total Claims Allowed:**<br>39 | |
| /MYRON K WYCHE/ 3/23/18<br>Primary Examiner.Art Unit 2644<br><br>(Primary Examiner) (Date) | O.G. Print Claim(s)<br>1 | O.G. Print Figure<br>1 |

U.S. Patent and Trademark Office Part of Paper No. 20180323

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | Examiner | Art Unit |
| | MYRON K WYCHE | 2644 |

| CPC- SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| H04W 64/00 | 1/12/15 | MW |
| H04W 64/00 | 5/31/15 | MW |
| H04W 84/02 | 5/31/15 | MW |
| H04J 3/26 | 5/31/15 | MW |
| Updated search H04W 64/00 | 11/1/15 | MW |
| Updated search H04W 84/02 | 11/1/15 | MW |
| Updated search H04J 3/26 | 11/1/15 | MW |
| Update search for H04W 64/00 | 5/15/16 | MW |
| Update search for H04W 84/02 | 5/15/16 | MW |
| Update search for H04J 3/26 | 5/15/16 | MW |
| Updated search for H04W 64/00 | 3/23/18 | MW |
| Updated search for H04W 84/02 | 3/23/18 | MW |
| Updated search for H04J 3/26 | 3/23/18 | MW |

| CPC COMBINATION SETS - SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Inventor NAME Search | 1/12/15 | MW |
| WORD Search | 1/12/15 | MW |
| Updated WORD Search | 5/31/15 | MW |

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| SEARCH NOTES | | |
|---|---|---|
| **Search Notes** | **Date** | **Examiner** |
| Updated WORD Search | 11/1/15 | MW |
| Updated WORD search | 5/15/16 | MW |
| Updated WORD Search | 3/23/18 | MW |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| **US Class/ CPC Symbol** | **US Subclass / CPC Group** | **Date** | **Examiner** |
| H04W 64/00 | | 11/1/15 | MW |
| H04W 84/02 | | 11/1/15 | MW |
| H04J 3/26 | | 11/1/15 | MW |
| Update H04W 64/00 | | 3/23/18 | MW |
| Update H04W 84/02 | | 3/23/18 | MW |
| Update H04J 3/26 | | 3/23/18 | MW |

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

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|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 01/12/2015 | 05/31/2015 | 11/02/2015 | 05/15/2016 | 03/23/2018 | | | | |
| 1 | 1 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 2 | 2 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 3 | 3 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 4 | 4 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 5 | 5 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 6 | 6 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 7 | 7 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 8 | 8 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 9 | 9 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 10 | 10 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 11 | 11 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 12 | 12 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 13 | 13 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 14 | 14 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 15 | 15 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 16 | 16 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 17 | 17 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 18 | 18 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 19 | 19 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 20 | 20 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 21 | 21 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 22 | 22 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 23 | 23 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 24 | 24 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 25 | 25 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 26 | 26 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 27 | 27 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 28 | 28 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 29 | 29 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 30 | 30 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 31 | 31 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 32 | 32 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 33 | 33 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 34 | 34 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 35 | 35 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 36 | 36 | ✓ | ✓ | ✓ | ✓ | = | | | | |

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 13976636 | GOLDSTEIN, STEVEN W. |
| | **Examiner** | **Art Unit** |
| | MYRON K WYCHE | 2644 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 01/12/2015 | 05/31/2015 | 11/02/2015 | 05/15/2016 | 03/23/2018 | | | | |
| 37 | 37 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 38 | 38 | ✓ | ✓ | ✓ | ✓ | = | | | | |
| 39 | 39 | ✓ | ✓ | ✓ | ✓ | = | | | | |

Doc Code: MFEE.C.AD PTO/SB/47-EFS

Document Description: Maintenance Fee Address Change

# FEE ADDRESS INDICATION FORM

| | | | |
|---|---|---|---|
| Application Number | 13976636 | Art Unit | 2644 |
| Filing Date | 01-Oct-2013 | Examiner Name | MYRON WYCHE |
| First Name Inventor | Steven Goldstein | Attorney Doc. Number | 11472-15_AMBZ-101US |

**INSTRUCTIONS:** In order for the fee address identified on this form to be effective, the issue fee must have been paid for the application listed on this form. Only an address represented by a customer number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application. For more information on customer numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

**Please recognize as the Fee Address under the provisions of 37 CFR 1.363 the address associated with:**

| | |
|---|---|
| Customer Number: | 154598 |

## Signature :

*I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application.*

| | | | |
|---|---|---|---|
| **Signature** | /Peter A. Chiabotti/ | **Date** | 07-05-2018 |
| **Name** | Peter Allen Chiabotti | **Registration Number** | 54603 |

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 13976636 |
| **Filing Date:** | 01-Oct-2013 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Filer:** | Peter Allen Chiabotti/Angela Martin |
| **Attorney Docket Number:** | 11472-15_AMBZ-101US |

Filed as Small Entity

**Filing Fees for U.S. National Stage under 35 USC 371**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| UTILITY APPL ISSUE FEE | 2501 | 1 | 500 | 500 |
| PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL | 1504 | 1 | 0 | 0 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| Post-Allowance-and-Post-Issuance: | | | | |
| Extension-of-Time: | | | | |
| Miscellaneous: | | | | |
| | | Total in USD ($) | | 500 |

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 33090437 |
| **Application Number:** | 13976636 |
| **International Application Number:** | |
| **Confirmation Number:** | 3839 |
| **Title of Invention:** | INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| **First Named Inventor/Applicant Name:** | Steven W. Goldstein |
| **Customer Number:** | 150139 |
| **Filer:** | Peter Allen Chiabotti/Angela Martin |
| **Filer Authorized By:** | Peter Allen Chiabotti |
| **Attorney Docket Number:** | 11472-15_AMBZ-101US |
| **Receipt Date:** | 05-JUL-2018 |
| **Filing Date:** | 01-OCT-2013 |
| **Time Stamp:** | 10:41:32 |
| **Application Type:** | U.S. National Stage under 35 USC 371 |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | DA |
| Payment was successfully received in RAM | $500 |
| RAM confirmation Number | 070518INTEFSW00011195500951 |
| Deposit Account | 500951 |
| Authorized User | Angela Martin |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:<br>37 CFR 1.17 (Patent application and reexamination processing fees)<br>37 CFR 1.19 (Document supply fees) | |

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

37 CFR 1.492 (National application filing, search, and examination fees)

37 CFR 1.492(a) (Basic national fee only)

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Issue Fee Payment (PTO-85B) | Web85b.pdf | 46460<br>c1435b065335e19d9a053e98bc5cb7c80e4a96b4 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Maintenance Fee Address Change | web85feeaddress.pdf | 32564<br>a4ef7d0d867e6c8edcc84103aeded1a10cf2cc93 | no | 1 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Fee Worksheet (SB06) | fee-info.pdf | 32261<br>6cb33f57184140375f1d1fe909d37a6710e526cd | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 111285 | | |

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**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

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Document Description: Issue Fee Payment (PTO-85B)

# Issue Fee Transmittal Form

| Application Number | Filing Date | First Named Inventor | Atty. Docket No. | Confirmation No. |
|---|---|---|---|---|
| 13976636 | 01-Oct-2013 | Steven Goldstein | 11472-15_AMBZ-101US | 3839 |

**TITLE OF INVENTION :**

INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

| Entity Status | Application Type | Art Unit | Class - Subclass | EXAMINER |
|---|---|---|---|---|
| Small | U.S. National Stage under 35 USC 371 | 2644 | 456100 | MYRON WYCHE |

| Issue Fee Due | Publication Due | Total Fee(s) Due | Date Due | Prev. Paid Fee |
|---|---|---|---|---|
| $500 | $0 | $500 | 05-Jul-2018 | $0 |

## 1.Change of Correspondence Address and/or Indication Of Fee Address (37 CFR 1.33 & 1.363)

| Current Correspondence Address: | Current Indicated Fee Address : |
|---|---|
| 150139<br>Akerman LLP<br><br>777 South Flagler Drive<br>Suite 1100 West Tower<br>West Palm Beach FL 33401<br>UNITED STATES<br>5616535000<br>ip@akerman.com | |
| ☐ Change of correspondence address requested, system generated AIA/122-EFS form attached | ☒ Fee Address indication requested, system generated SB/47-EFS form attached |

## 2.Entity Status

**Change in Entity Status**

○ Applicant certifying micro entity status; system generated Micro Entity certification form attached. See 37 CFR 1.29.
Note: Absent a valid certification of micro entity status, issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. If this box is checked, you will be prompted to choose a micro entity status on the gross income basis (37 CFR 1.29(a)) or the institution of higher education basis (37 CFR 1.29(d)), and make the applicable certification online.

◉ Applicant asserting small entity status. See 37 CFR 1.27.
Note: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

○ Applicant changing to regular undiscounted fee status.
Note: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

Doc Code: IFEE PTOL/85B-EFS

Document Description: Issue Fee Payment (PTO-85B)

**3.The Following Fee(s) Are Submitted:**

| | |
|---|---|
| ☒ Issue Fee | ☐ I authorize USPTO to apply my previously paid issue fee to the current fees due |
| ☐ Publication Fee | ☐ The Director is hereby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number _____ |
| ☐ Advance Order - # of copies _____ | ☒ If i**n addition to** the payment of the issue fee amount submitted with this form, there are any discrepancies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number 500951 . The **issue fee must be submitted** with this form. **If payment of the issue fee does not accompany this form, checking this box and providing a deposit account number will NOT be effective to satisfy full payment of the fee(s) due.** |

**4.Firm and/or Attorney Names To Be Printed**

**NOTE: If no name is listed, no name will be printed**
For printing on the patent front page, list to be displayed as entered

1. Akerman LLP
2. Peter A. Chiabotti
3. Mammen (Roy) P. Zachariah, Jr.

**5.Assignee Name(s) and Residence Data To Be Printed**

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

| Name | City | State | Country | Category |
|---|---|---|---|---|
| Staton Techiya, LLC | Delray Beach | FLORIDA | united states | other |

**6.Signature**

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via EFS-WEB on the date indicated below.

| | | | |
|---|---|---|---|
| **Signature** | /Peter A. Chiabotti/ | **Date** | 07-05-2018 |
| **Name** | Peter Allen Chiabotti | **Registration Number** | 54603 |

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/976,636 | 08/07/2018 | 10045321 | 11472-15_AMBZ-101US | 3839 |

150139 7590 07/18/2018

Akerman LLP
777 South Flagler Drive
Suite 1100 West Tower
West Palm Beach, FL 33401

# ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Steven W. Goldstein, Delray Beach, FL;

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Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
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NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

| | |
|---|---|
| Application Number | 13/976,636 |
| Filing Date | 10/01/2013 |
| First Named Inventor | Steven W. Goldstein |
| Title | FORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES |
| Art Unit | 2644 |
| Examiner Name | MYRON WYCHE |
| Attorney Docket Number | 11472-15_AMBZ-101US |

**SIGNATURE of Applicant or Patent Practitioner**

| | | | |
|---|---|---|---|
| Signature | /Peter A. Chiabotti/ | Date (Optional) | 08/21/2024 |
| Name | Peter A. Chiabotti | Registration Number | 54603 |
| Title (if Applicant is a juristic entity) | Attorney of Record | | |
| Applicant Name (if Applicant is a juristic entity) | ST FamTech, LLC | | |

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

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P.O. Box 1450
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# ELECTRONIC ACKNOWLEDGEMENT RECEIPT

| APPLICATION # | RECEIPT DATE / TIME | ATTORNEY DOCKET # |
|---|---|---|
| **13/976,636** | **08/21/2024 01:53:09 PM Z ET** | **11472-15_AMBZ-101US** |

## Title of Invention

INFORMATION PROCESSING USING A POPULATION OF DATA ACQUISITION DEVICES

## Application Information

| | | | |
|---|---|---|---|
| APPLICATION TYPE | Utility - U.S. National Stage under 35 USC 371 | PATENT # | 10045321 |
| CONFIRMATION # | 3839 | FILED BY | EDWARD MERCIER |
| PATENT CENTER # | 66871242 | FILING DATE | 10/01/2013 |
| CUSTOMER # | 150139 | FIRST NAMED INVENTOR | Steven W. Goldstein |
| INTL. APPLICATION # | - | INTL. FILING DATE | - |
| CORRESPONDENCE ADDRESS | - | AUTHORIZED BY | Peter Chiabotti |

## Documents

**TOTAL DOCUMENTS: 2**

| DOCUMENT | PAGES | DESCRIPTION | SIZE (KB) |
|---|---|---|---|
| 13976636_POA_TML_3839.pdf | 1 | Transmittal Letter | 285 KB |
| ST_FamTech_LLC_POA.pdf | 2 | Power of Attorney | 638 KB |

Warning: The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.

## Digest

| DOCUMENT | MESSAGE DIGEST(SHA-512) |
|---|---|
| 13976636_POA_TML_3839.pdf | 03327C0BC8C03BB2CE800665C276E43940DAFD089F77BEA8 |

F7705780598C7B07546CEC02FCBCDCE53B93249B9483B0FC
6E34F0929CC8AA07ADDE0F695E9C784D

ST_FamTech_LLC_POA.pdf

A6B1850523FA4EC9B059E238D4FDD5983F14DA1E59C3045D3
5C03C9484ABEDB200935F07BDE425C57D031A17A672FA87D
49358A4828A22090619E76470C93384

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**New International Application Filed with the USPTO as a Receiving Office**

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# POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

[X] Practitioners associated with Customer Number: 150139

**OR**

[ ] Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

| Name | Registration Number | Name | Registration Number |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

[X] The address associated with Customer Number: 150139

**OR**

[ ]

| | | |
|---|---|---|
| Firm or individual name | | |
| Address | | |
| City | State | Zip |
| Country | | |
| Telephone | Email | |

Assignee name and address: ST FamTech, LLC
9501 Jagged Creek Ct, Delray Beach, Florida 33446

**A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.**

**SIGNATURE of Assignee of Record**

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

| | |
|---|---|
| Signature DocuSigned by: Dr. John Patrick Keady 2284C80151564FA... | Date 7/26/2024 |
| Name John Patrick Keady | Telephone |
| Title Chief Technical Officer and Assistant General Counsel Intellectual Property | |

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