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# UTILITY PATENT APPLICATION TRANSMITTAL

*(Only for new nonprovisional applications under 37 CFR 1.53(b))*

| | |
|---|---|
| *Attorney Docket No.* | 090611-0361350 |
| *First Inventor* | ROBERT A. KENNEWICK |
| *Title* | See 1 in Addendum |
| *Express Mail Label No.* | |

## APPLICATION ELEMENTS

*See MPEP chapter 600 concerning utility patent application contents.*

1. ☐ **Fee Transmittal Form** (e.g., PTO/SB/17)
   *(Submit an original and a duplicate for fee processing)*
2. ☒ **Applicant claims small entity status.**
   See 37 CFR 1.27.
3. ☒ **Specification** [*Total Pages* 56 ]
   Both the claims and abstract must start on a new page
   *(For information on the preferred arrangement, see MPEP 608.01(a))*
4. ☒ **Drawing(s)** (*35 U.S.C. 113*) [*Total Sheets* 7 ]
5. **Oath or Declaration** [*Total Sheets* 3 ]
   a. ☐ Newly executed (original or copy)
   b. ☒ A copy from a prior application (37 CFR 1.63(d))
   *(for continuation/divisional with Box 18 completed)*
   i. ☐ DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☒ **Application Data Sheet.** See 37 CFR 1.76
7. ☐ **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)*
   ☐ Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission**
   *(if applicable, items a. – c. are required)*
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper
   c. ☐ Statements verifying identity of above copies

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

## ACCOMPANYING APPLICATION PARTS

9. ☐ **Assignment Papers** (cover sheet & document(s))
   Name of Assignee_____
10. ☐ **37 CFR 3.73(b) Statement** *(when there is an assignee)* ☐ **Power of Attorney**
11. ☐ **English Translation Document** *(if applicable)*
12. ☐ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    ☐ Copies of foreign patent documents, publications, & other information
13. ☐ **Preliminary Amendment**
14. ☐ **Return Receipt Postcard** (MPEP 503)
    *(Should be specifically itemized)*
15. ☐ **Certified Copy of Priority Document(s)**
    *(if foreign priority is claimed)*
16. ☐ **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
17. ☐ Other:_____

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

☐ Continuation ☒ Divisional ☐ Continuation-in-part (CIP) of prior application No.: 10/452,147

*Prior application information:* *Examiner* Martin Lerner *Art Unit:* 2626

## 19. CORRESPONDENCE ADDRESS

☒ The address associated with Customer Number: 00909 **OR** ☐ Correspondence address below

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| Country | | Telephone | | Email | |

| | | | |
|---|---|---|---|
| Signature | | Date | May 11, 2007 |
| Name (Print/Type) | Syed Jafar Ali | Registration No. (Attorney/Agent) | 58,780 |

This collection of information is required by 37 CFR 1.53(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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# Addendum

1. SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

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

In re application of: Robert A. KENNEWICK *et al.*

Application No.: TBD

Filed: May 11, 2007

For: SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

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

**APPLICATION DATA SHEET**
**37 C.F.R. § 1.76**

**BIBLIOGRAPHIC DATA**

**1. Applicant information**

First applicant: ROBERT A. KENNEWICK
Citizenship: United States of America
Residence: 2204 S. Eddy, Seattle, WA 98101

Second applicant: DAVID LOCKE
Citizenship: United States of America
Residence: 11315 196th Avenue, N.E., Redmond, WA 98053

Third applicant: MICHAEL R. KENNEWICK, SR.
Citizenship: United States of America
Residence: 13407 N.E. 37th Place, Bellevue, WA 98075

Fourth applicant: MICHAEL R. KENNEWICK, JR.
Citizenship: United States of America
Residence: 13407 N.E. 37th Place, Bellevue, WA 98075

Fifth applicant: RICHARD KENNEWICK
Citizenship: United States of America
Residence: 14222 227 Avenue, N.E., Woodinville, WA 98072

Sixth applicant: TOM FREEMAN
Citizenship: United States of America
Residence: 6735 83rd Avenue, S.E., Mercer Island, WA 98040

**2. Correspondence information**

Correspondence for this application should be addressed as follows:

Customer No.: 00909

**3. Application information**

Title of Invention: SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

Docket number assigned to this application: 090611-0361350

Total number of drawing sheets: 7
Type of application: Utility
Application is to be published.

Secrecy order under § 5.2:

This application does not disclose subject matter of an application which is under a secrecy order pursuant to § 5.2.

**4. Representative information**

The following have a power of attorney or authorization of agent in this application:

Customer No.: 00909

**5. Domestic Priority information**

Domestic priority for this application is claimed as follows:

35 U.S.C. § 119(e):
Application No.: 60/384,388
Filed: June 3, 2002
Status: Expired
Relationship: Provisional

35 U.S.C. § 121:
Application No.: 10/452,147
Filed: June 3, 2003
Status: Pending
Relationship: Parent

Date: May 11, 2007

Customer No. 00909



Syed Jafar Ali
Registration No. 58,780
PILLSBURY WINTHROP SHAW PITTMAN LLP
P.O. Box 10500
McLean, VA 22102

# SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

This application claims priority from U.S. Provisional Patent Application Serial No. 60/384,388, filed June 3, 2002, the disclosure of which is hereby incorporated by reference by its entirety.

## BACKGROUND OF THE INVENTION

Field of the Invention

[01] The present invention relates to the retrieval of online information or processing of commands through a speech interface. More specifically, the invention is a fully integrated environment allowing users to submit natural language speech questions and commands. Information that is sought may be obtained from a wide range of disciplines, making local and network queries to obtain the information, and presenting results in a natural manner even in cases where the question asked or the responses received are incomplete, ambiguous or subjective. The invention may further allow users to control devices and systems either locally or remotely using natural language speech commands.

Background of the Related Art

[02] A machine's ability to communicate with humans in a natural manner remains a difficult problem. Cognitive research on human interaction shows that a person asking a question or giving a command typically relies heavily on context and the domain knowledge of the person answering. On the other hand, machine-based queries (a query may be a question, a command, a request and/or other types of communications)may be highly structured and are not inherently natural to the human user. Thus, human questions

and machine processing of queries may be fundamentally incompatible. Yet the ability to allow a person to make natural language speech-based queries remains a desirable goal.

[03] Much work covering multiple methods has been done in the fields of natural language processing and speech recognition. Speech recognition has steadily improved in accuracy and today is successfully used in a wide range of applications. Natural language processing has previously been applied to the parsing of speech queries. Yet, current systems are generally unable to provide a complete environment for users to make natural language speech queries and receive natural sounding responses. There remains a number of significant barriers to creation of a complete natural language speech-based query and response environment.

## SUMMARY OF THE INVENTION

[04] According to an aspect of the invention, one object of the invention is to overcome these and other drawbacks of prior systems.

[05] According to one aspect of the invention, in order for machines (e.g., computer devices) to properly respond to a question and/or a command that is in a natural language form, machine processable queries and commands may be formulated after the natural language question and/or command has been parsed and interpreted.

[06] In another aspect of the invention, systems are provided which may overcome the deficiencies of prior systems through the application of a complete speech-based information query, retrieval, presentation and command environment. This environment makes maximum use of context, prior information, domain knowledge, and user specific profile data to achieve a natural environment for one or more users making queries or commands in multiple domains. Through this integrated approach, a complete speech-



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based natural language query and response environment may be created. Further, at each step in the process, accommodation may be made for full or partial failure and graceful recovery. The robustness to partial failure is achieved through the use of probabilistic and fuzzy reasoning at several stages of the process. This robustness to partial failure promotes the feeling of a natural response to questions and commands.

[07] According to another aspect of the invention, the system comprises a speech unit interface device that receives spoken natural language queries, commands and/or other utterances from a user, and a computer device or system that receives input from the speech unit and processes the input (e.g., retrieves information responsive to the query, takes action consistent with the command and performs other functions as detailed herein). The system may further generate a natural language speech response in response to the user and/or generate a natural language speech message without any prompting from a user such as an alert message.

[08] According to another aspect of the invention, the speech unit may be incorporated into the computer device or system, or may be a separate structure. If a separate structure, the speech unit may be connected to the computer device via a wired or wireless connection. If a wireless connection, a base unit may be connected to the computer, internally or externally, to communicate with the speech unit.

[09] According to another aspect of the invention, the computer device or system may comprise a stand alone or networked PC, a PDA or other portable computer device, or other computer device or system. For convenience, these and other computer alternatives shall be simple referred to as a computer. One aspect of the invention comprises software that is installed onto the computer, where the software comprises one or more of the



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following modules: a speech recognition module for capturing the user input; a parser for parsing the input, a text to speech engine module for converting text to speech; a network interface for enabling the computer to interface with one or more networks; a graphical user interface module and an event manager for managing events. Preferably the event manager is in communication with a dictionary and phrases module, a user profile module that enables user profiles to be created, modified and accessed, a personality module that enables various personalities to be created and used, an agent module, an update manager and one or more databases.

[10] According to another aspect of the invention domain specific behavior and information is organized into agents. Agents are autonomous executables that receive, process and respond to user questions, queries and commands. The agents provide a complete, convenient and re-distributable packages or modules of functionality, typically for a specific domain of application. Agents can be complete packages of executable code, scripts, links to information, and other forms of communication data, required to provide a specific package of functionality, usually in a specific domain. In other words, an agent includes everything that is needed to extend the functionality of the invention to a new domain. Further, agents and their associated data can be updated remotely over a network as new behavior is added or new information becomes available. Agents can use system resources and the services of other, typically more specialized, agents. Agents can be distributed and redistributed in a number of ways including on removable storage media, transfer over networks or attached to emails and other messages. An update manger is used to add new agents to the system or update existing agents.



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[11] According to another aspect of the invention, license management capabilities allowing the sale of agents by third parties to one or more users on a one time or subscription basis may be provided. In addition, users with particular expertise may create agents, update existing agents by adding new behaviors and information, and making these agents for other users.

[12] In order to enhance the natural query and response environment, the system may format results in a manner enhancing the understandability to the user. The optimal formatting and presentation depends on the context of the questions, the contents of the response being presented, the history of the interaction with the user, the user's preferences and interests and the nature of the domain. Information presented in a rigid, highly formatted, or structured manner seems unnatural to most people. Thus a system simulates some aspects of human "personality". In some cases, the presentation of the response and the terms used are randomized so they do not appear rigidly formatted or mechanical. The use of other simulated personality characteristics is also desirable. For example, a response that may be upsetting to the user is best presented in a sympathetic manner. Finally, the results of many queries are long text strings, lists, tables or other lengthy sets of data. Natural presentation of this type of information presents particular challenges. Simply reading the long response is generally not preferred. Therefore the system parses the most important sections from the response and, at least initially, only reports these. Determining what parts of a long response are presented depends on the context of the questions, the contents of the response being presented, the history of the interaction with the user, the user's preferences and interests and the nature of the domain. At the same time the system gives the user interactive control over what



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information and how much information is being presented, to stop the response all together, or to take other actions.

[13] According to another aspect of the invention, the system may process and respond to both questions or queries and commands. Keywords or context are used to determine if the user's utterance is a command or query. Some utterances can include both aspects of a command and a query or question. For example, a user may say, "record my favorite TV program". A query is required to determine the name, the channel, and time for the users favorite TV program. A command must be executed to set a video recorder to capture this program.

[14] For each user utterance including a question or query or set of questions or queries, the system may perform multiple steps possibly including:

- capture of the user's question or query through accurate speech recognition operating in a variety of real-world environments;
- parse and interpret the question or query;
- determine the domain of expertise required and context, invoking the proper resources, including agents;
- formulate one or more queries to one or more local and/or network data sources or sending appropriate commands to local or remote devices or the system itself;
- perform required formatting, variable substitutions and transformations to modify the queries to a form most likely to yield desired results from the available sources;



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- execute the multiple queries or commands in an asynchronous manner and dealing gracefully with failures;
- extract or scrape the desired information from the one or more results, which may be returned in any one of a number of different formats;
- evaluate and interpret the results, including processing of errors, gathered and combine them into a single best result judged to be "best" even if the results are ambiguous, incomplete, or conflicting;
- perform required formatting, variable substitutions and transformations to modify the results to a form most easily understood by the user; and
- present the compound result, through a text to speech engine, to the user in a useful and expected manner.

[15] The above steps preferably are performed while accounting for the domain of expertise required, the context for the question or command, domain specific information, the history of the user's interaction, user preferences, information sources or commands available, and responses obtained from the sources. At each stage probabilistic or fuzzy set decision and matching methods can be applied to deal with inconsistent, ambiguous, conflicting and incomplete information or responses. In addition, the use of asynchronous queries that may result in rapid and graceful failure of some queries or commands may allow the system to robustly return results quickly and in a manner that seems natural to the user.

[16] Many everyday questions are inherently subjective and result in answers that are a matter of option or consensus as much as fact. Such questions are often ad hoc in their nature, as well. The system, according to another aspect of the invention, may use



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probabilistic and fuzzy set decision and matching methods to first identify the subjective nature of the question and to evaluate a range of possible answers, selecting the one answer or few answers that best represent the type of result desired by the user.

The context and expected results from a particular question may be highly dependent on the individual asking the question. Therefore, the system may create, store and use extensive personal profile information for each user. Information in the profile may be added and updated automatically as the user uses the system or may be manually added or updated by the user or by others. Domain specific agents may collect, store and use specific profile information, as may be required for optimal operations. Users can create commands for regularly used reports, automatically generated alerts, and other queries and for the formatting and presentation of results. The system may use profile data in interpreting questions, formulating queries, interpreting results of queries and presenting answers to the user. Examples of information in a user profile includes, history of questions asked, session histories, formatting and presentation preferences, special word spelling, terms of interest, special data sources of interest, age, sex, education, location or address, place of business, type of business, investments, hobbies, sports interests, news interests and other profile data.

[17] To create a natural question and response environment, the system according to one aspect of the invention, may attempt to provide rapid responses without requiring any additional information. The system may determine the mostly likely context or domain for a user's question or command, for example, by using a real-time scoring system or other technique. Based on this determination, the system may invoke the correct agent. The agent makes one or more queries and rapidly returns a formatted response. Thus, a



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user can receive a direct response to a set of questions, each with a different response or context. In some cases, the available information, including the query results, may not adequately answer the question. In such a situation, the user may be asked one or more questions to resolve the ambiguity. Additional queries may then be made before an adequate response is made. In these cases, the system may use context information, user profile information and domain specific information to minimize the interaction with the user required to deliver a response.

[18] If the confidence level of the domain or context score is not high enough to ensure a reliable response, the system can request that the user verify the question or command is correctly understood. In general, the question may be phrased to indicate the context of the question including all criteria or parameters. If the user confirms that the question is correct the system may proceed to produce a response. Otherwise, either the user can rephrase the original question, perhaps adding additional information to remove ambiguity, or the system may ask one or more questions to attempt to resolve the ambiguity or other actions may taken.

[19] Although the system, according to another aspect of the invention, is intended to be able to accept most any natural language question or command, ambiguity can still be a problem. To assist users formulate concise questions and commands the system may support a voice query language. The language may help users clearly specify the keywords or contexts of the question or command along with the parameters or criteria. The system may provide built in training capabilities to help the user learn the best methods to formulate their questions and commands.



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[20] In order to make the responses to user's questions and commands seem more natural, the system may employ one or more dynamically invokeable personalities. Personalities have specific characteristics, which simulate the behavioral characteristics of real humans. Examples of these characteristics include, sympathy, irritation, and helpfulness. The personality also randomizes aspects of responses, just as a real human would do. This behavior includes randomization of terms used and the order of presentation of information. Characteristics of the personality are invoked using probabilistic or fuzzy set decision and matching methods, and using criteria including the context for the question, the history of the user's interaction, user preferences, information sources available, responses obtained from the sources.

[21] According to another aspect of the invention, special procedures to present information that is in the form of long text strings, tables, lists or other long response sets may be employed. Simply presenting a long set of information in an ordered manner is not natural nor what most users have in mind. The system, using for example, probabilistic or fuzzy set matching methods, may extract the most relevant information to the user and presents these subsets first. Further the system may provide commands allowing the user to skip through the list, find keywords or key information in the list or stop processing the list altogether.

[22] In addition to the ability to process user questions and commands, the invention may provide local or remote control functions for the system or for other devices. Users may initiate commands locally or remotely. Several techniques for executing remote operations are possible, for example, the use of a telephone or other audio connection. Other remote command techniques may be used. The processing of these commands is



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performed in a nearly identical manner to a question. One difference being that the result of the command is generally an action rather than a response. Examples of control operations supported by the invention include, finding and playing music, film, games or other entertainment media, control of the appliances or other electronic or electro-mechanical devices, security systems control, audio, text and video conferencing (including Voice over IP conferencing), operating integrated messaging environments and other control operations. By using an optional analog or digital telephone interface or a data network interface, the invention can provide remote control capability of the computer or and auxiliary devices connected to the computer. For example, if the computer is connected via an interface to one or more auxiliary devices, a remote user can use this capability to remotely control or program the operation of the auxiliary device. For example, this enables recording of a television program, checking the status of a home security system, checking voice mail messages, hearing and responding to email messages, and much more. For each user command utterance the system may execute a number of steps possibly including:

- capture the user's command through accurate speech recognition operating in a variety of real-world environments;
- parse and interpret the command;
- determine the domain for the command and context, invoking the proper resources, including agents;
- formulate device specific commands for the system or external devices;
- route command to system, or external devices, including external devices connected to data networks;



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- receive and process results of command, including errors; and
- optionally, provide response to user indicating the success or failure of the command, and possibly including state information.

[23] The system may be used in conjunction with a wide range of platform environments. These environments include, as a peripheral to a PC, a portable or wearable computer or other computer, embedded in a PC or other computer, on a personal digital assistant (e.g., a PDA with wireless networking capability, in a specialized device such as a bar code scanner or payment terminal, on a wireless telephone, or other platforms. If the invention is used with a mobile or portable device that has position location capability, the location data can be used by the invention as part of the context for user questions. A user may use the system on one or more devices. In this case history and profile information for the user may be synchronized between the multiple devices on a periodic basis or other basis.

[24] According to another aspect of the invention, the system may be deployed in a network of devices using common base of agents, data, information, user profiles and histories. Each user can then interact with, and receive the same services and applications at any location equipped with the required device on the network. For example, multiple devices on which the invention is deployed, and connected to a network, can be placed at different locations throughout a home, place of business or other location. In such a case, the system may use the location of the particular device addressed by the user as part of the context for the questions asked.

[25] Multiple users may use the system at different times or during interleaved or overlapping sessions. The system recognizes the user either by name or voice. Once the



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user is recognized, the system invokes the correct profile. If multiple users are addressing the system in overlapping or interleaved sessions, the system determines which user is stating each question or command and applies the correct profile and context. For applications requiring security, the user is verified, typically by using voiceprint matching or requesting a password or pass-phrase from the user. When multiple users are engaged in interleaved sessions, the system gracefully resolves conflicts using a probabilistic or fuzzy set decision method. This process simulates the manner in which a human would address multiple questions. For example, the system may answer short questions first at times, while answering questions in the order received at other times.

[26] Given the desire for domain specific behavior, user specific behavior and domain specific information, the system, according to another aspect of the invention, may allow both users and content providers to extend the system capabilities, add data to local data sources, and add references to network data sources. To allow coverage of the widest possible range of topics, the system allows third party content developers to develop, distribute and sell specialized or domain specific system programs and information. Content is created though creation of new agents, scripting existing agents, adding new data to agents or databases and adding or modifying links to information sources. Distribution of this information is sensitive to the users interests and use history and to their willingness to pay or not.

[27] According to another aspect of the invention, the system may allow users to disseminate their knowledge without programming. The system may include mechanisms that allow users to post and distribute agents and information in their particular areas of



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expertise, to improved system capability. Further, users can extend the system and configure it to their own preferences, add information to their profile to define new questions or queries, extend and modify existing questions and queries, add new data sources, update data sources, set preferences and specify presentation parameters for results.

[28] Since the invention may operate in many environments, including environments with background noise, point noise sources and people holding conversations, filtering of speech input may be performed. The invention may use, for example, either one-dimensional or two-dimensional array microphones to receive human speech. The array microphones can be use fixed or employ dynamic beam forming techniques. The array pattern may be adjusted to maximize gain in the direction of the user and to null point noise sources. Speech received at the microphones may then be processed with analog or digital filters to optimize the bandwidth, cancel echoes, and notch-out narrow band noise sources. Following filtering, the system may use variable rate sampling to maximize the fidelity of the encoded speech, while minimizing required bandwidth. This procedure may be particularly useful in cases where the encoded speech is transmitted over a wireless network or link.

[29] Some example applications for the invention includes but are not limited to the following:

- white pages and yellow pages lookups to find, email addresses, telephone numbers, street addresses and other information for businesses and individuals;
- personal address book, calendars and reminders for each user;



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- automatic telephone dialing, reading and sending emails and pages by voice and other communications control functions;
- map, location and direction applications;
- movie or other entertainment locator, review information and ticket purchasing;
- television, radio or other home entertainment schedule, review information and device control from a local or remote user;
- weather information for the local area or other locations;
- stock and other investment information including, prices; company reports, profiles, company information, business news stories, company reports, analysis, price alerts, news alerts, portfolio reports, portfolio plans, etc.;
- flight or other scheduled transportation information and ticketing;
- reservations for hotels, rental cars and other travel services;
- local, national and international news information including headlines of interest by subject or location, story summaries, full stories, audio and video retrieval and play for stories.;
- sports scores, news stories, schedules, alerts, statistics, back ground and history information, etc.;
- ability to subscribe interactively to multimedia information channels, including sports, news, business, different types of music and entertainment, applying user specific preferences for extracting and presenting information;



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- rights management for information or content used or published;
- horoscopes, daily jokes and comics, crossword puzzle retrieval and display and related entertainment or diversions;
- recipes, meal planning, nutrition information and planning, shopping lists and other home organization related activities;
- as an interface to auctions and online shopping, and where the system can manage payment or an electronic wallet;
- management of network communications and conferencing, including telecommunications, email, instant messaging, Voice over IP communications and conferencing, local and wide area video and audio conferencing, pages and alerts;
- location, selection, management of play lists and play control of interactive entertainment from local or network sources including, video on demand, digital audio, such as MP3 format material, interactive games, web radio and video broadcasts;
- organization and calendar management for families, businesses and other groups of users including the management of, meetings, appointments, and events; and
- interactive educational programs using local and network material, with lesson material level set based on user's profile, and including, interactive multimedia lessons, religious instruction, calculator, dictionary and spelling, language training, foreign language translation and encyclopedias and other reference material.



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[30] It will be appreciated that the foregoing statements of the features of the invention are not intended as exhaustive or limiting, the proper scope thereof being appreciated by reference to this entire disclosure and reasonably apparent variations and extensions thereof.

## BRIEF DESCRIPTION OF THE DRAWINGS

[31] The invention will be described by reference to the preferred and alternative embodiments thereof in conjunction with the drawings in which:

[32] **FIG. 1** is an overall diagrammatic view according to one embodiment of the invention;

[33] **FIG. 2** is a schematic block diagram showing the agent architecture according to one embodiment of the invention;

[34] **FIG. 3** is a high level process for receiving natural language speech-based queries and/or commands and generating a response according to one embodiment of the invention;

[35] **FIG. 4A** is a process for receiving natural language speech-based queries and/or commands and generating a response according to one embodiment of the invention;

[36] **FIG. 4B** is a process for receiving natural language speech-based commands in order to locally or remotely control functions of devices according to one embodiment of the invention;

[37] **FIG. 5** is a process for correctly interpreting a user's utterance according to one embodiment of the invention; and



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[38] FIG. 6 is a process for determining the proper domain agents to invoke and the properly formatted queries and/or commands that is to be submitted to the agents according to one embodiment of the invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[39] The fact that most natural language queries are incomplete in their definition is a significant barrier to natural human query-response interaction between humans and machines. Further, some questions can only be interpreted in the context of previous questions, knowledge of the domain, or the user's history of interests and preferences. Thus, some natural language questions may not be easily transformed to machine processable form. Compounding this problem, many natural language questions are ambiguous or subjective. In these cases, the formation of a machine processable query and returning of a natural language response is difficult at best.

[40] In order for machines (e.g., computer devices) to properly respond to a question or a command that is in a natural language form, machine processable queries and commands may be formulated after the natural form question or command has been parsed and interpreted. Depending on the nature of the question or command, there may not be a simple set of queries and commands that will return an adequate response. Several queries and commands may need to be initiated and even these queries and commands may need to be chained or concatenated to achieve a complete result. Further, no single available source may contain the entire set of results required. Thus multiple queries and/or commands, perhaps with several parts, may be needed for multiple data sources, which can be both local or on a network. Not all of these sources, queries and/or commands will return useful results or any results at all. Useful results that are returned



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are often embedded in other information, and from which they may need to be extracted. For example, a few key words or numbers often need to be "scraped" from a larger amount of other information in a text string, table, list, page or other information. At the same time, other extraneous information such as graphics or pictures needs to be removed to process the response. In any case, the multiple results must be evaluated and combined to form the best possible answer, even in the case where some queries do not return useful results or fail entirely. In cases where the question is ambiguous or the result inherently subjective, determining the best result to present is a complex process. Finally, to maintain a natural interaction, responses need to be returned rapidly to the user. Managing and evaluating complex and uncertain queries while maintaining real-time performance is a significant challenge.

[41] The following detailed description refers to the accompanying drawings, and describes exemplary embodiments of the present invention. Other embodiments are possible and modifications may be made to the exemplary embodiments without departing from the spirit, functionality and scope of the invention. Therefore, the following detailed descriptions are not meant to limit the invention.

[42] The present invention provides a complete speech-based information query, retrieval, processing and presentation environment. In addition, the invention may be useful for control of the system itself and/or external devices. This integrated environment makes maximum use of context, prior information and domain and user specific profile data to achieve a natural environment for one or more users making queries or stating commands in multiple domains. Through this integrated approach, a complete speech-based natural language query, command and response environment may



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be created. **FIG. 1** shows a schematic diagram view of a system **90** according to an embodiment of the invention.

[43] The system **90** may include a main unit **98** and a speech unit **128**. Alternatively, the system **98** may only comprise of the main unit **98**, the speech unit **128** being a completely separate system. The event manager **100** may mediate interactions between other components of the main unit **98**. The event manager **100** provides a multi-threaded environment allowing the system **98** to operate on multiple commands or questions from multiple user sessions without conflict and in an efficient manner, maintaining real-time response capabilities.

[44] Agents **106** contain packages of both generic and domain specific behavior for the system **98**. Agents **106** may use nonvolatile storage for data, parameters, history information, and locally stored content provided in the system databases **102** or other local sources. User specific data, parameters, and session and history information that may determine the behavior of agents **106** are stored in one or more user profiles **110**. Data determining system personality characteristics for agents are stored in the one or more personality module **108**. The update manager **104** manages the automatic and manual loading and updating of agents **106** and their associated data from the Internet **136** or other network through the network interface **116**.

[45] The main user interface for the system **90**, according to an embodiment of the invention, is through one or more speech units **128**. The speech unit **128** includes one or more microphones, for example array microphone **134**, to receive the utterances of the user. The speech received at the microphone **134** may be processed by filter **132** and passed to the speech coder **138** for encoding and compression. In one embodiment, a



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transceiver module **130** transmits the coded speech to the main unit **98**. Coded speech received from the main unit **98** is detected by the transceiver **130**, then decoded and decompressed by the speech coder **138** and annunciated by the speaker **136**.

[46] The one or more speech units **128** and the main unit **98** may communicate over a communication link. The communication link can include a wired or wireless link. According to one embodiment, the communication link comprises an RF link. The transceiver **130** on the speech unit communicates coded speech data bi-directionally over the communication link with the transceiver **126** on the main unit **98**. According to another embodiment, RF link may use any standard local area wireless data protocols including the IEEE 802.11, Bluetooth or other standards. Alternatively, an infrared data link conforming to any suitable standard such as IrDA or other infrared standards can be used. In an alternative embodiment, wires connect the speech unit **128** and the main unit **98**, eliminating the need for one speech coder **138**. Other wired or wireless analog or digital transmission techniques can be used.

[47] Coded speech received at the transceiver **126** on the main unit **98** is passed to the speech coder **122** for decoding and decompression. The decoded speech is processed by the speech recognition engine **120** using data in the dictionary and phrases module **112** and received from the agents **106**. The recognized words and phrases are processed by the parser **118**, which transforms them into complete commands and questions using data supplied by an agent[s] **106**. The agent[s] **106** then process the commands or questions. The agent[s] **106** create queries to local databases **102** or though the network interface **116** to data sources on the Internet **136** or other networks. Commands typically result in actions taken by the system **90** itself (i.e., pause or stop), or to a remote device or data



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source (i.e., download data or program, or control a remote device), through the network interface to the Internet or other data interface.

[48] The agents **106** return results of questions as responses to users. The response may be created using the results of information queries, the system personality **108** and the user preferences or other data in the user profile **110**. The agents **106** generally present these results using the speech unit **128**. The agents **106** creates a response string, which is sent to the text to speech engine **124**. The text to speech engine **124** creates the required utterances, which may be encoded and compressed by the speech coder **122**. Once coded, the utterances are transmitted from the main unit **98** by the transceiver **126** to the transceiver **130** on the speech unit **128**. The utterance is then decoded and decompressed by the speech coder **138** and output by the speaker **136**.

[49] The graphical user interface **114** can be used as a substitute or complement to the speech interface. For example, the graphical user interface 114 can be used to view and interact with graphical or tabular information in a manner more easily digested by the user. The graphical user interface can show system state and history in a more concise manner than the speech interface. Users can use the graphical user interface to create or extend agents **106**. These operations can include scripting of agents, adding data to the agent or databases **102** used by the agent, adding links to information sources.

[50] The system **90** may comprise of different types of agents. In one embodiment of the invention, generic and domain specific behavior and information may be organized into domain agents. A system agent, on the other hand, provides default functionality and basic services. The domain specific agents provide complete, convenient and re-distributable packages or modules for each application area. In other words, a domain



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agent includes everything needed to extend or modify the functionality of the system **90** in a current or new domain. Further, domain agents and their associated data can be updated remotely over a network as new behavior is added or new information becomes available. Domain agents may use the services of other, typically more specialized, agents and the system agent. Agents are distributed and redistributed in a number of ways including on removable storage media, transfer over networks or attached to emails and other messages. The invention may provide license management capability allowing the sale of agents by third parties to one or more users on a one time or subscription basis. In addition, users with particular expertise may create agents, update existing agents by adding new behaviors and information and making these agents to other users. A block diagram of an agent architecture according to an embodiment of the invention is shown in **FIG. 2.**

[51] Agents **106** receive and return events to the event manager **100**. Both system agents **150** and domain agents **156** receive questions and commands from the parser **118**. Based on keywords in the questions and commands and the structures of the questions and commands, the parser invokes the required agent[s]. Agents use the nonvolatile storage for data, parameters, history information and local content provided in the system databases **102**. When the system starts-up or boots-up the agent manager **154** may load and initialize the system agent **150** and the one or more domain agents **156**. At shutdown the agent manager unloads the agents. The agent manager **154** also performs license management functions for the domain agents **156** and content in the databases **102**.



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[52] The system agent **150** manages the criteria handlers **152**, which handle specific parameters or values (criteria) used to determine context for questions and commands. Both the system agent **150** and the domain agents **156** use the criteria handlers **152**. The various domain agents **156** can use the services of the system agent **150** and of other, typically more specialized, domain agents **156**. The system agent **150** and the domain agents **156** use the services of the agent library **158**, which contains utilities for commonly used functions. The library may include utilities for text and string handling, network communications, database lookup and management, fuzzy and probabilistic evaluation, text to speech formats, and other utilities.

[53] Domain agents **156** can be data-driven, scripted or created with compiled code. A base of generic agent is used as the starting point for data-driven or scripted agents. Agents created with compiled code are typically built into dynamically linkable or loadable libraries. Developers of agents can add new functionality to the agent library **158** as required. Details of agent distribution and update, and agent creation or modification are discussed in sections below.

[54] The invention, according to another embodiment of the invention, may provide capabilities to distribute and update system agents **150**, domain agents **156**, agent library components **158**, databases **102**, and dictionary and phrase entries **112** over wireless or wired networks **136**, including dial-up networks using the update manager **104**. The network interface **116** may provide connections to one or more networks. The update manager **104** may also manages the downloading and installation of core system updates. The agent manager **154** may perform license management functions for the domain agents and the databases. The update manager **104** and agent manager **154** may perform



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these functions for all agents and database content including, agents and content available to all users or agents and content only available to certain users. Examples of agent and database components added or updated on a periodic basis include:

- agents for new domains;
- additional domain knowledge for agents;
- new keywords for a domain, which can include names of politicians, athletes, entertainers, names of new movies or songs, etc. who have achieved recent prominence;
- links to a preferred set of information sources for the domains covered including links for, entertainment, news, sports, weather, etc.;
- updates to domain information based on, for example, changes to tax laws, company mergers, changing political boundaries; and
- updates to content, including dictionaries, encyclopedias and almanacs; and
- other content and database components.

[55] When a user requires or selects a new domain agent **156** or database element **102,** the update manager **104** may connect to their source on the network **136** though the network interface **116,** download and install the agent or data. To save system resources and to comply with any license conditions, the update manger **104** may uninstall agents that are no longer in use. In one embodiment of the invention, the update manager **104** periodically queries one or more sources of the licensed agents and database components to locate and down load updates to agent executables, scripts or data as they become



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available. Alternatively, the agent sources may initiate the downloading of agent updates of the registered or licensed agents to the update manager as they become available.

[56] The agent manager **154** may provide a license management client capable of executing most any license terms and conditions. When a particular agent **106** and/or database element **102** is required by a command, the agent manger **154** verifies that the use of the agent or data element is within the allowed terms and conditions, and if so, invokes the agent or allows access to the data element. License management schemes that can be implemented through the agent manager **154** include outright purchase, subscription for updates, one time or limited time use. Use of shared agents and data elements (such as those down-loaded from web sites maintained by groups of domain experts) may also be managed by the agent manager **154**.

[57] If a question or command requires an agent, currently not loaded on the system, the agent manager **154** may search the network **136** through the network interface **116** to find a source for a suitable agent. Once located, the agent can be loaded under the control of the update manager **104**, within the terms and conditions of the license agreement as enforced by the agent manger.

[58] New commands, keywords, information, or information sources can be added to any domain agent **156** by changing agent data or scripting. These configuration capabilities may allow users and content developers to extend and modify the behavior of existing domain agents **156** or to create new domain agents **156** from a generic agent without the need to create new compiled code. Thus, the modification of the domain agents **156** may range from minor data-driven updates by even the most casual users, such as specifying the spelling of words, to development of complex behavior using the



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scripting language as would typically be done by a domain expert. The user can create and manage modifications to domain agents **156** through speech interface commands or using a graphical user interface **114**. User-specific modifications of domain agents **156** are stored in conjunction with the user's profile **110** and accessed by the domain agent **156** at run-time.

[59] The data used to configure data driven agents **156** are structured in a manner to facilitate efficient evaluation and to help developers with organization. These data are used not only by the agents **156**, but also by the speech recognition engine **120**, the text to speech engine **124**, and the parser **118**. Examples of some major categories of data include:

1. Content packages include questions or commands. Each command or question or group of commands or questions includes contexts used for creation of one or more queries. The agent **156** passes a regular grammar expression to the parser **118** for evaluation of a context or question. An initial or default context is typically supplied for each command or question. The command or question includes a grammar for the management and evaluation of the context stack.

2. Page lists or pointers to other local or network content sources. For each page or content source there is a pointer (e.g. URL, URI, or other pointer) to the page or source. Each page has specific scraping information used to extract the data of interest. The scraping information includes matching patterns, HTML or other format parsing information.



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3. A response list, determining the response of the agent 156 to a particular command or question given the context, the user profile and the information retrieved. Responses can include diagnostic error messages or requests for more information if the question or command cannot yet be resolved from the known information. Responses can be based on or dependent on thresholds or probabilistic or fuzzy weights for the variables.

4. Substitution lists containing variable substitutions and transformations, often applied by the agents **150, 156** in the formatting of queries and results. For example, a stock domain specific agent **156** would use a substitution list of company trading symbols, company names and commonly used abbreviations. Substitutions and transformations can be performed on commands and questions to create precise queries, which can be applied against one or more information sources or to results for creating more meaningful output to the user. Substitution lists also include information for optimally dealing with structured information, such as HTTP formatted page parsing and evaluation.

5. Personalities used for responses. Personalities are constructed by combining multiple traits in a weighted manner. Weights can be specified for each agent's domain area to create one or more specific personalities. Examples of personality traits include, sarcasm, humor, irritation, and sympathy, and other traits.

6. Public and user specific parameters for sources, substitutions, transformations, variables or criteria. The public parameter lists are part of the



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agent package **156**. The user specific parameters are contained in the user profile **110**.

[60] Commands and questions are interpreted, queries formulated, responses created and results presented based on the users personal or user profile **110** values. Personal profiles may include information specific to the individual, their interests, their special use of terminology, the history of their interactions with the system, and domains of interest. The personal profile data may be used by the agents **106**, the speech recognition engine **120**, the text to speech engine **124**, and the parser **118**. Preferences can include, special (modified) commands, past behavior or history, questions, information sources, formats, reports, and alerts. User profile data can be manually entered by the user and/or can be learned by the system **90** based on user behavior. User profile values may include:

- spelling preferences;
- date of birth for user, family and friends;
- income level;
- gender;
- occupation;
- location information such as, home address, neighborhood, and business address;
- car type;
- telecommunications and other service providers and services;
- financial and investment information;
- synonyms (i.e., a nick name for someone);



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- special spelling;
- keywords;
- transformation or substitution variables;
- domains of interest; and
- other values.

[61] End users may use the data driven agent **156** extension and modification facilities and values stored in user profiles **110** to create special reports, packages of queries, alerts and output formats. A single alert or report can be configured to use multiple data sources and other variables (i.e., time, location) value to condition to determine when alert should be sent. For example, an alert can be generated by sampling a stock price every 15 min and sending an alert if the price drops below some value. To create a report, the user first specifies a set of commands or questions. Next, the user creates or selects a format for the report. Finally the user may name the report. A report can have variable parameters. For example, a user may create a company stock report, and execute the report by stating its name and the company name, which gives the user selected information and in a specified format for that company. In another example, a user can create a "morning" report, which presents selected multimedia information from different sources (news, sports, traffic, weather) in the order and formats desired. Alerts and reports can be created using only voice commands and responses, commands and responses through the graphical user interface **114**, or a combination of the two. To create a report, alert, or other specialized behavior, the user performs a number of steps including:

- specify the command to run a report or alert;



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- specify the question or questions, including keywords, used for a query;
- set the criteria for running the report such as on command or when a particular condition is met;
- define preferred information sources;
- define preferences for order of result evaluation by source, value, etc.;
- specify the presentation medium for a report or alert, such as an email, the text to speech engine, a message to a pager, or a text and graphics display; and
- specify the preferred format for the report, such as information to be presented, order of information to be presented, preferred abbreviations or other variable substitutions.

[62] Filtering and noise elimination may be important in facilitating the various functionalities of the system **90**. The accurate recognition and parsing of the user's speech requires the best possible signal to noise ratio at the input to the speech recognition engine **120**. To accomplish the required improvements an array microphone **134** and a filter **132** are employed. According to an embodiment of the invention, the microphone array, filters and speech coder **138** are physically separated from the main unit **98** into a speech unit **128**, and connected using a wireless link. Since bandwidth on a wireless connection is at a premium, the speech coder dynamically adapts the digitization rate and compression of the captured speech.

[63] The speech unit **128** may use an array of microphones **134** to provide better directional signal capture and noise elimination than can be achieved with a single microphone. The microphone array can be one-dimensional (a linear array) or two-



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dimensional (a circle, square, triangle or other suitable shape). The beam pattern of the array can be fixed or made adaptive though use of analog or digital phase shifting circuitry. The pattern of the active array is steered to point in the direction of the one or more users speaking. At the same time nulls can be added to the pattern to notch out point or limited area noise sources. The use of the array microphone also helps reduce the cross talk between output from the text to speech engine **124** through the speaker **136** and detection of the user's speech.

[64] The microphone can be complemented with an analog or digital (i.e., Voice over IP) speech interface. This interface allows a remote user to connect to the system and interact with it in the same manner possible if they were physically present.

[65] The speech unit **128**, according to an embodiment of the invention, may use an analog or digital filter **132** between the array microphone **134** and the speech coder **138**. The pass band of the filter is set to optimize the signal to noise ratio at the input to the speech recognition engine **120**. In some embodiments, the filter is adaptive, using band shaping combined with notch filtering to reject narrow-band noise. In one embodiment of the invention, the system **90** may employ adaptive echo cancellation in the filter. The echo cancellation helps prevent cross talk between output from the text to speech engine and detection of the user's speech as well as suppression of environmentally caused echoes. Algorithms comparing the background noise to the signal received from the users speech are used to optimize the band-shaping parameters of the adaptive filter. Those skilled in the art will be familiar with multiple techniques used to construct suitable digital and analog filters.



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[66] The speech received by the array microphone **134** and passed through the filter **132** may be sent to the speech digitizer or coder **138**. The speech coder 138 may use adaptive lossy audio compression to optimize bandwidth requirements for the transmission of the coded speech to the speech recognition engine **120** over a wireless link. The lossy coding may be optimized to preserve only the components of the speech signal required for optimal recognition. Further, the lossy compression algorithms that may be used may be designed to prevent even momentary gaps in the signal stream, which can cause severe errors in the speech recognition engine. The digitized speech may be buffered in the coder and the coder may adapt the output data rate to optimize the use of the available bandwidth. The use of the adaptive speech coder is particularly advantageous when a band-limited wireless link is used between the coder and the speech recognition engine.

[67] In an alternative embodiment, the array microphone can be replaced by a set of physically distributed microphones or a headset worn by the user. The distributed microphones can be placed in different parts of a room or in different rooms. The distributed microphones can create a three-dimensional array to improve signal to noise ration. The headset may use a wireless or wired connection.

[68] While the invention is intended to be able to accept most any natural language question or command, ambiguity can still be a problem. To assist users formulate concise questions and commands the system **90** may support a voice query language. The language is structured to allow a variety of queries with minimal ambiguity. Thus, the voice query language helps users clearly specify the keywords or contexts of the question or command along with the parameters or criteria. The language provides a grammar to



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clearly specify the keyword used to determine the context and a set of one or criteria or parameters. A user asking a question or stating a command in the voice query language is nearly always guaranteed to receive a response.

[69] The voice query language may be sensitive to the contents of the context stack. Thus, a following-on question can be asked using an abbreviated grammar, since key words and criteria can be inherited from the stack. For example, the user can simply asked about another keyword if the criteria of the question remain constant.

[70] The system **90**, may provide built in training capabilities to help the user learn the best methods to formulate their questions and commands. The interactive training allows the user to audibly or visibly see the machine interpretation of their queries and provides suggestions on how to better structure a query. Using the interactive training a user can quickly become comfortable with the voice query language and at the same time learn how to optimize the amount of information required with each step of a dialog.

[71] The output of the speech coder **122** may be fed to the speech recognition engine **120**. The speech recognition engine **120** recognizes words and phrases, using information in the dictionary and phrase tables **112**, and passes these to the parser **118** for interpretation. The speech recognition engine **120** may determine the user's identity by voice and name for each utterance. Recognized words and phrases may be tagged with this identity in all further processing. Thus, as multiple users engage in overlapping sessions, the tags added by the speech recognition engine **120** to each utterance allows other components of the system **90** to tie that utterance to the correct user and dialog. The user recognition capability may further be used as a security measure for



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applications, such as auctions or online shopping, where this is required. Voice characteristics of each user may be contained in the user profile **110**.

[72] A user may start a dialog with the system **90** when they first address it. This can be done by speaking a generic word ("computer") or addressing a specific name ("Fred"), which may be generally tied to a system personality **108**. Once the user starts the dialog, it may be recognized by the speech recognition engine **120**, using unique characteristics of the user's speech. At the end of a dialog or to interrupt a dialog, the user may utter a dismissal word ("good by").

[73] According to another embodiment of the invention, the system **90** may employ a speech recognition engine **124** seeding for improved word recognition accuracy, using data from the dictionary and phrase tables **112,** user profiles **110,** and the agents **106**. At the same time, the fuzzy set possibilities or prior probabilities for the words in the dictionary and phrase tables may be dynamically updated to maximize the probability of correct recognition at each stage of the dialog. The probabilities or possibilities may be dynamically updated based on a number of criteria including the application domain, the questions or commands, contexts, the user profile and preferences, user dialog history, the recognizer dictionary and phrase tables, and word spellings.

[74] For uncommon words or new vocabulary words, a user may be given the option to spell the words. The spelling may be done by saying the names or the letters or using a phonetic alphabet. The phonetic alphabet can be a default one or one of the user's choosing.

[75] Alternatively, when a user uses a word that is not recognized at all or is not correctly recognized by the speech recognition engine **120** then the user may be asked to



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spell the word. The speech recognition engine **120** determines this condition based on confidence level for the scoring process. The word is looked up in the dictionary **112** and the pronunciation for the word is added to either the dictionary, the agent **106**, or the user's profile **110**. The word pronunciation can then be associated with the domain, the question, the context and the user. Though this process the speech recognition engine learns with time and improves accuracy. To assist users in spelling words an individualized phonetic alphabet can be used. Each user can modify the standard phonetic alphabets with words, which they can remember more easily.

[76] Once the words and phrases have been recognized by the speech recognition engine **120,** the tokens and user identification is passed to the parser **118**. The parser **118** examines the tokens for the questions or commands, context and criteria. The parser **118** determines a context for an utterance by applying prior probabilities or fuzzy possibilities to keyword matching, user profile **110**, and dialog history. The context of a question or command determines the domain and thereby, the domain agent **156**, if any, to be evoked. For example, a question with the keywords "temperature" implies a context value of weather for the question. The parser dynamically receives keyword and associated prior probability or fuzzy possibility updates from the system agent **150** or an already active domain agent **156**. Based on these probabilities or possibilities the possible contexts are scored and the top one or few are used for further processing.

[77] The parser **118** uses a scoring system to determine the mostly likely context or domain for a user's question and/or command. The score is determined from weighting a number of factors including, the user profile **110**, the domain agent's data content and previous context. Based on this scoring, the system **90** invokes the correct agent. If the



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confidence level of the score is not high enough to ensure a reliable response, the system 90 may ask the user to verify whether the question and/or command is correctly understood. In general, the question that is asked by the system **90** may be phrased to indicate the context of the question including all criteria or parameters. For example, the question can be in the form of: "Did I understand that you want such-and-such" If the user confirms that the question is correct the system proceeds to produce a response. Otherwise, the user can rephrase the original question, perhaps adding additional information to remove ambiguity, or the system can ask one or more questions to attempt to resolve the ambiguity.

[78] Once the context for the question or command has been determined, the parser **118** can invoke the correct agent **156, 150**. To formulate a question or command in the regular grammar used by agents, the parser **118** may determine required and optional values for the criteria or parameters. These criteria may have been explicitly supplied by the user or may need to be inferred. The parser **118** makes use of the criteria handlers **152** supplied by the system agent **150**. The criteria handlers **152** provide context sensitive procedures for extracting the criteria or parameters from the user's question or command. Some criteria are determined by executing algorithms in the agent, while others may be determined by applying probabilistic of fuzzy reasoning to tables of possible values. Prior probabilities or fuzzy possibilities and associated values are received from a number of sources including the history of the dialog, the user profile **110**, and the agent. Based on user responses, the prior probabilities or fuzzy possibilities are updated as the system learns the desired behavior. For a weather context, examples of criteria include, location, date and time. Other criteria can include command criteria (i.e., yes/no, on/off,



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pause, stop), and spelling. Special criteria handlers are available from the system agent for processing lists, tables, barge-in commands, long strings of text and system commands.

[79] The criteria handlers **152** operate iteratively or recursively on the criteria extracted to eliminate ambiguity. This processing helps reduce the ambiguity in the user's question or command. For example, if the user has a place name (or other proper noun) in their utterance the parser **118** can use services of the domain agent **156** to look up tables in the databases **102** for place names or can attempt to determine which word is the proper noun from the syntax of the utterance. In another example, the user asks "what about flight one hundred and twenty too?". The parser and domain agent use flight information in the database and network information along with context to determine the most plausible interpretation among; flight 100 and flight 20 also, flight 100 and flight 22, flight 122, and the like.

[80] Once the context and the criteria are determined, the parser **118** may form the question or command in a standard format or hierarchical data structure used for processing by the agents **150, 156**. The parser 118 may fill in all required and some optional tokens for the grammar of the context. Often the tokens must be transformed to values and forms acceptable to the agents. The parser obtains the required transformations from the agents, dialog history or user profile **110**. Examples of transformations or substitutions performed by the parser on tokens include:

- substituting a stock symbol for a company name or abbreviation;
- substituting a numerical value for a word or words;
- adding a zip code to an address; and



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- changing a place or other name to a commonly used standard abbreviation.

[81] The agents **150, 156** may receive a command or question once the parser **118** has placed it in the required standard format. Based on the context, the parser **118** evokes the correct agent to process the question or command.

[82] Commands can be directed to the system **90** or to an external entity. System commands are generally directed to the system agent **150**. Commands for external entities are generally processed by a domain agent **156**, which includes the command context and behavior for the external entity.

[83] Specific questions are generally directed to one of the domain agents **156**. Based on the question or context and the parameters or criteria, the domain agent creates one or more queries to one or more local or external information sources. Questions can be objective or subjective in nature. Results for objective questions can often be obtained by structured queries to one or more local or network information sources. Even for objective questions, the system 90 may need to apply probabilistic or fuzzy set analysis to deal with cases of conflicting information or incomplete information. Information to answer subjective questions is generally obtained by one or more ad-hoc queries to local or network data sources, followed by probabilistic or fuzzy set evaluation of the one results to determine a best answer.

[84] Once the domain agent **156** has formulated the one or more queries, they may be sent to local and/or network information sources. The queries are performed in an asynchronous manner to account for the fact that sources respond at different speeds or may fail to respond at all. Duplicate queries are sent to different information sources to ensure that at least one source responds with a useful result in a timely manner. Further,



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if multiple results are received in a timely manner, they can be scored by the system to determine which data is most reliable or appropriate. Examples of data sources accommodated include, HTTP data sources, sources with meta-data in various formats including XML, entertainment audio, video and game files including MP3, databases using query languages and structured responses such as SQL, and other data sources.

[85] The local information sources can be stored in one or more system databases **102** or can be on any local data storage such as a set of CDs or DVDs in a player or other local data storage. Network information sources can be connected to the Internet **136** or other network and accessed through a series of plug-ins or adaptors, known a pluggable sources, in the network interface **116**. The pluggable sources in the network interface 116 may be capable of executing the protocols and interpreting the data formats for the data sources of interest. The pluggable sources may provide information scrapping data and procedures for each source to the domain agents **156**. If a new type of data source is to be used, a new plug-in or adaptor can be added to the network interface 116.

[86] The domain agent **156** evaluates the results of the one or more queries as they arrive. The domain agent 156 scores the relevance of the results based on results already received, the context, the criteria, the history of the dialog, the user profile **110** and domain specific information using probabilistic or fuzzy scoring techniques. Part of the dialog history is maintained in a context stack. The weight of each context for the scoring is based on the relevance of one context to another and the age of the contexts. Other scoring variables can be associated through the context stack. Contexts can also be exclusive, so that previous contexts have no weight in the scoring.



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[87] Based on the continuous scoring processes, the domain agent **156** may determine if a single best answer can be extracted. For most questions the desired result has a set of tokens that must be found to formulate an answer. Once a value has been found for each of these tokens the results is ready for presentation to the user. For example, for a question on weather, the tokens can include the date, day of week, predicted high temperature, predicted low temperature, chance of precipitation, expected cloud cover, expected type of precipitation and other tokens. Results processed in this manner include error messages. For subjective questions this determination is made by determining a most likely answer or answers, extracted by matching of the results received. If no satisfactory answer can be inferred from the results of the query the agent can do one of the following:

1. Ask the user for more information, typically through the speech interface, and based on the results obtained formulate new queries. This approach is applied when an irresolvable ambiguity arises in the formulation of a response.
2. Formulate new queries based on the results received from the first set of queries. This approach is typically applied in cases where the responses received do not contain all the required information. Information sources to query can inferred from the results already obtained (i.e., links in an HTML document) or from other sources. Using this approach one or more sets of queries and responses can be chained without the need for action by the user.
3. Wait for additional queries to return results.

[88] In any case, the domain agent **156** may continue to make queries and evaluate results until a satisfactory response is constructed. In doing so, the agent can start several



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overlapping query paths or threads of inquiry, typically mediated by the event manager **100**. This technique, combined with the use of asynchronous queries from multiple data sources provides the real-time response performance required for a natural interaction with the user.

[89] The domain agent **156** may apply conditional scraping operations to each query response as it is received. The conditional scraping actions depend on the context, the criteria, user profile **110**, and domain agent coding and data. For each token to be extracted, a scraping criteria **152** may be created using the services of the system agent **150**. The scraping criteria use format specific scraping methods including, tables, lists, text, and other scrapping methods. One or more scraping criteria can be applied to a page or results set. Once additional results are received, the domain agent 156 can create new scraping criteria to apply to results already acquired. The conditional scarping process removes extraneous information, such as graphics, which need not be further processed or stored, improving system performance.

[90] The domain agent **156** may strongly influence how the results are presented. For instance, once the domain agent **156** has created a satisfactory response to a question, the agent 156 may format that response for presentation. Typically, the domain agent **156** formats the response into the markup format used by the text to speech engine **124**. The domain agent **156** may also format the result presentation using available format templates and based on the context, the criteria, and the user profile **110**. Variable substitutions and transformations may be performed by the agent **156** to produce a response best understood and most natural to the user. Further, the order of presentation of tokens and the exact terminology used to create a more natural response to the user



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may be varied by the agent **156**. The domain agent **156** may also select the presentation personality **108** to be used.

[91] The domain agent **156**, may select the presentation template, determine order of presentation for tokens and determine variable substitutions and transformations using probabilistic or fuzzy set decision methods. The template used to form the presentation can be from the domain agent itself or from the user profile **110**. The user profile **110** can completely specify the presentation format or can be used to select and then modify an existing presentation format. Selection and formatting of presentation template can also depend on the presentation personality modules **108**. At the same time, the characteristics of the personality used for the response are dynamically determined using probabilities or fuzzy possibilities derived from the context, the criteria, the domain agent itself and the user profile **110**.

[92] The domain agent **156** may apply a number of transformations to the tokens before presentation to the user. These variable substitutions and transformations are derived from a number of sources including, domain information carried by the agent, the context, the token values, the criteria, the personality module **108** to be used, and the user profile **110**. Examples of variable substitutions and transformations include:

- substitution of words for numbers;
- substitution of names for acronyms or symbols (i.e., trading symbols);
- use of formatting information derived from the information sources (i.e., HTML tags);
- nature of the response including, text, long text, list, table;
- possible missing information or errors;



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- units for measurement (i.e., English or metric); and
- preferred terminology from the user profile 110 or presentation personality **108**.

[93] The system **90**, according to another embodiment of the invention, may provide special purpose presentation capabilities for long text strings, tables, lists and other large results sets. Domain agents **156** may use special formatting templates for such results. The system agent **150** may provide special criteria handlers **152** for presentation and user commands for large results sets. The presentation templates used by the domain agents 156 for large results sets typically include methods for summarizing the results and then allowing the user to query the result in more detail. For example, initially only short summaries, such as headlines or key numbers, are presented. The user can then query the results set further. The criteria handlers **152** provide users with the capability to browse large results sets. Commands provided by the criteria handlers **152** for large results sets include, stop, pause, skip, rewind, start, and forward.

[94] Some information, in formats such as video, pictures and graphics, may be best presented in a displayed format. The domain agents **156** may apply suitable presentation templates in these cases and present the information through the graphical user interface **114**. The system agent **150** provides special criteria handlers **152** for presentation and user commands for display presentation and control.

[95] **FIG. 3** is a high level process **300** for receiving natural language speech-based queries and/or commands and generating a response according to an embodiment of the invention. The process **300** comprises of individual steps, several of which may be repetitive in order to accommodate partial failures. The process **300** may begin when a



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user's utterance is received and processed at **302**. The user utterance may be a query and/or a command and may be of a natural language speech-based form. After receiving the natural language query and/or command, the query and/or command may be processed so that the data is in a more machine understandable format such as in a digital format. Once the utterance has been converted into an understandable format, the utterance may be processed so that at least an approximate meaning of the utterance can be determined at **304**. This may be accomplished by, for example, the use of stored dictionaries, phrases, user profiles, domain agent data, and other data. Based on the approximate meaning of the utterance, one or more correctly formatted queries and/or commands may be generated. A user created query and/or command may require that multiple queries and/or commands may be needed in order to generate the desired response or action. Further, depending upon the context (e.g., who is the user, what is the subject the query and/or command directed to, at what time or location is the query and/or command being directed to, and other parameters used in defining the query and/or command) in which the query and/or command has been submitted, a specific format for the query and/or command may be required. For instance, each of the domain agents 156 may require that queries and/or commands be formatted in a specific manner. Thus at 306, one or more properly formatted queries and/or commands may be generated. Steps **304** and **306** may be operations which may have to be repeated in order to obtain the correct interpretation of the user utterance and result in the desired response and/or action. Once, the properly formatted queries and/or commands are generated, the appropriate action may be taken at **308**. This may require that the properly formatted queries and/or commands be sent to specific domain agent[s], information source[s],



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device[s], or other appropriate destination[s] that can fulfill the requirements of the query and/or command. Once the appropriate action[s] have been executed, this event may be recorded to, for example, the user's profile, database and/or one or more agents at **310**. Such data may be useful for future user inquires and commands. After the action[s] have been performed, a response, if need be, may be generated and forwarded to the user and/or third parties at **312**. In the case of a query for retrieving data, the response would contain the requested information. In the case of a command, the response may be a confirmation that a specific action[s] has been executed. The response may be in the form of a natural language format. The response may also be formatted to reflect a particular personality or tone to the response in order to make the response more "human." The response may relayed to the user and/or third parties as an audio message and/or a visual message displayed on a user interface.

[96] **FIG. 4A** is a process **400** for receiving natural language speech-based queries and/or commands and generating a response using the system **90** according to another embodiment of the invention. The process **400** may begin when a user's utterance (i.e., user query and/or command) is captured through accurate speech recognition operating in a variety of real-world environments at **402**. Once the utterance is captured, it is parse and interpret to determine the query and/or command that is contained in the utterance at **404**. Next, review the query and/or command and determine the domain of expertise required and the context of the query, invoking the proper resources including, for example, agents at **406**. The original query and/or command submitted by the user will often require that multiple queries and/or commands be generated. For instance, suppose a user is interested in retrieving the value of her stock portfolio. The user may utter



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"please get the value of my stock portfolio." The system **90** may review this request together with stored data such as the user's profile and determine keywords such as "get the value" and "my stock portfolio." The system **90** may then generate queries to determine the stocks in the user's portfolio, the number of shares and the source for current pricing information. These queries may then be sent to one or more agent domains, such as a domain which may access a database containing the user's profile and a domain which accesses stock pricing sources to determine the answers to these questions. Queries may be sent to these domain agents or sources in order to obtain the desired data. Thus, at **408** formulate one or more queries that are sent to one or more local and/or network data sources and/or send appropriate commands to local or remote devices or the system itself. The queries are then sent to the designated agent[s]. The agents may then, in turn, generate their own queries and/or commands to be sent to, for example, local or remote information sources to retrieve needed data. The agent generated queries and/or commands may be formatted according to the requirements of the target sources and variable substitutions and transformations are performed to modify the queries to a form most likely to yield desired results from the available sources at **410**. Once the queries are formatted correctly, they may be executed in an asynchronous manner and dealing gracefully with failures at **412**. As a result of the execution of the queries, results may be returned by the domain agents and/or sources. The system **90** may then extract or scrape the desired information from the one or more results, which may be returned in any one of a number of different formats at **414**. That is, the results sought by a user may be the summary or the results of further processing of information obtained from several sources for example. Next, the results may be evaluated and



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interpreted including processing of errors, and gathering and combining them into a single best result judged to be "best" even if the results are ambiguous, incomplete, or conflicting at **416**. Once the best results are determined, perform any required formatting, variable substitutions and transformations to modify the results to a form most easily understood by the user at **418**. Finally, the compound results may be presented through the text to speech engine **124**, to the user in a useful and expected manner at **420**. The process **400** may be performed while accounting for the domain of expertise required, the context in which the question or command is presented, the domain specific information available, the history of the user's interaction, the user preferences, the information sources or commands that are available, and responses obtained from the sources. At each stage of the process **400**, probabilistic or fuzzy set decision and matching methods may be applied to deal with inconsistent, ambiguous, conflicting and incomplete information or responses. In addition, the use of asynchronous queries that may result in rapid and graceful failure of some queries or commands may allow the system **90** to robustly return results quickly and in a manner that seems natural to the user.

[97] **FIG. 4B** is a process **450** for receiving natural language speech-based commands in order to locally or remotely control functions of the system **90** or for other devices according to another embodiment of the invention. The process **450** may begin when a user's utterance (i.e., user query and/or command) is captured through accurate speech recognition operating in a variety of real-world environments at **452**. Once the utterance is captured, it is parse and interpret to determine the command that is contained in the utterance at **454**. Next, review the command and determine the domain for the command



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and context, invoking the proper resources including agents at **456**. The original command submitted by the user will often require that multiple queries and/or commands be generated. For instance, suppose a user is interested in recorded his favorite television program. The user may utter "please record my favorite TV program." The system **90** may review this request together with stored data such as the user's profile and determine keywords such as "record" and "my favorite TV program." The system **90** may then generate queries to determine the name, the channel, and time for the user's favorite TV program. These queries may then be sent to a agent domain, which may access a database containing the user's profile and determine the answers to these questions. A command may then be sent to a video recorder ordering the video recorder to record the selected TV program. Thus, at **458** formulate one or more queries that are to be sent to one or more local and/or network data sources and/or send appropriate commands to local or remote devices or the system itself. Next, route the generated commands to the appropriate system[s] and/or external devices at **460**. Once the commands have been executed, results including errors may be received and processed at **462**. The results of the executed commands may be optionally presented to the user at **464**.

[98] Some of the steps depicting in **FIG. 4A** may actually require multiple steps that may also be repetitive. For instance, in step **404**, the user's utterance is parsed and interpreted in order to determine the meaning of the utterance. The system **90** may make an initial interpretation of the utterance based the data stored in, for example, the dictionary and phrases module **124**, user profiles, **110**, agents **106** and the databases **104**. A real-time scoring system or other techniques may be applied to the interpretation results in order to generate a domain or a context score. If the confidence level of the



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domain or context score is not high enough to ensure a reliable response, the system **90** can request that the user verify the question or command is correctly understood. In general, the question may be phrased to indicate the context of the question including all criteria or parameters. If the user confirms that the question is correct, the system **90** may proceed to produce a response. Otherwise, either the user can rephrase the original question, perhaps adding additional information to remove ambiguity, or the system may ask one or more questions to attempt to resolve the ambiguity or other actions may taken. **FIG. 5** is a process **500** for correctly interpreting a user's utterance according to one embodiment of the invention. The process **500** generally represents steps **402** and **404** of process **400**. Initially the user's utterance is inputted into the system **90** at **502**. The input is then interpreted using, for example, various stored data such as user profiles, agent data, dictionary and phrases, and other relevant data. The interpretation is then scored using, for instance, a weighted scoring system as described previously at **506**. Once a score is obtained, determine whether the confidence level of the interpretation is satisfactory at **508**. In other words, whether the score given to the interpretation exceeds a certain value. If the confidence level is determined to be unsatisfactory then a request may be submitted to the user requesting that the user verify the interpretation at **510** and **512**. If the user is unsatisfied with the interpretation, he/she may be asked to rephrase the utterance and/or provide additional information at **514**. Once the user provides the rephrased utterance and/or additional information, the process **500** returns to the beginning at **502**. If, on the other hand, the user is satisfied with the interpretation, then the process **400** for receiving a natural language speech-based queries and/or commands and generating a response may continue at **516**.



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[99] Once the meaning of the utterance has been determined, the appropriate domain agent[s] and the query and/or commands properly formatted for the agent[s] may be determined. Referring to **FIG. 6**, which is a process **600** for determining the proper domain agent[s] to invoke and the properly formatted queries and/or commands that is to be submitted to the agents **106** as generally depicted in steps **406-408** of **FIG. 4A** according to one embodiment of the invention. In order to formulate a question or command in the regular grammar used by agents **106**, a determination may be made as to the required and optional values for the criteria or parameters of the queries and/or commands. These criteria may have been explicitly supplied by the user or may need to be inferred. Thus, the properly interpreted query and/or command that is generated by, for example, steps **404** and **454** of **FIGS. 4A** and **4B**, is parsed at **602**. The content of the properly interpreted query and/or command is then analyzed to determine the criteria and/or parameters of the properly interpreted query and/or command at **604**. A context sensitive procedure for extracting the criteria or parameters from the properly interpreted query and/or command may be used. Some criteria are determined by executing algorithms in the agent, while others may be determined by applying probabilistic of fuzzy reasoning to tables of possible values. Prior probabilities or fuzzy possibilities and associated values are received from a number of sources including the history of the dialog, the user profile **110**, and the agent. Based on user responses, the prior probabilities or fuzzy possibilities are updated as the system **90** learns the desired behavior. For a weather context, examples of criteria include, location, date and time. Other criteria can include command criteria (i.e., yes/no, on/off, pause, stop), and spelling. The process for determining criteria may be iterative or recursive in order to



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eliminate ambiguity in the user's question or command. For example, if the user has a place name (or other proper noun) in their utterance, tables in the databases **102** may be reviewed for place names or an attempt may be made to determine which word is the proper noun from the syntax of the utterance. In another example, the user asks "what about flight one hundred and twenty too?" In such a situation, flight information in the database and network information along with context may be used to determine the most plausible interpretation among; flight 100 and flight 20 also, flight 100 and flight 22, flight 122, and the like. Once the parameters and criteria for the query and/or command have been established, the proper agents **106** may be selected at **606**. After selecting the agents **106**, a properly formatted query and/or command that will be submitted to the agents **106** may be determined at **608**. The query and/or command may be in a standard format or may be a hierarchical data structure used for processing by the agent **106**. In order to submit the properly formatted query and/or command to the agent **106**, all of the required and some optional tokens for the grammar of the context may be filled in. Often the tokens must be transformed to values and forms acceptable to the agents. The required transformations may be obtained from the agents, dialog history or user profile **110**. Examples of transformations or substitutions that may be performed were provided above. Once the properly formatted queries and/or commands are generated, the process (e.g., process **400**) may continue at **610**.



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**We Claim:**

1. A system responsive to a user generated natural language speech utterance, comprising:

an event manager, the event manager coordinating interaction between components of the system;

a plurality of domain agents, the domain agents being autonomous executable that receives, processes and responds to at least one of a query or a command; and

a parser that determines a domain for the user generated natural language utterance based on the content and context of the user utterance.

2. The system according to claim 1, further comprising a speech unit for receiving the user generated natural language utterance.

3. The system according to claim 2, wherein the speech unit further comprises a speech code.

4. The system according to claim 1, wherein the utterance comprising at least one of a user query and a user command.

5. The system according to claim 1, further comprising a speech recognition engine that processes the user generated natural language utterance using data in a dictionary and phrase module.

6. The system according to claim 1, further comprising user profiles.



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7. The system according to claim 1, further comprising a text to speech engine.

8. The system according to claim 1, further comprising a personality module that facilitates formatting of a response generated by the system.

9. The system according to claim 1, wherein the parser determines a context of the user utterance based on at least one of applying prior probabilities or fuzzy possibilities to keyword matching, user profile, and dialog history.

10. The system according to claim 1, wherein at least one of the domain agents creates and directs a query to at least one of a local information source and a network information source.

11. The system according to claim 1, wherein at least one of the domain agents creates and directs a command to the system or a remote or local device.

12. The system according to claim 10, wherein at least one of the domain agents evaluates multiple responses from multiple sources in response to the query.

13. The system according to claim 12, wherein at least one of the domain agents evaluates the multiple responses by scoring each response based on results already received, context of the user utterance, user utterance criteria, history of dialog between the user and the system, a user profile or domain specific information using probabilistic or fuzzy scoring techniques.



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14. The system according to claim 1, wherein at least one of the domain agents formats generated responses using available format templates and based on user utterance context, user utterance criteria, or a user profile.

15. The system according to claim 14, wherein the responses are generated by performing variable substitutions and transformations to produce a response best understood and most natural to the user.



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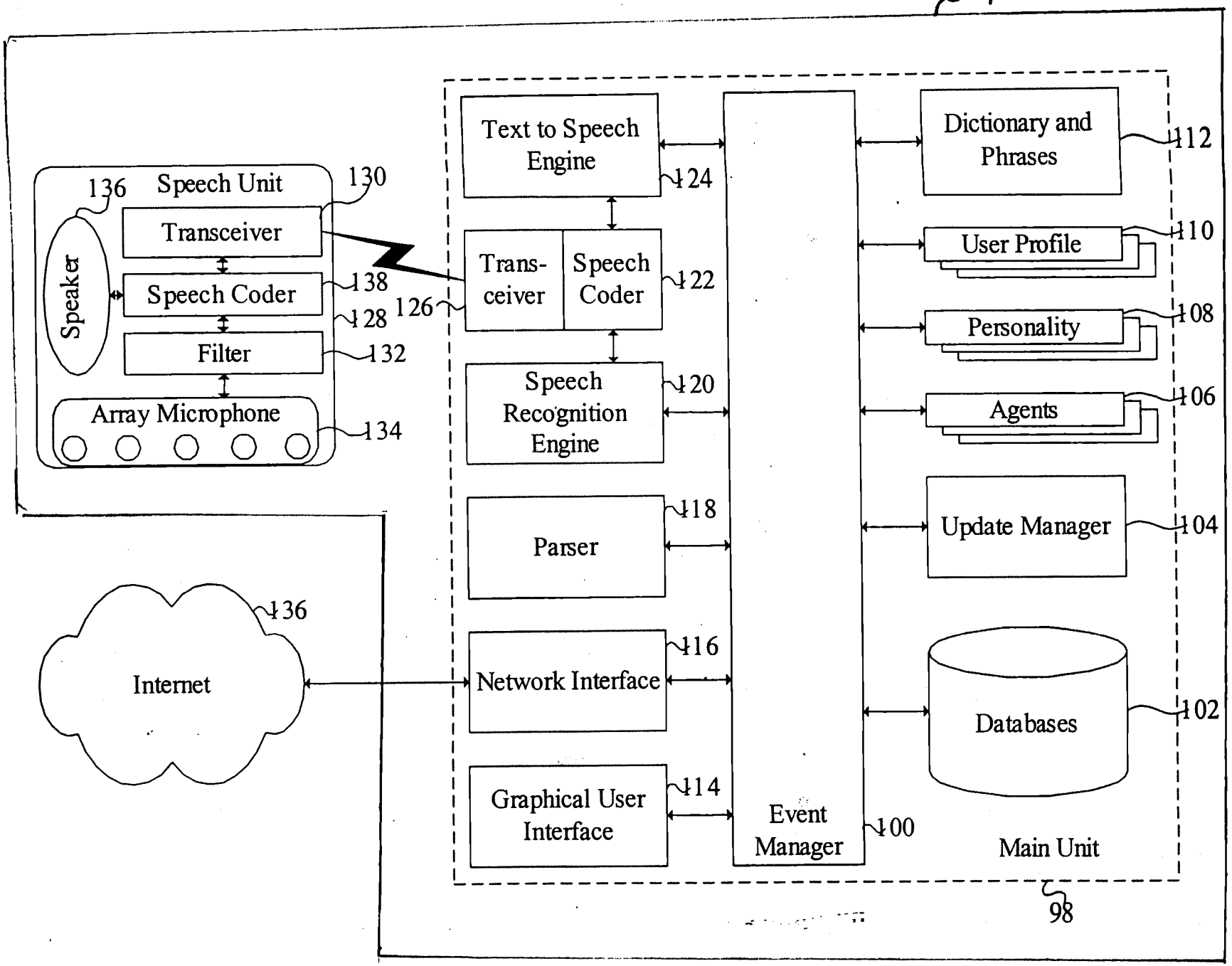
## ABSTRACT

Systems and methods for receiving natural language queries and/or commands and execute the queries and/or commands. The systems and methods overcomes the deficiencies of prior art speech query and response systems through the application of a complete speech-based information query, retrieval, presentation and command environment. This environment makes significant use of context, prior information, domain knowledge, and user specific profile data to achieve a natural environment for one or more users making queries or commands in multiple domains. Through this integrated approach, a complete speech-based natural language query and response environment can be created. The systems and methods creates, stores and uses extensive personal profile information for each user, thereby improving the reliability of determining the context and presenting the expected results for a particular question or command.




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FIG. 1




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FIG. 2

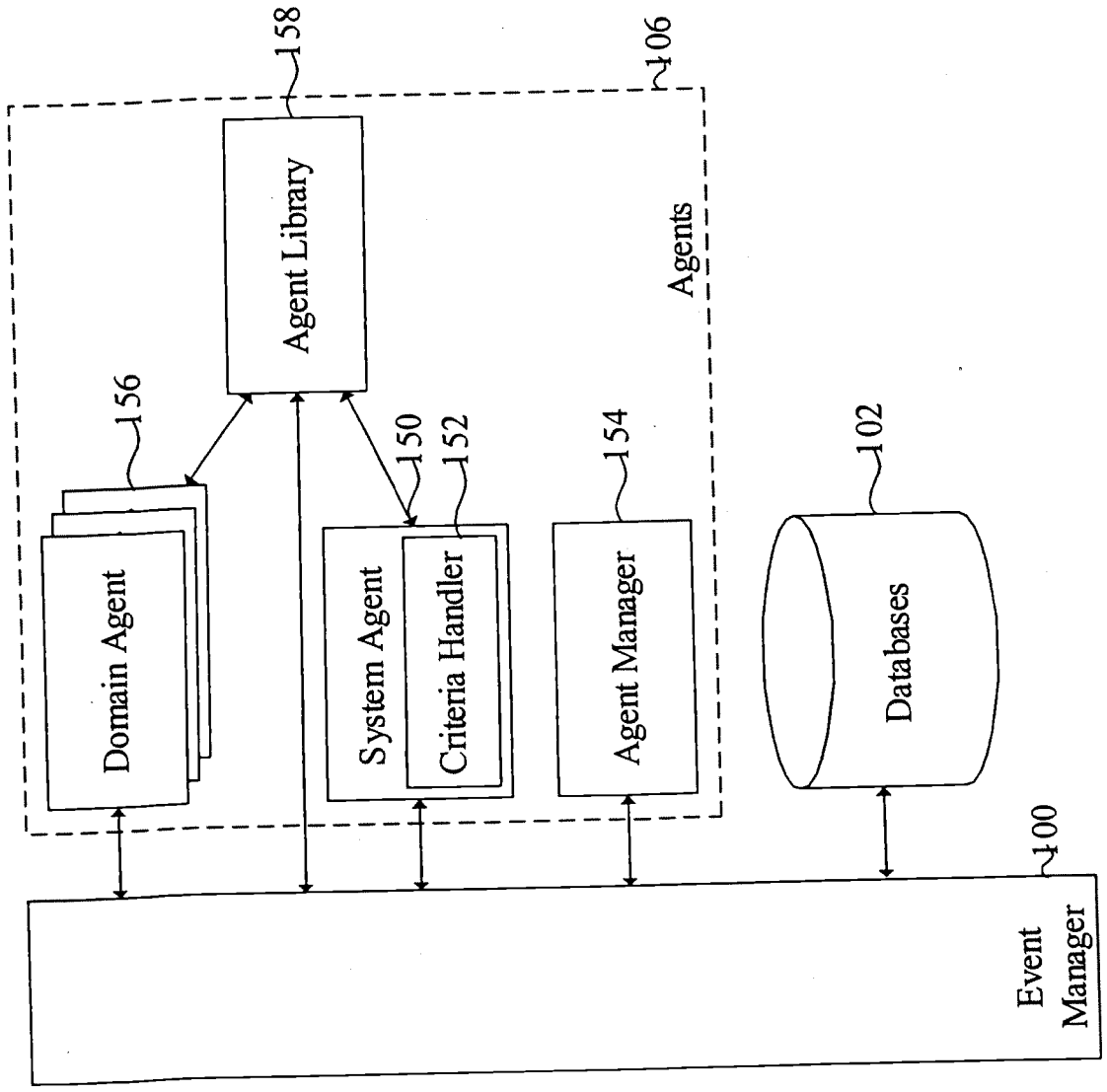
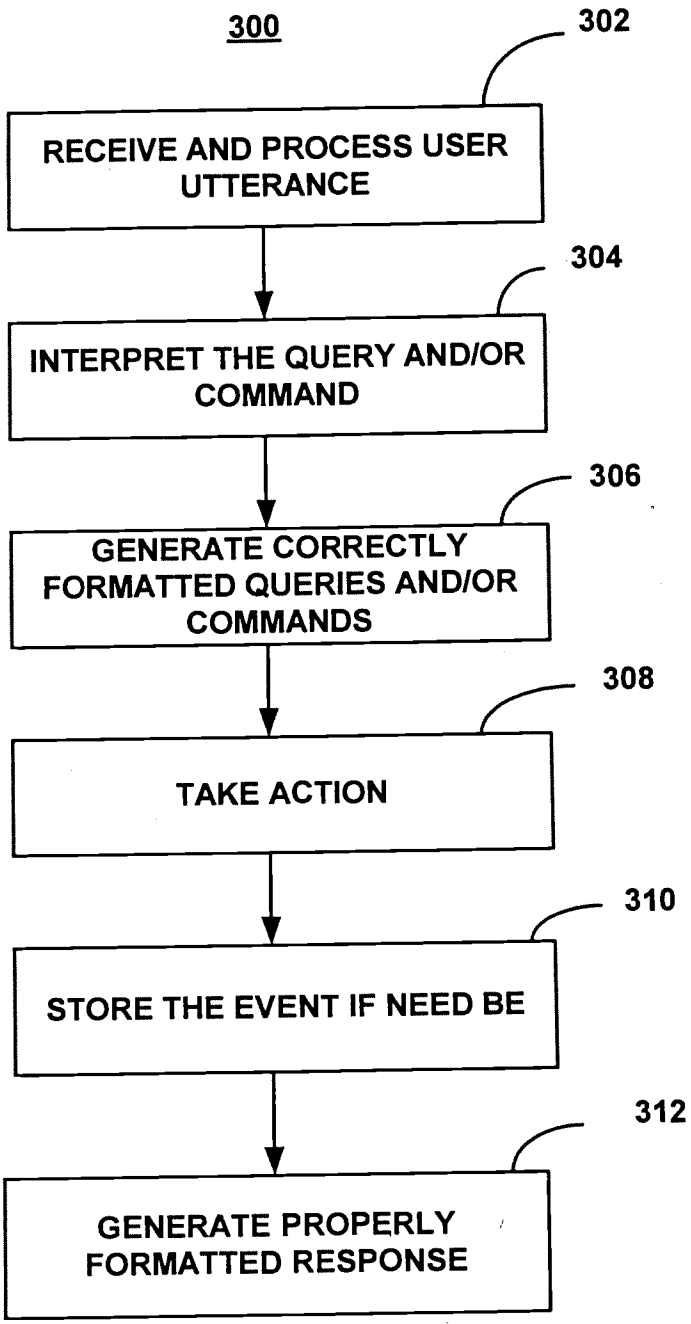

158
106
Agent Library
Agents
156
Domain Agent
150
152
System Agent
Criteria Handler
154
Agent Manager
102
Databases
100
Event Manager

FIG. 3


300
302
RECEIVE AND PROCESS USER UTTERANCE
304
INTERPRET THE QUERY AND/OR COMMAND
306
GENERATE CORRECTLY FORMATTED QUERIES AND/OR COMMANDS
308
TAKE ACTION
310
STORE THE EVENT IF NEED BE
312
GENERATE PROPERLY FORMATTED RESPONSE

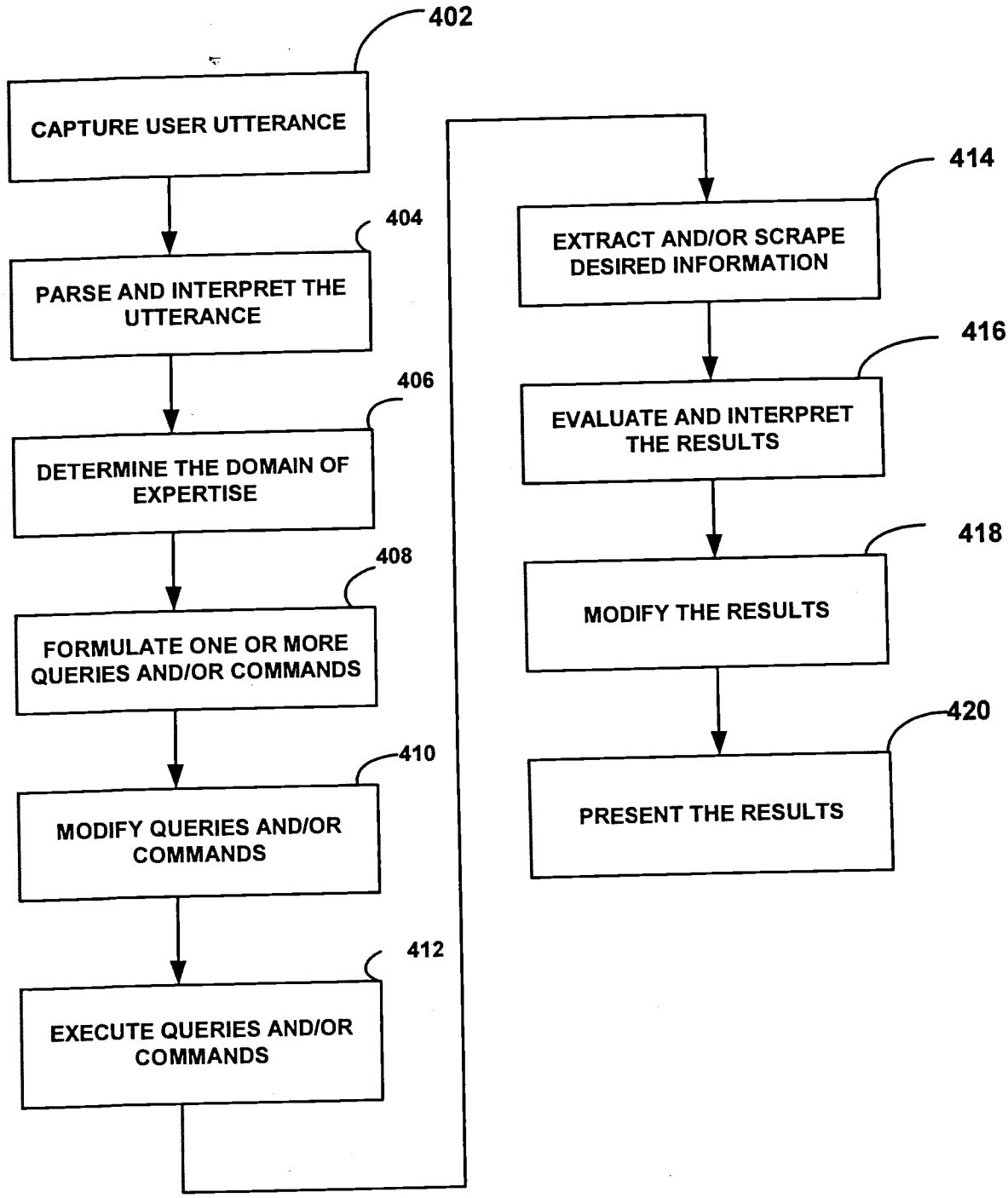

400
402
CAPTURE USER UTTERANCE
404
PARSE AND INTERPRET THE UTTERANCE
406
DETERMINE THE DOMAIN OF EXPERTISE
408
FORMULATE ONE OR MORE QUERIES AND/OR COMMANDS
410
MODIFY QUERIES AND/OR COMMANDS
412
EXECUTE QUERIES AND/OR COMMANDS
414
EXTRACT AND/OR SCRAPE DESIRED INFORMATION
416
EVALUATE AND INTERPRET THE RESULTS
418
MODIFY THE RESULTS
420
PRESENT THE RESULTS

FIG. 4B

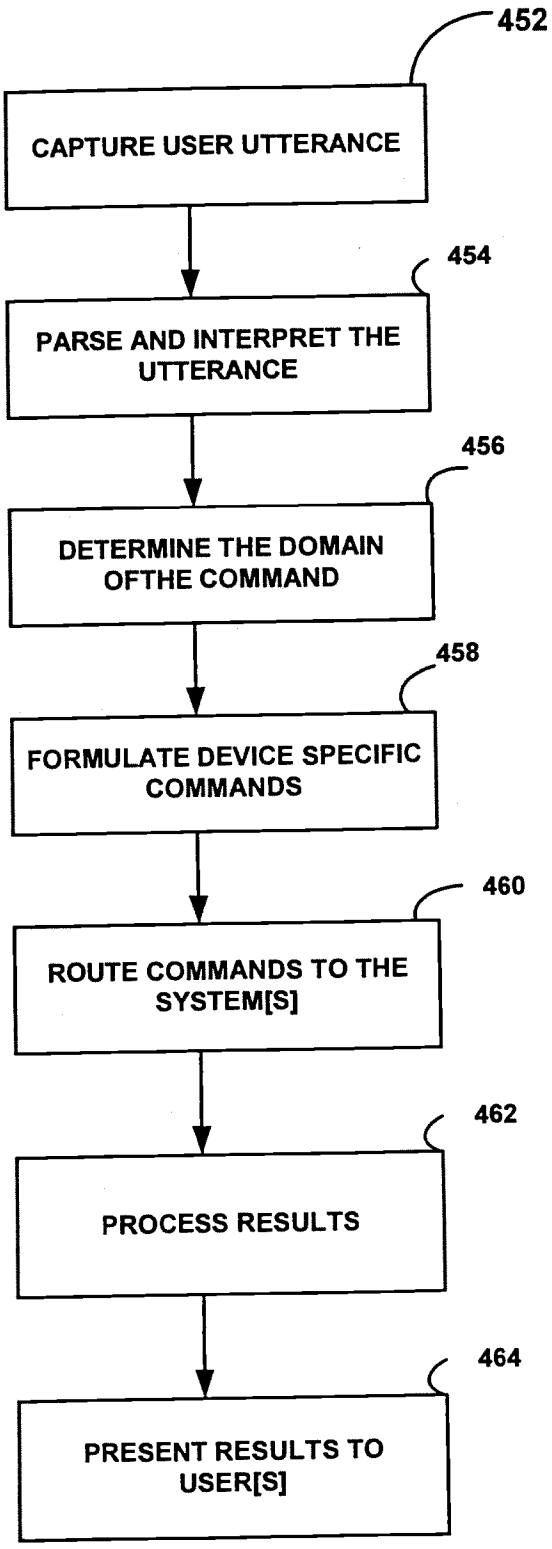

450
452
CAPTURE USER UTTERANCE
454
PARSE AND INTERPRET THE UTTERANCE
456
DETERMINE THE DOMAIN OFTHE COMMAND
458
FORMULATE DEVICE SPECIFIC COMMANDS
460
ROUTE COMMANDS TO THE SYSTEM[S]
462
PROCESS RESULTS
464
PRESENT RESULTS TO USER[S]

FIG. 5

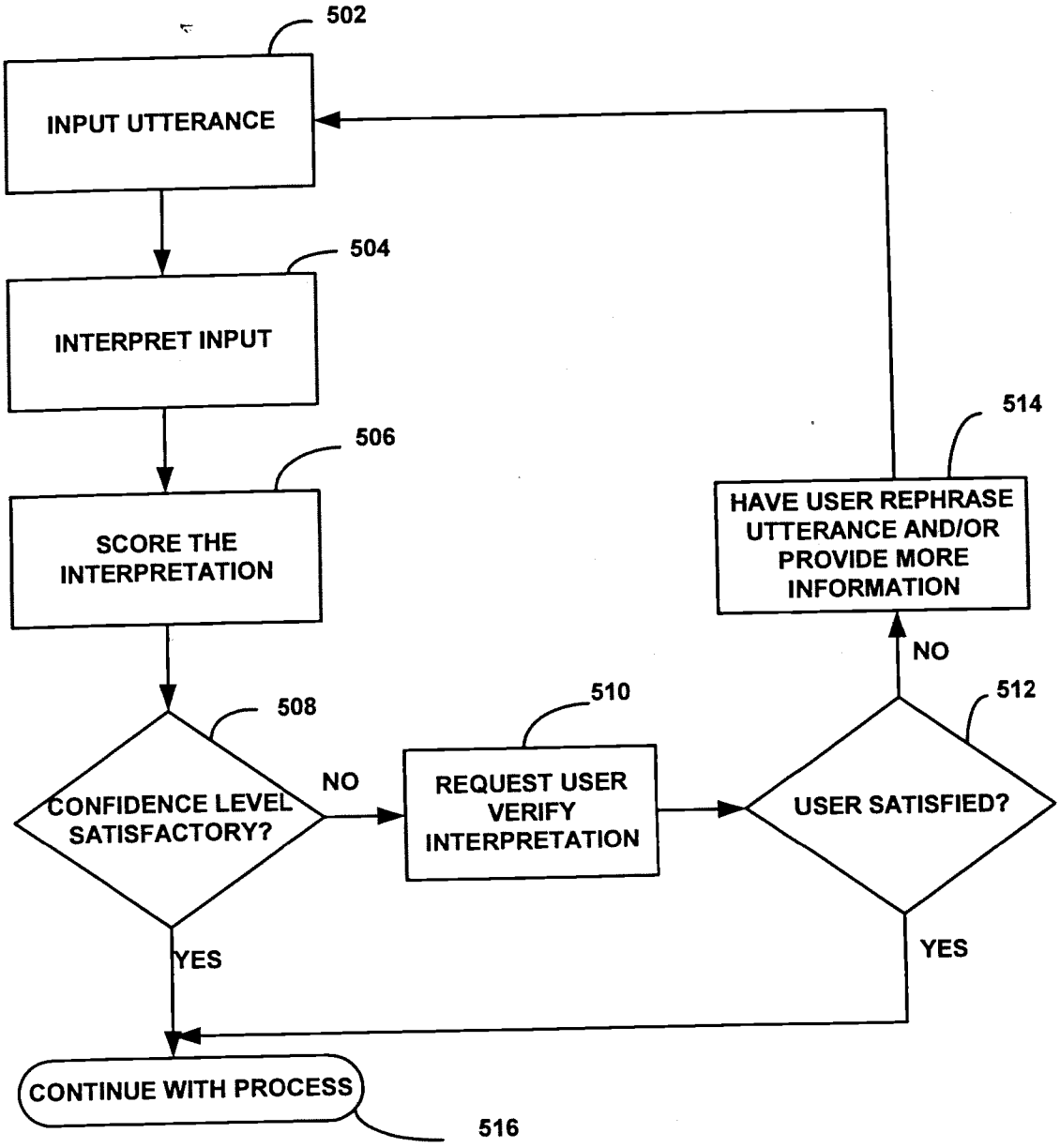
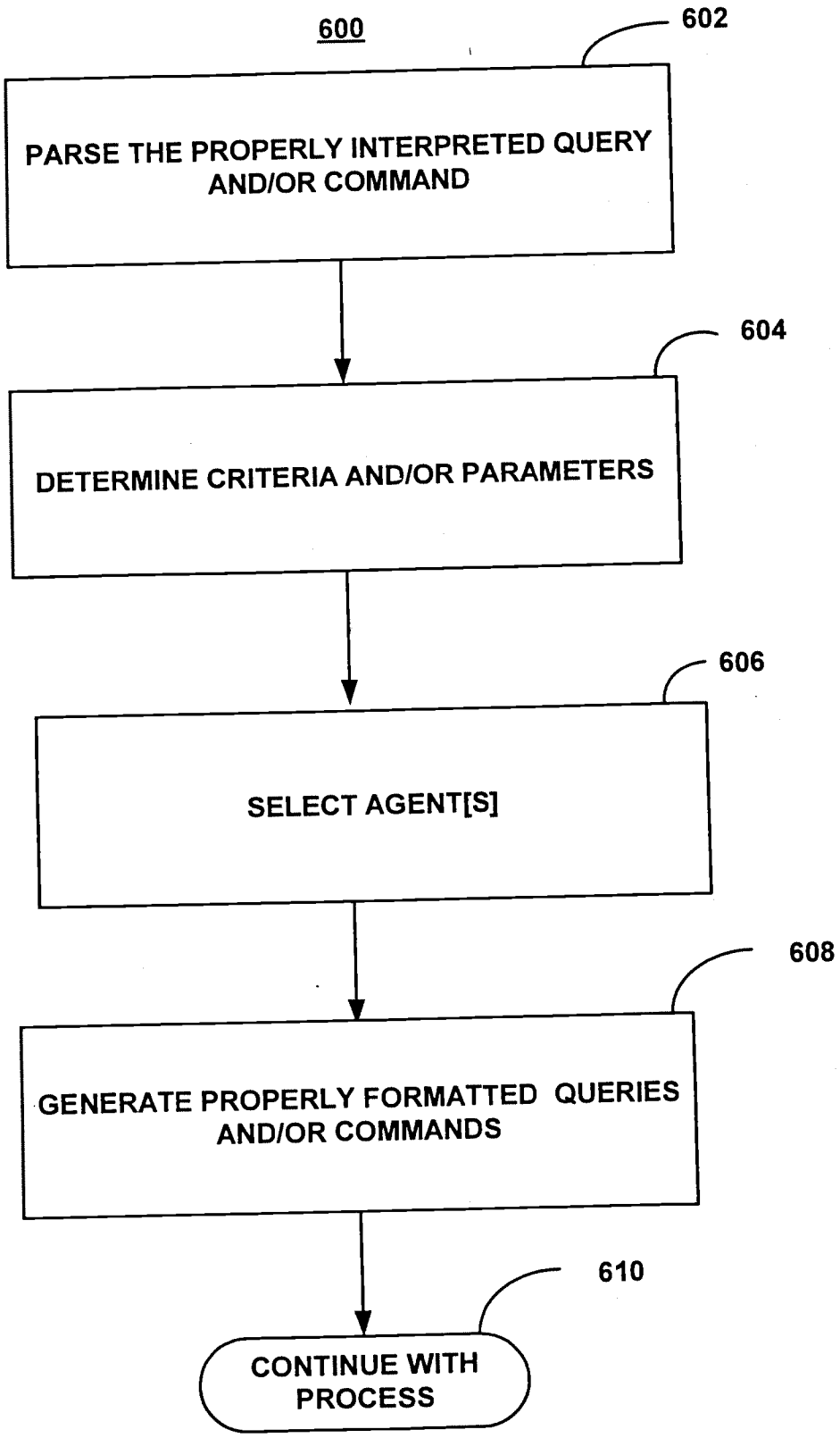

500
502
INPUT UTTERANCE
504
INTERPRET INPUT
506
SCORE THE INTERPRETATION
508
CONFIDENCE LEVEL SATISFACTORY?
NO
510
REQUEST USER VERIFY INTERPRETATION
512
USER SATISFIED?
NO
514
HAVE USER REPHRASE UTTERANCE AND/OR PROVIDE MORE INFORMATION
YES
YES
CONTINUE WITH PROCESS
516

FIG. 6


600
602
PARSE THE PROPERLY INTERPRETED QUERY AND/OR COMMAND
604
DETERMINE CRITERIA AND/OR PARAMETERS
606
SELECT AGENT[S]
608
GENERATE PROPERLY FORMATTED QUERIES AND/OR COMMANDS
610
CONTINUE WITH PROCESS

# COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As below named inventors, we hereby declare that:

Our residences, post office addresses and citizenships are as stated below next to our names.

We believe we are the original, first and joint inventors which is claimed and for which a utility patent is sought on the invention entitled:

SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

the specification of which was filed on June 3, 2003, with the U.S. Patent and Trademark Office and assigned U.S. Patent Application Serial No. 10/452,147.

We hereby state that we have reviewed and understand the contents of the above-identified specification, including the claims.

We acknowledge the duty to disclose information that is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

We hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application designating at least one country other than the United States listed below and have also identified below any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

| **Appln. Number** | **Country** *(if PCT, so indicate)* | **Filing Date** *(dd/mm/yy )* | **Priority Claimed** | |
|---|---|---|---|---|
| | | | **Yes** | **No** |
| | | | ☐ | ☐ |
| | | | ☐ | ☐ |

We hereby claim the benefit under Title 35, United States Code, § 119(e) or §120 of any United States application(s), or §365(c) of any PCT International application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:



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| Application No. *(U.S.S.N.)* | Filing Date *(dd/mm/yy)* |
|---|---|
| 60/384,388 | 06/03/2002 |
| | |
| | |

We hereby appoint the attorneys and/or agents associated with Mintz Levin Cohn Ferris Glovsky & Popeo, Customer Number

29315

to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Please address all telephone calls to James G. Gatto at telephone number 703-464-8182, and address all correspondence to:

Customer No. 29315

We hereby declare that all statements made herein of our 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 Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or patent issued thereon.

**First Inventor's Signature:** Date 9/6/03

Full Name of Inventor: Robert A. Kennewick

Citizenship: U.S. U.S.A.

Residence: 2204 S Bailey Seattle WA 98101 Seattle, Washington



Google Exhibit 1021
Page 0069

**Second Inventor's Signature:** Date

Full Name of Inventor: David Locke

Citizenship: U.S.A.

Residence: Redmond, Washington

11315 196th Ave NE
Redmond, WA 98053

10-13-03

**Third Inventor's Signature:** Date

Full Name of Inventor: Michael R. Kennewick, Senior

Citizenship: U.S.A.

Residence: Bellevue, Washington

13407 NE 37th Place
Bellevue, WA, 98005

10-13-03

**Fourth Inventor's Signature:** Date

Full Name of Inventor: Michael R. Kennewick, Junior

Citizenship: U.S.A.

Residence: Bellevue, Washington

13407 NE 37th Place
Bellevue WA 98005

10-13-03

**Fifth Inventor's Signature:** Date

Full Name of Inventor: Richard Kennewick

Citizenship: U.S. U.S.A.

Residence: Woodinville, Washington

14222 227 Ave NE
Woodinville, Wash 98072

10-13-03

**Sixth Inventor's Signature:** Date

Full Name of Inventor: Tom Freeman

Citizenship: U.S.A. U.S.A.

Residence: Mercer Island, Washington

6735 85rd Ave SE.
Mercer Island 98040





Google Exhibit 1021
Page 0070

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | |
| **Filing Date:** | |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| First Named Inventor/Applicant Name: | ROBERT A. KENNEWICK |
| **Filer:** | Syed Ali |
| **Attorney Docket Number:** | 090611-0361350 |

Filed as Small Entity

**Utility Filing Fees**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| Utility filing Fee (Electronic filing) | 4011 | 1 | 75 | 75 |
| Utility Search Fee | 2111 | 1 | 250 | 250 |
| Utility Examination Fee | 2311 | 1 | 100 | 100 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| Post-Allowance-and-Post-Issuance: | | | | |
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | | **Total in USD ($)** | **425** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 1767996 |
| **Application Number:** | 11747547 |
| **International Application Number:** | |
| **Confirmation Number:** | 4708 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| **First Named Inventor/Applicant Name:** | ROBERT A. KENNEWICK |
| **Customer Number:** | 00909 |
| **Filer:** | Syed Ali |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | 090611-0361350 |
| **Receipt Date:** | 11-MAY-2007 |
| **Filing Date:** | |
| **Time Stamp:** | 15:45:03 |
| **Application Type:** | Utility |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment was successfully received in RAM | $425 |
| RAM confirmation Number | 331 |
| Deposit Account | 033975 |
| 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 1.16 and 1.17 | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes) | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 0361350Appln.pdf | 2610795 | yes | 70 |

**Multipart Description/PDF files in .zip description**

| Document Description | Start | End |
|---|---|---|
| Transmittal of New Application | 1 | 2 |
| Application Data Sheet | 3 | 4 |
| Specification | 5 | 56 |
| Claims | 57 | 59 |
| Abstract | 60 | 60 |
| Drawings | 61 | 67 |
| Oath or Declaration filed | 68 | 70 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 2 | Fee Worksheet (PTO-06) | fee-info.pdf | 8408 | no | 2 |

**Warnings:**

**Information:**

| Total Files Size (in bytes): | 2619203 |
|---|---|

**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.**

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 1767996 |
| **Application Number:** | 11747547 |
| **International Application Number:** | |
| **Confirmation Number:** | 4708 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| **First Named Inventor/Applicant Name:** | ROBERT A. KENNEWICK |
| **Customer Number:** | 00909 |
| **Filer:** | Syed Ali |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | 090611-0361350 |
| **Receipt Date:** | 11-MAY-2007 |
| **Filing Date:** | |
| **Time Stamp:** | 15:45:03 |
| **Application Type:** | Utility |

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| Submitted with Payment | yes |
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## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes) | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 0361350Appln.pdf | 2610795 | yes | 70 |

**Multipart Description/PDF files in .zip description**

| Document Description | Start | End |
|---|---|---|
| Transmittal of New Application | 1 | 2 |
| Application Data Sheet | 3 | 4 |
| Specification | 5 | 56 |
| Claims | 57 | 59 |
| Abstract | 60 | 60 |
| Drawings | 61 | 67 |
| Oath or Declaration filed | 68 | 70 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 2 | Fee Worksheet (PTO-06) | fee-info.pdf | 8408 | no | 2 |

**Warnings:**

**Information:**

| Total Files Size (in bytes): | 2619203 |
|---|---|

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5/11/07

PTO/SB/06 (12-04)
Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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**PATENT APPLICATION FEE DETERMINATION RECORD**
Substitute for Form PTO-875

11/747,547

## 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)) | | | | 75 | | | |
| SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | | | | 250 | | | |
| EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | | | | 100 | | | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | 15 minus 20 = | | X 25= | | OR | X 50= | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | 1 minus 3 = | | X 100= | | | X 200= | |
| APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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)) | | | N/A | | | N/A | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | 425 | | 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)) | | | | | | | OR | | |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | N/A | | OR | N/A | |
| | | | | | TOTAL ADD'T FEE | | OR | TOTAL ADD'T FEE | |

AMENDMENT B

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) | OR | 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)) | | | | | | | OR | | |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | N/A | | OR | N/A | |
| | | | | | TOTAL ADD'T FEE | | OR | TOTAL ADD'T 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.

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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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | 2626 | 425 | 090611-0361350 | 15 | 1 |

**CONFIRMATION NO. 4708**

909
PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA22102

**FILING RECEIPT**

Date Mailed: 05/31/2007

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. 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 mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. 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 (if appropriate).**

**Applicant(s)**

ROBERT A. KENNEWICK, Seattle, WA;
David Locke, Redmond, WA;
Michael R. Kennewick SR., Bellevue, WA;
Michael R Kennewick JR., Bellevue, WA;
Richard Kennewick, Woodinville, WA;
Tom Freeman, Mercer Island, WA;

**Power of Attorney:** The patent practitioners associated with Customer Number 29315

**Domestic Priority data as claimed by applicant**

This application is a DIV of 10/452,147 06/03/2003
which claims benefit of 60/384,388 06/03/2002

**Foreign Applications**

**If Required, Foreign Filing License Granted:** 05/31/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/747,547**

**Projected Publication Date:** To Be Determined - pending completion of Corrected Papers

**Non-Publication Request:** No

**Early Publication Request:** No

** SMALL ENTITY **

**Title**

SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

**Preliminary Class**

704

## 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.

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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 (1-866-999-4158).

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## Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date

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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 | ATTORNEY DOCKET NUMBER |
|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 |

**CONFIRMATION NO. 4708**

909
PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

**FORMALITIES LETTER**

Date Mailed: 05/31/2007

## NOTICE TO FILE CORRECTED APPLICATION PAPERS

### *Filing Date Granted*

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
    - More than one figure is present and each figure is not labeled "Fig." with a consecutive Arabic numeral (1, 2, etc.) or an Arabic numeral and capital letter in the English alphabet (A, B, etc.)(see 37 CFR 1.84(u)(1)). See Figure(s) 4A. A brief description of the several views of the drawings (see 37 CFR 1.74) should be added or amended to correspond to the corrected numbering of the figures. See also 37 CFR 1.77(b)(7).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

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***If you are not using EFS-Web to submit your reply, you must include a copy of this notice.***

Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199
PART 3 - OFFICE COPY






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

| | |
|---|---|
| IN RE PATENT APPLICATION OF: | Robert A. KENNEWICK *et al.* |
| SERIAL NO.: | 11/747,547 |
| ATTORNEY DOCKET NO.: | 090611-0361350 |
| FILING DATE: | May 11, 2007 |
| ART UNIT: | 2626 |
| EXAMINER | *Not yet assigned* |
| FOR: | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |

**Mail Stop Missing Parts**
Commissioner for Patents
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Alexandria, Virginia 22313-1450

**RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS**

Sirs:

In response to the Notice to File Corrected Application Papers mailed May 31, 2007, a copy of which is enclosed herewith, Applicants respectfully submit seven (7) sheets of formal drawings, Figs. 1, 2, 3, 4A, 4B, 5 and 6, identifying them as replacement sheets. The Examiner is respectfully requested to acknowledge receipt of these formal drawings.

Date: **July 31, 2007**

Respectfully submitted,

By: _____
Syed Jafar Ali
Registration No. 58,780

**Customer No. 00909**

PILLSBURY WINTHROP SHAW PITTMAN LLP
P.O. Box 10500
McLean, Virginia 22102
Main: 703-770-7900
Direct Dial: 703-770-7540
Fax: 703-770-7901

OIPE JUL 31 2007 PATENT & TRADEMARK OFFICE

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P.O. BOX 10500
MCLEAN, VA 22102

**FORMALITIES LETTER**

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Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

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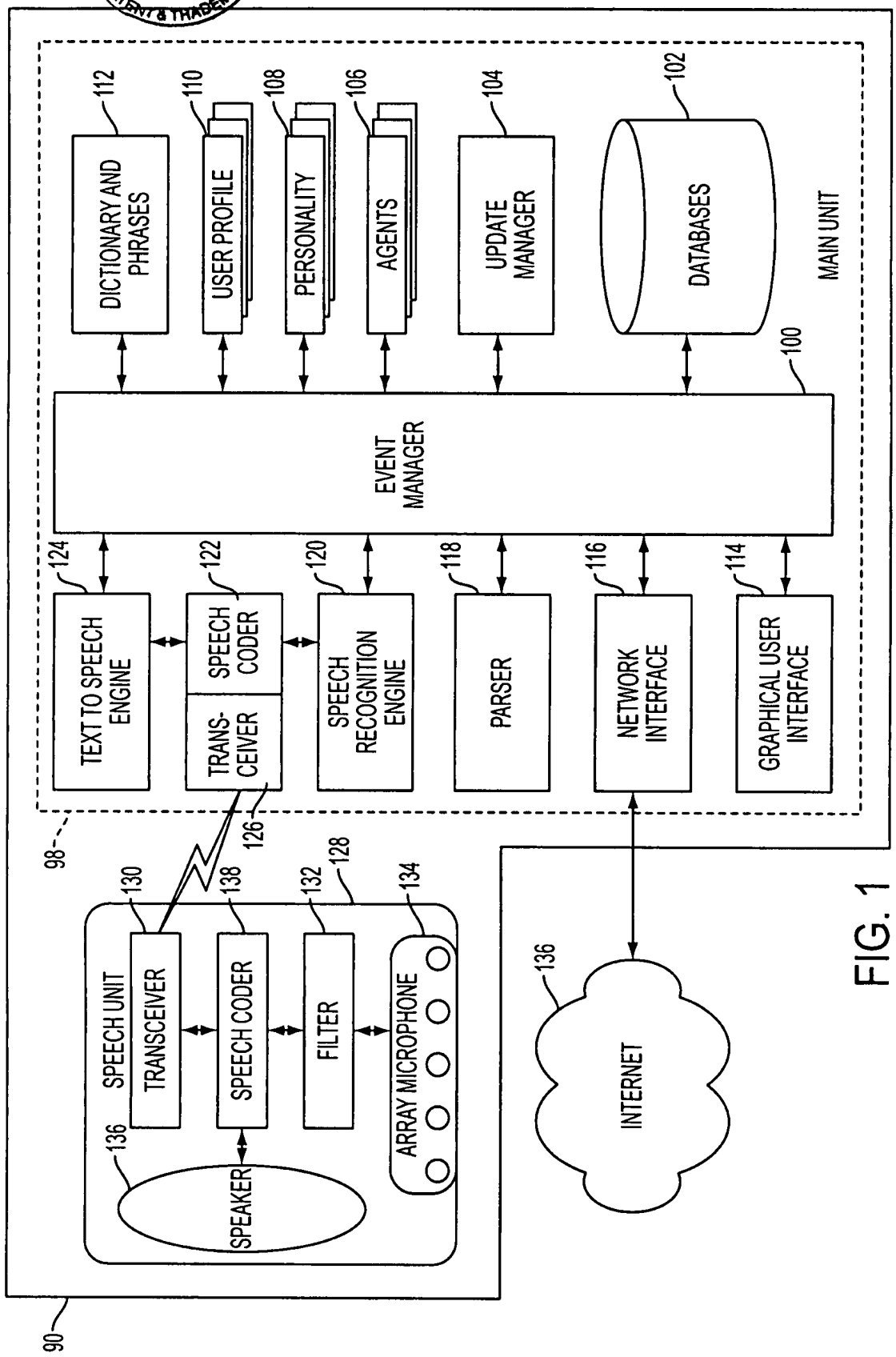



FIG. 1

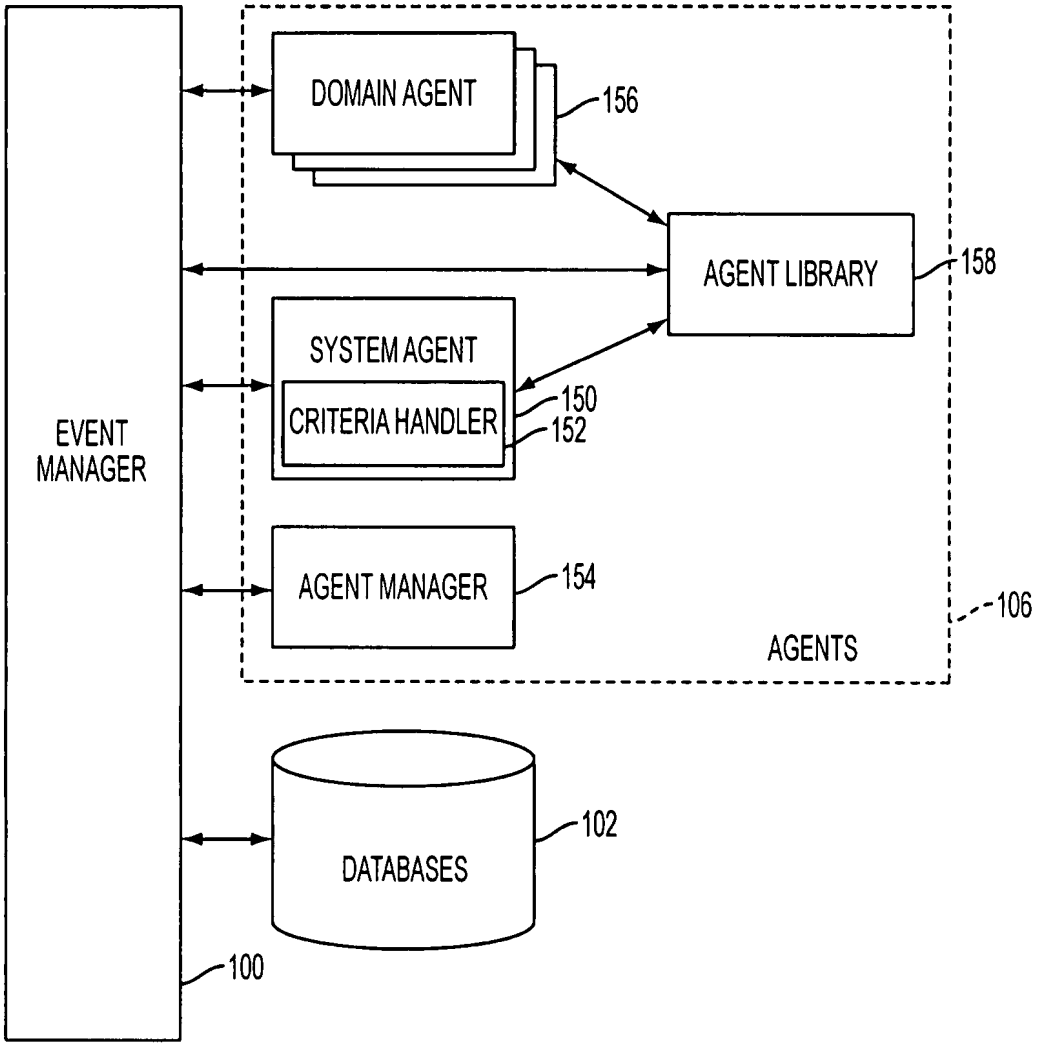

DOMAIN AGENT
156
AGENT LIBRARY
158
SYSTEM AGENT
CRITERIA HANDLER
150
152
EVENT MANAGER
AGENT MANAGER
154
106
AGENTS
DATABASES
102
100

FIG. 2

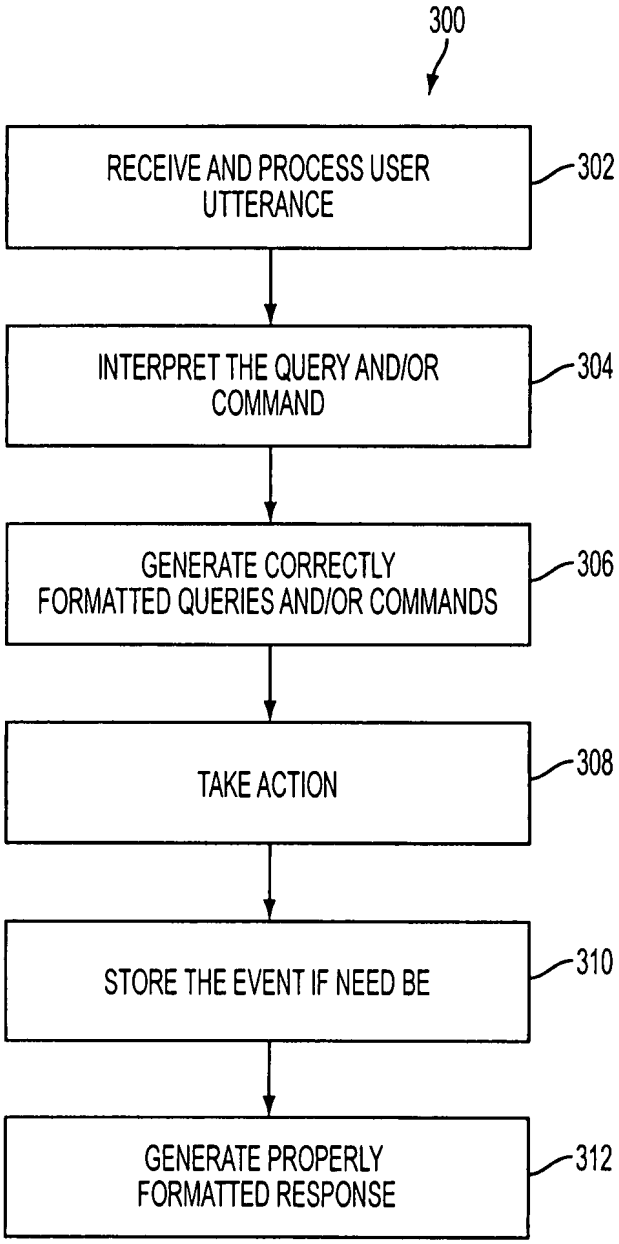

300
RECEIVE AND PROCESS USER UTTERANCE
302
INTERPRET THE QUERY AND/OR COMMAND
304
GENERATE CORRECTLY FORMATTED QUERIES AND/OR COMMANDS
306
TAKE ACTION
308
STORE THE EVENT IF NEED BE
310
GENERATE PROPERLY FORMATTED RESPONSE
312

FIG. 3

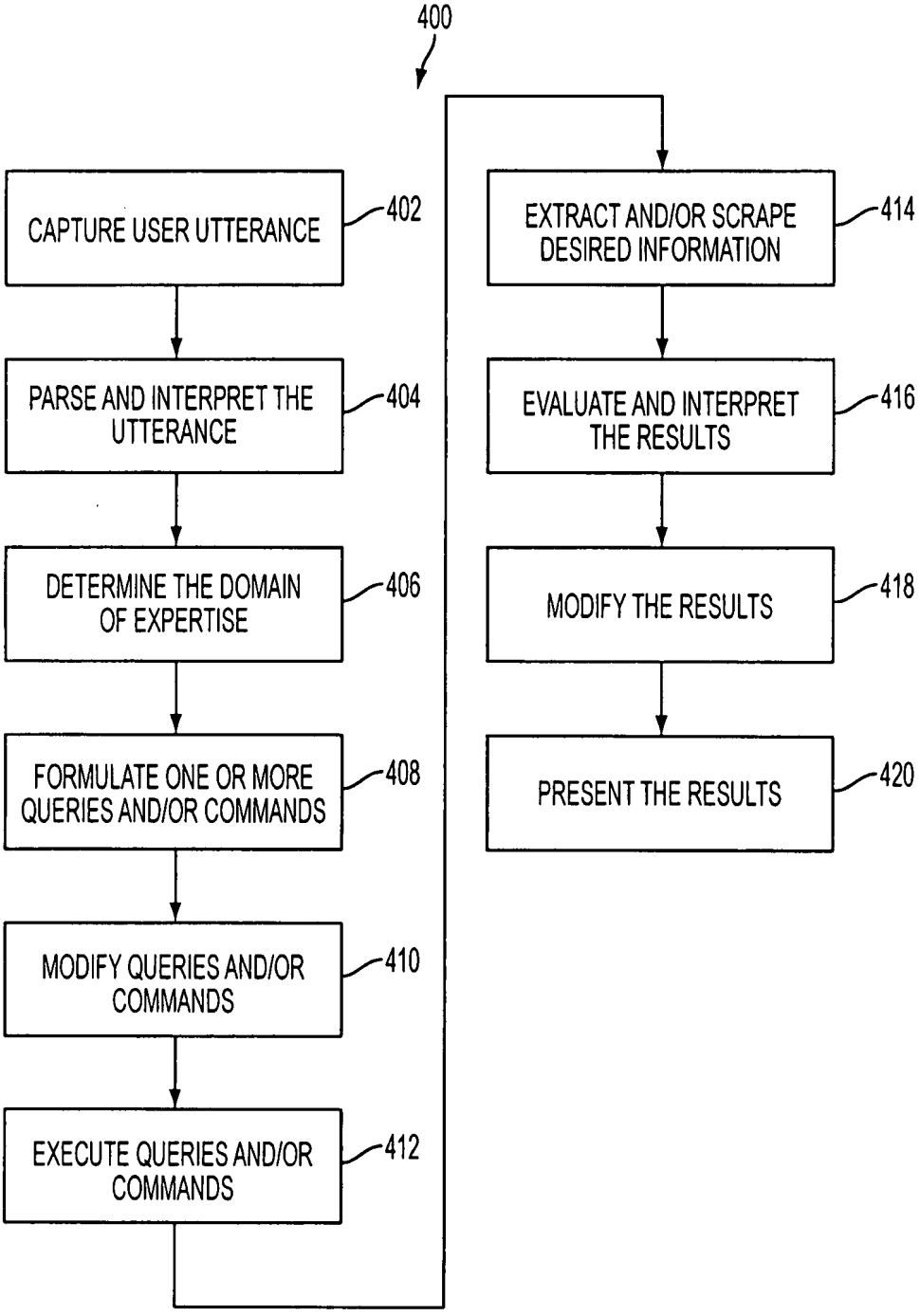

400
CAPTURE USER UTTERANCE
402
PARSE AND INTERPRET THE UTTERANCE
404
DETERMINE THE DOMAIN OF EXPERTISE
406
FORMULATE ONE OR MORE QUERIES AND/OR COMMANDS
408
MODIFY QUERIES AND/OR COMMANDS
410
EXECUTE QUERIES AND/OR COMMANDS
412
EXTRACT AND/OR SCRAPE DESIRED INFORMATION
414
EVALUATE AND INTERPRET THE RESULTS
416
MODIFY THE RESULTS
418
PRESENT THE RESULTS
420

FIG. 4A

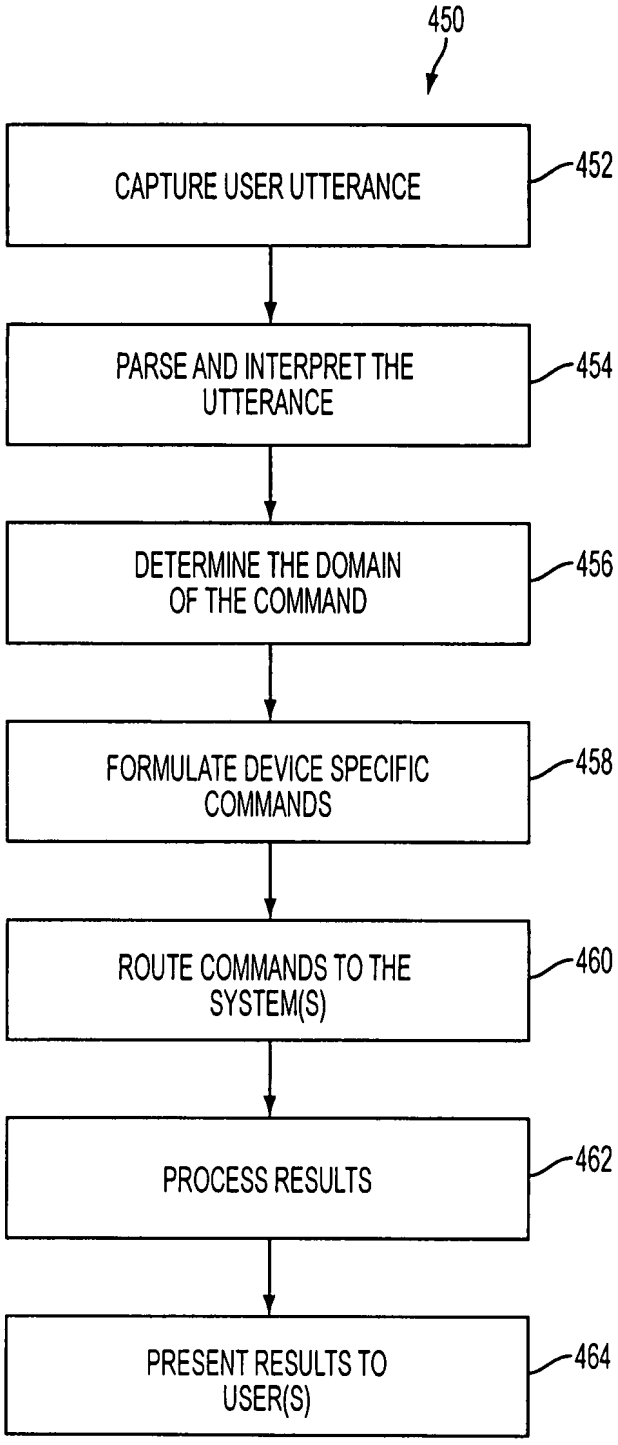

450
CAPTURE USER UTTERANCE
452
PARSE AND INTERPRET THE UTTERANCE
454
DETERMINE THE DOMAIN OF THE COMMAND
456
FORMULATE DEVICE SPECIFIC COMMANDS
458
ROUTE COMMANDS TO THE SYSTEM(S)
460
PROCESS RESULTS
462
PRESENT RESULTS TO USER(S)
464

FIG. 4B

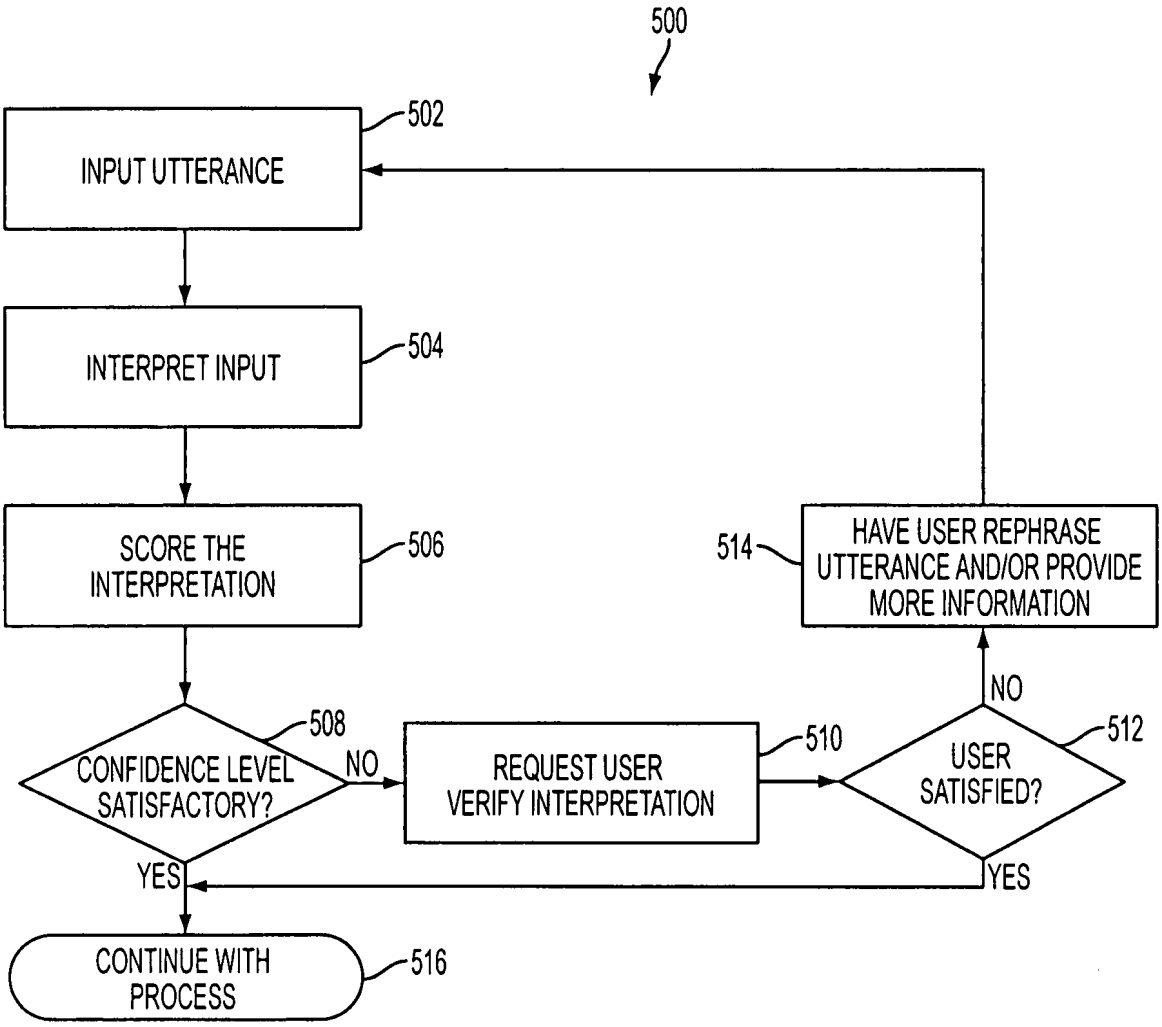

500
INPUT UTTERANCE
502
INTERPRET INPUT
504
SCORE THE INTERPRETATION
506
CONFIDENCE LEVEL SATISFACTORY?
508
NO
REQUEST USER VERIFY INTERPRETATION
510
USER SATISFIED?
512
NO
YES
YES
HAVE USER REPHRASE UTTERANCE AND/OR PROVIDE MORE INFORMATION
514
CONTINUE WITH PROCESS
516

FIG. 5

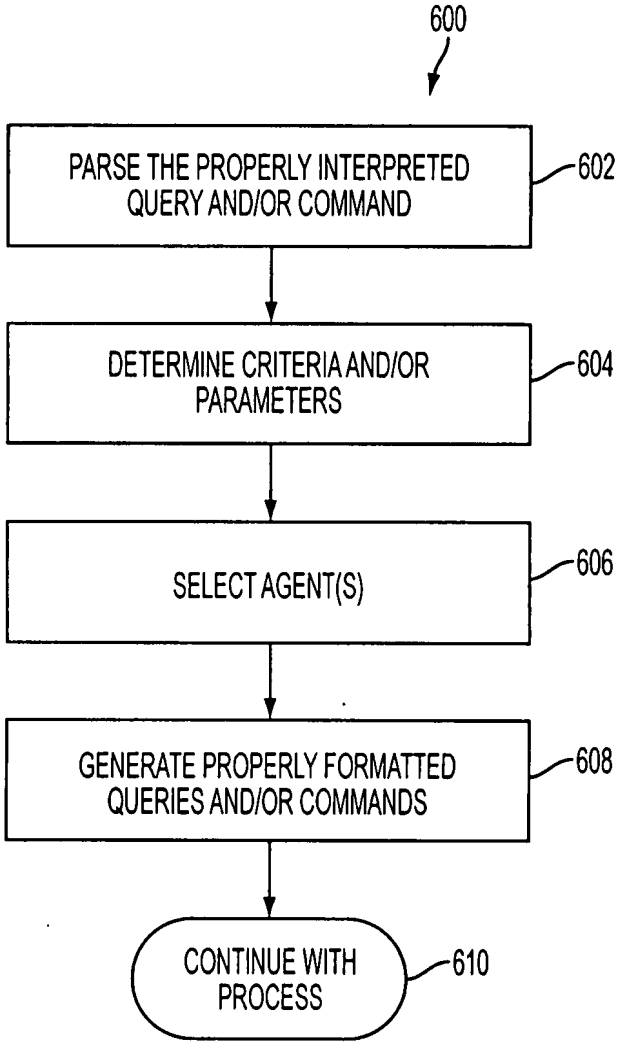

600
PARSE THE PROPERLY INTERPRETED QUERY AND/OR COMMAND
602
DETERMINE CRITERIA AND/OR PARAMETERS
604
SELECT AGENT(S)
606
GENERATE PROPERLY FORMATTED QUERIES AND/OR COMMANDS
608
CONTINUE WITH PROCESS
610

FIG. 6

UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | 2626 | 425 | 090611-0361350 | 15 | 1 |

**CONFIRMATION NO. 4708**

909
PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA22102

**UPDATED FILING RECEIPT**

Date Mailed: 08/09/2007

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 write to the Office of Initial Patent Examination's Filing Receipt Corrections. 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**

**Applicant(s)**

ROBERT A. KENNEWICK, Seattle, WA;
David Locke, Redmond, WA;
Michael R. Kennewick SR., Bellevue, WA;
Michael R Kennewick JR., Bellevue, WA;
Richard Kennewick, Woodinville, WA;
Tom Freeman, Mercer Island, WA;

**Power of Attorney:** The patent practitioners associated with Customer Number 29315

**Domestic Priority data as claimed by applicant**

This application is a DIV of 10/452,147 06/03/2003
which claims benefit of 60/384,388 06/03/2002

**Foreign Applications**

**If Required, Foreign Filing License Granted:** 05/31/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/747,547**

**Projected Publication Date:** 11/15/2007

**Non-Publication Request:** No

**Early Publication Request:** No

** SMALL ENTITY **

**Title**

SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

**Preliminary Class**

704

## 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.

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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.

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PATENT

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

Assignee : VoiceBox Technologies, Inc.

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**REVOCATION AND NEW POWER OF ATTORNEY**

VoiceBox Technologies, Inc., owner of the entire right, title and interest in, to and under the listed patent applications attached hereto under Schedule A, by virtue of assignments, hereby revokes any and all former powers of attorney and appoints the attorneys

| | |
|---|---|
| James G. Gatto | Registration No. 32,694 |
| Rick A. Toering | Registration No. 43,195 |
| Bradford C. Blaise | Registration No. 47,429 |
| Sean L. Ingram | Registration No. 48,283 |

as Assignee's attorneys with full power of substitution and revocation to take any and all action necessary with regard to the patent applications listed on the attached Schedule A.

Address all telephone calls to James G. Gatto at telephone number 703-905-2054.

Address all correspondence to Customer Number

**00909**

The undersigned hereby declares that all statements made herein of his/her 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 patent applications or any patents issuing therefrom.

VOICEBOX TECHNOLOGIES, INC.

By: _____

Name: Mike Kennewick

Title: CEO

Date: July 11, 2005

## SCHEDULE A

| Serial No. | Filing Date | Title |
|---|---|---|
| [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] |
| 10/452,147 | 06/03/2003 | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| [redacted] | [redacted] | [redacted] |

PATENT

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

Assignee : VoiceBox Technologies, Inc.

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**ASSOCIATE POWER OF ATTORNEY**

The undersigned holder of a Power of Attorney for the listed patent applications attached hereto under Schedule A, grants an Associate Power of Attorney to the attorneys and agents associated with Customer Number:

**00909**

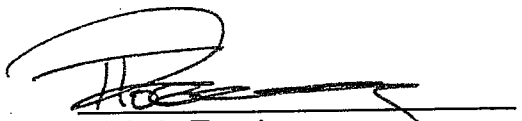
to take any and all action necessary with regard to the patent applications listed on the attached Schedule A.

Address all telephone calls to James G. Gatto at telephone number 703-905-2054.

Address all correspondence to Customer Number:

**00909**

Respectfully submitted,



Rick A. Toering
Registration No.: 43,195
PILLSBURY WINTHROP SHAW PITTMAN LLP
P.O. Box 10500
McLean, Virginia 22102
703-905-2000

Customer No.
00909

Dated: July 14, 2005

## SCHEDULE A

| Serial No. | Filing Date | Title |
|---|---|---|
| [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] |
| 10/452,147 | 06/03/2003 | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| [redacted] | [redacted] | [redacted] |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 2146613 |
| **Application Number:** | 11747547 |
| **International Application Number:** | |
| **Confirmation Number:** | 4708 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| **First Named Inventor/Applicant Name:** | ROBERT A. KENNEWICK |
| **Customer Number:** | 909 |
| **Filer:** | Rick Alyn Toering/Susan Trader |
| **Filer Authorized By:** | Rick Alyn Toering |
| **Attorney Docket Number:** | 090611-0361350 |
| **Receipt Date:** | 31-AUG-2007 |
| **Filing Date:** | 11-MAY-2007 |
| **Time Stamp:** | 11:43:56 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

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|---|---|
| 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 | 10-452147_RPOA.pdf | 110365<br>c96722a92fd3cfb50f12654c44e5f9a1084ad878 | no | 5 |

**Warnings:**

| Information: | |
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| Total Files Size (in bytes): | 110365 |

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**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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| APPLICATION NUMBER | FILING OR 371 (c) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 |

**CONFIRMATION NO. 4708**

*OC000000025750231*

909
PILLSBURY WINTHROP SHAW PITTMAN, LLP
Eric S. Cherry - Docketing Supervisor
P.O. BOX 10500
MCLEAN, VA 22102

Date Mailed: 09/10/2007

## NOTICE REGARDING POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/31/2007 . The Power of Attorney in this application is not accepted for the reason(s) listed below:

- The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(b) has not been received.

EA

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

| | | | |
|---|---|---|---|
| APPLICANTS : | Robert A. KENNEWICK *et al.* | CONFIRMATION NO.: | 4708 |
| SERIAL NUMBER : | 11/747,547 | EXAMINER: | *Unknown* |
| FILING DATE : | May 11, 2007 | ART UNIT: | 2626 |
| FOR : | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | | |

**INFORMATION DISCLOSURE STATEMENT (IDS)**

Commissioner for Patents
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Sir:

Pursuant to the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, Applicants hereby make of record in the above-identified application the documents listed on the attached Form PTO-1449.

Applicants have listed publication dates on the attached PTO-1449 based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the date indicated. Where the publication date of a listed document does not provide a month of publication, the year of publication of the listed document is sufficiently earlier than the effective U.S. filing date and any foreign priority date so that the month of publication is not an issue.

Applicants reserve the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be

prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered.

This Information Disclosure Statement is being filed within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. §1.53(d), or within three months of the date of entry of the national stage as set forth in 37 C.F.R. §1.491 in an international application, or before the mailing date of a first Office Action on the merits, or before the mailing date of a first Office Action after the filing of a request for continued examination under 37 C.F.R. §1.114. No certification or fee is required. 37 C.F.R. §1.97(b).

A copy of each cited U.S. patent is not submitted herewith pursuant to the Official Gazette Notice of August 5, 2003, wherein the Office waived the requirement under 37 C.F.R. §1.98(a)(2)(i) for all U.S. national phase applications filed after June 30, 2003.

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

By _____
Syed Jafar Ali
Registration No.: 58,780

Customer No.
00909

P. O. Box 10500
McLean, Virginia 22102
Telephone: (703) 770-7900
Telefax: (703) 770-7901

Dated: September 27, 2007

OTF 1449 TAP97
SEP 27 2007
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**INFORMATION DISCLOSURE CITATION IN AN APPLICATION**

Form PTO-1449

| Docket Number | Application Number |
|---|---|
| 090611-0361350 | 11/747,547 |
| Applicant(s) | |
| Robert A. KENNEWICK *et al.* | |
| Filing Date | Group Art Unit |
| May 11, 2007 | 2626 |

## U.S. PATENT DOCUMENTS

| *EXAMINER INITIAL | REF | DOCUMENT NO. | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
|---|---|---|---|---|---|---|---|
| | 1A | 5,155,743 | 10/13/1992 | Jacobs | 375 | 28 | |
| | 1B | 5,386,556 | 01/31/1995 | Hedin et al. | 395 | 600 | |
| | 1C | 5,424,947 | 06/13/1995 | Nagao et al. | 364 | 419.08 | |
| | 1D | 5,471,318 | 11/28/1995 | Ahuja et al. | 358 | 400 | |
| | 1E | 5,475,733 | 12/12/1995 | Eisdorfer et al. | 379 | 52 | |
| | 1F | 5,499,289 | 03/12/1996 | Bruno et al. | 379 | 220 | |
| | 1G | 5,517,560 | 05/14/1996 | Greenspan | 379 | 114 | |
| | 1H | 5,533,108 | 07/02/1996 | Harris et al. | 379 | 201 | |
| | 1I | 5,537,436 | 07/16/1996 | Bottoms et al. | 375 | 222 | |
| | 1J | 5,539,744 | 07/23/1996 | Chu et al. | 370 | 60 | |
| | 1K | 5,557,667 | 09/17/1996 | Bruno et al. | 379 | 201 | |
| | 1L | 5,563,937 | 10/08/1996 | Bruno et al. | 379 | 201 | |
| | 1M | 5,590,039 | 12/31/1996 | Ikeda et al. | 395 | 759 | |
| | 1N | 5,633,922 | 05/27/1997 | August et al. | 379 | 220 | |
| | 1O | 5,675,629 | 10/07/1997 | Raffel et al. | 379 | 58 | |
| | 1P | 5,708,422 | 01/13/1998 | Blonder et al. | 340 | 825.34 | |
| | 1Q | 5,721,938 | 02/24/1998 | Stuckey | 395 | 754 | |
| | 1R | 5,722,084 | 02/24/1998 | Chakrin et al. | 455 | 551 | |
| | 1S | 5,742,763 | 04/21/1998 | Jones | 395 | 200.3 | |
| | 1T | 5,752,052 | 05/12/1998 | Richardson et al. | 395 | 759 | |
| | 1U | 5,754,784 | 05/19/1998 | Garland et al. | 395 | 200.49 | |
| | 1V | 5,761,631 | 06/02/1998 | Nasukawa | 704 | 9 | |
| | 1W | 5,794,050 | 08/11/1998 | Dahlgren et al. | 395 | 708 | |

## FOREIGN PATENT DOCUMENTS

| | REF | DOCUMENT NO. | DATE | COUNTRY | CLASS | SUBCLASS | Translations YES | Translations NO |
|---|---|---|---|---|---|---|---|---|
| | 1X | WO 01/78065 | 10/18/2001 | International | | | | |
| | | | | | | | | |
| | | | | | | | | |

## OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

| | | |
|---|---|---|
| | 1Y | REUTERS, "IBM to Enable Honda Drivers to Talk to Cars", Charles Schwab & Co., Inc., July 28, 2002, 1 page. |
| | 1Z | LIN, Bor-shen, *et al.*, "A Distributed Architecture for Cooperative Spoken Dialogue Agents with Coherent Dialogue State and History", ASRU'99, 1999, 4 pages. |
| | 1AA | KUHN, Thomas, *et al.*, "Hybrid In-Car Speech Recognition for Mobile Multimedia Applications", Vehicular Technology Conference, IEEE, July 1999, pages 2009-2013. |

| EXAMINER | DATE CONSIDERED |
|---|---|
| | |

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

| INFORMATION DISCLOSURE CITATION IN AN APPLICATION | Docket Number | Application Number |
|---|---|---|
| | 090611-0361350 | 11/747,547 |
| | Applicant(s) | |
| | Robert A. KENNEWICK *et al.* | |
| | Filing Date | Group Art Unit |
| Form PTO-1449 | May 11, 2007 | 2626 |

## U.S. PATENT DOCUMENTS

| *EXAMINER INITIAL | REF | DOCUMENT NO. | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
|---|---|---|---|---|---|---|---|
| | 2A | 5,799,276 | 08/25/1998 | Komissarchik *et al.* | 704 | 251 | |
| | 2B | 5,802,510 | 09/01/1998 | Jones | 707 | 2 | |
| | 2C | 5,832,221 | 11/03/1998 | Jones | 375 | 200.36 | |
| | 2D | 5,878,386 | 03/02/1999 | Coughlin | 704 | 10 | |
| | 2E | 5,895,466 | 04/20/1999 | Goldberg et al. | 707 | 5 | |
| | 2F | 5,911,120 | 06/08/1999 | Jarett et al. | 455 | 417 | |
| | 2G | 5,918,222 | 06/29/1999 | Fukui *et al.* | 707 | 1 | |
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(71) Applicant *(for all designated States except US)*: **ONE VOICE TECHNOLOGIES, INC.** [US/US]; Suite 240, 6333 Greenwich Drive, San Diego, CA 92122 (US).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **WEBER, Dean, C.** [US/US]; 11422 Cypress Terrace Place, San Diego, CA 92131 (US).

(74) Agents: **SZE, James, Y.** et al.; Pillsbury Winthrop LLP, P.O. Box 7880, 50 Fremont Street, San Francisco, CA 94120-7880 (US).

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(54) Title: NATURAL LANGUAGE AND DIALOGUE GENERATION PROCESSING

(57) Abstract: A system and method for interacting with objects, via a computer using utterances, speech processing and natural language processing. A Dialogue Generation Log provides a conversational memory by relating earlier generated utterances with possible new utterances. The Dialogue Generation Log encompasses a memory structure relating the prior spoken utterances with objects, and conversational contexts. The speech processor searches the Dialogue Generation Log for a matching phrase for the proposed utterance, and determines whether the utterance should be repeated. The determination may be made on a case-by-case basis, depending upon the context of the conversational utterance. Custom user information may be stored globally using a global user registry for remote access. The system reduces the repetitive nature of computer generated conversation by not voicing utterances that have been generated recently, and by learning user preferences from already voiced conversations.

# NATURAL LANGUAGE AND DIALOGUE GENERATION PROCESSING

## BACKGROUND OF THE INVENTION

### I. Field of the Invention

The present invention relates to speech recognition for an object-based computer user interface. More specifically, the embodiments relate to a novel method and system for user interaction with a computer using speech recognition and natural language processing.

### II. Description of the Related Art

As computers have become more prevalent it has become clear that many people have great difficulty understanding and communicating with computers. A user must often learn archaic commands and non-intuitive procedures in order to operate the computer. For example, most personal computers use windows-based operating systems that are largely menu-driven. This requires that the user learn which menu commands or sequence of commands produce the desired results.

Furthermore, traditional interaction with a computer is often slowed by manual input devices such as keyboards or mice. Many computer users are not fast typists. As a result, much time is spent communicating commands and words to the computer through these manual input devices. It is becoming clear that an easier, faster and more intuitive method of communicating

with computers and networked objects, such as web-sites, is needed.

One proposed method of computer interaction is speech recognition. Speech recognition involves software and hardware that act together to audibly detect human speech and translate the detected speech into a string of words. As is known in the art, speech recognition works by breaking down sounds the hardware detects into smaller, non-divisible sounds called phonemes. Phonemes are distinct units of sound. For example, the word "those" is made up of three phonemes; the first is the "th" sound, the second is the "o" sound, and the third is the "s" sound. The speech recognition software attempts to match the detected phonemes with known words from a stored dictionary. An example of a speech recognition system is given in U.S. Patent No. 4,783,803, entitled "SPEECH RECOGNITION APPARATUS AND METHOD", issued November 8, 1998, assigned to Dragon Systems, Inc., and incorporated herein by reference. Presently, there are many commercially available speech recognition software packages available from such companies as Dragon Systems, Inc. and International Business Machines, Inc.

One limitation of these speech recognition software packages or systems is that they typically only perform command and control or dictation functions. Thus, the user is still required to learn a vocabulary of commands in order to operate the computer.

A proposed enhancement to these speech recognition systems is to process the detected words using a natural language processing system. Natural language processing generally involves determining a conceptual "meaning" (e.g., what meaning the speaker intended to convey) of the detected words by analyzing their grammatical relationship and relative context. For example, U.S. Patent No. 4,887,212, entitled "PARSER FOR NATURAL LANGUAGE TEXT", issued December 12, 1989, assigned to International Business Machines Corporation



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and incorporated by reference herein teaches a method of parsing an input stream of words by using word isolation, morphological analysis, dictionary look-up and grammar analysis.

Natural language processing used in concert with speech recognition provides a powerful tool for operating a computer using spoken words rather than manual input such as a keyboard or mouse. However, one drawback of a conventional natural language processing system is that it may fail to determine the correct "meaning" of the words detected by the speech recognition system. In such a case, the user is typically required to recompose or restate the phrase, with the hope that the natural language processing system will determine the correct "meaning" on subsequent attempts. Clearly, this may lead to substantial delays as the user is required to restate the entire sentence or command. Another drawback of conventional systems is that the processing time required for the speech recognition can be prohibitively long. This is primarily due to the finite speed of the processing resources as compared with the large amount of information to be processed. For example, in many conventional speech recognition programs, the time required to recognize the utterance is long due to the size of the dictionary file being searched.

An additional drawback of conventional speech recognition and natural language processing systems is that they are not interactive, and thus are unable to cope with new situations. When a computer system encounters unknown or new networked objects, new relationships between the computer and the objects are formed. Conventional speech recognition and natural language processing systems are unable to cope with the situations that result from the new relationships posed by previously unknown networked objects. As a result, a conversational-style interaction with the computer is not possible. The user is required to



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communicate complete concepts to the computer. The user is not able to speak in sentence fragments because the meaning of these sentence fragments (which is dependent on the meaning of previous utterances) will be lost.

Moreover, conventional speech recognition and natural language processing systems fail to generate intelligent conversations because they lack a conversational memory. In other words, conventional systems do not remember the contents of their conversations with users. As a result, conversations with such system are repetitive, and may result in users repeatedly telling the systems the same facts over-and-over, or worse, have systems fail to learn and remember simple concepts.

Another drawback of conventional speech recognition and natural language processing systems is that once a user successfully "trains" a computer system to recognize the user's speech and voice commands, the user cannot easily move to another computer without having to undergo the process of training the new computer. As a result, changing a user's computer workstations or location results in wasted time by users that need to re-train the new computer to the user's speech habits and voice commands.

What is needed is an interactive user interface for a computer that utilizes speech recognition and natural language processing which avoids the drawbacks mentioned above.

## BRIEF DESCRIPTION OF THE DRAWINGS

The features, objects and advantages of the embodiments discussed herein will become more apparent from the detailed description set forth below when taken in conjunction with the



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drawings in which like reference characters identify correspondingly throughout and wherein:

FIG. 1 is a functional block diagram of an exemplary computer system;

FIG. 2 is an expanded functional block diagram of the CPU and storage medium of the computer system of FIG. 1;

FIGS. 3A-D are a flowchart of the method of providing interactive speech recognition and natural language processing to a computer;

FIG. 4 is a diagram of selected columns of an exemplary natural language processing (NLP) database;

FIG. 5 is a diagram of an exemplary Database Definition File (DDF);

FIG. 6 is a diagram of selected columns of an exemplary object table;

FIGS. 7A-D are a flowchart illustrating the linking of interactive speech recognition and natural language processing to a networked object, such as a web-page;

FIG. 8 is a diagram depicting a computer system connecting to other computers, storage media, and web-sites via the Internet;

FIG. 9 is a diagram of an exemplary user global user registry;

FIGS. 10A-B are flowcharts illustrating alternate embodiments of the retrieval and enabling of an individual's user global user registry during login at a computer workstation; and

FIG. 11 is a diagram depicting an exemplary Dialogue Generation Log.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The embodiments discussed herein will now be disclosed with reference to a functional



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block diagram of an exemplary computer system **100** of FIG. 1. In FIG. 1, computer system **100** includes a central processing unit (CPU) **102**. The CPU **102** may be any general purpose microprocessor or microcontroller as is known in the art, appropriately programmed to perform the method described herein with reference to FIGS. 3A-D. The software for programming the CPU can be found at storage medium **108** or alternatively from another location across a computer network. For example, the CPU **102** may be a conventional microprocessor such as the Pentium III™ processor manufactured by Intel Corporation or the like.

CPU **102** communicates with a plurality of peripheral equipment, including a display **104**, manual input **106**, storage medium **108**, microphone **110**, speaker **112**, data input port **114** and network interface **116**. Display **104** may be a visual display such as a CRT, LCD screen, touch-sensitive screen, or other monitors as are known in the art for visually displaying images and text to a user. Manual input **106** may be a conventional keyboard, keypad, mouse, trackball, or other input device as is known in the art for the manual input of data. Storage medium **108** may be a conventional read/write memory such as a magnetic disk drive, floppy disk drive, CD-ROM drive, silicon memory or other memory device as is known in the art for storing and retrieving data. Significantly, storage medium **108** may be remotely located from CPU **102**, and be connected to CPU **102** via a network such as a local area network (LAN), or a wide area network (WAN), or the Internet. Microphone **110** may be any suitable microphone as is known in the art for providing audio signals to CPU **102**. Speaker **112** may be any suitable speaker as is known in the art for reproducing audio signals from CPU **102**. It is understood that microphone **110** and speaker **112** may include appropriate digital-to-analog and analog-to-digital conversion circuitry as appropriate. Data input port **114** may be any data port as is known in the art for



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interfacing with an external accessory using a data protocol such as RS-232, Universal Serial Bus, or the like. Network interface **116** may be any interface as known in the art for communicating or transferring files across a computer network, examples of such networks include TCP/IP, ethernet, or token ring networks. In addition, on some systems, a network interface **116** may consist of a modem connected to the data input port **114**.

Thus, FIG. 1 illustrates the functional elements of a computer system **100**. Each of the elements of computer system **100** may be suitable off-the-shelf components as described above. The present embodiment provides a method and system for human interaction with the computer system **100** using speech.

As shown in FIG. 8, the computer system **100** may be connected to the Internet **700**, a collection of computer networks. To connect to the Internet **700**, computer system **100** may use a network interface **116**, a modem connected to the data input port **114**, or any other method known in the art. Web-sites **710**, other computers **720**, and storage media **108** may also be connected to the Internet through such methods known in the art.

Turning now to FIG. 2, an expanded functional block diagram of CPU **102** and storage medium **108** is illustrated. It is understood that the functional elements of FIG. 2 may be embodied entirely in hardware, firmware, or as software instructions encoded on a computer-readable medium. In the case of a software embodiment, the software may be found at storage medium **108** or at an alternate location across a computer network. CPU **102** includes speech recognition processor **200**, data processor **201**, natural language processor **202**, and application interface **220**. The data processor **201** interfaces with the display **104**, storage medium **108**, microphone **110**, speaker **112**, data input port **114**, and network interface **116**. The data



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processor **201** allows the CPU to locate and read data from these sources. Natural language processor **202** further includes variable replacer **204**, string formatter **206**, word weighter **208**, boolean tester **210**, pronoun replacer **211**, and search engine **213**. Storage medium **108** includes a plurality of context-specific grammar files **212**, general grammar file **214**, dictation grammar **216**, context-specific dictation model **217**, natural language processor (NLP) database **218**, and a dialogue generation log (DGL) file **219**. In the preferred embodiment, the grammar files **212**, **214**, and **216** are Bakus-Naur Form (BNF) files, which describe the structure of the language spoken by the user. BNF files are well known in the art for describing the structure of language, and details of BNF files will therefore not be discussed herein. One advantage of BNF files is that hierarchical tree-like structures may be used to describe phrases or word sequences, without the need to explicitly recite all combinations of these word sequences. Thus, the use of BNF files in the preferred embodiment minimizes the physical sizes of the files **212**, **214**, and **216** in the storage medium **108**, increasing the speed at which these files can be enabled and searched as described below. However, in alternate embodiments, other file structures are used.

The context-specific dictation model **217** is an optional file that contains specific models to improve dictation accuracy. These models enable users to specify word orders and word models. The models accomplish this by describing words and their relationship to other words, thus determining word meaning by contextual interpretation in a specific field or topic. Take for example, the phrase "650 megahertz microprocessor computer." A context-specific dictation model **217** for computers may indicate the likelihood of the word "microprocessor" being associated with "computer," and that a number, such as "650" is likely to be found near the word "megahertz." By interpreting the context of the words, via a context-specific dictation model



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**217**, a speech recognition processor would analyze the phrase, interpret a single object, i.e. the computer, and realize that "650 megahertz microprocessor" are adjectives or traits describing the type of computer.

Topics for context-specific dictation models **217** vary widely, and may include any topic area of interest to a user—both broad and narrow. Broad topics may include: history, law, medicine, science, technology, or computers. Specialized topics, such as a particular field of literature encountered at a book retailer's web-site are also possible. Such a context-specific dictation model **217** may contain text for author and title information, for example.

The context-specific dictation model **217** format relies upon the underlying speech recognition processor **200**, and is specific to each type of speech recognition processor **200**.

A dialogue generation log **219** is a file, database table, or any other log known in the art that contains a memory of the conversations between a computer or system practicing the present embodiment, and a user of such a system. The purpose behind the dialogue generation log **219** is to create a conversational memory by storing a log of what is spoken. The log is also used to avoid repetitive speech generation.

An exemplary dialogue generation log **219** is shown in FIG. 11. In this example, the dialogue generation log **219** is comprised of individual dialogue generation log entries **1112A-*x***, each entry representing a line of dialogue or statement exchanged between the system and a user. Although the format of each entry may vary from embodiment to embodiment, an example dialogue generation log entry would contain information such as a log entry identifier (ID) **1102**, a user identifier **1104**, a statement **1106**, the context of the statement **1108**, and a date/time stamp **1110**. The log entry ID **1102** uniquely identifies each entry **1112**. A user ID **1104** represents



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each user of the system. Statements made by the system itself are also recorded in the log, and a special user ID **1104** is given to the system. In the example illustrated in FIG 11, the system is designated as user "-1," and other users are given positive numbers as their user ID **1104**. Other formats to represent users are certainly possible likely. The important part is that the system is uniquely identified with a user ID **1104** different from system users. Next, each entry contains a statement of what was spoken **1106**, and preferably the context **1108** in which the statement was spoken. For example, the statement "I would like to see movies," would be linked to the context of "movies" or "film." Lastly, a date-time-stamp **1110** may be recorded with each entry to identify the time frame (i.e. how recent) the statement was last made.

The operation and interaction of these functional elements of FIG. 2 will be described with reference to the flowchart of FIGS. 3A-3D. In FIG. 3A, the flow begins at block **300** with the providing of an utterance to speech processor **200**. An utterance is a series of sounds having a beginning and an end, and may include one or more spoken words. A microphone **110** may capture the spoken words in block **300**. Alternately, the utterance may be provided to the speech processor **200** over data input port **114**, or from storage medium **108**. Preferably, the utterance is in a digital format such as the well-known ".wav" audio file format.

The flow proceeds to decision **302** where the speech processor **200** determines whether one of the context-specific grammars **212** has been enabled. If the context-specific grammars **212** are enabled, the context-specific grammars **212** are searched at block **304**. In the preferred embodiment, the context-specific grammars **212** are BNF files that contain words and phrases which are related to a parent context. In general, a context is a subject area. For example, in one embodiment applicable to personal computers, examples of contexts may be "news", or



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"weather", or "stocks". In such a case, the context-specific grammars **212** would each contain commands, control words, descriptors, qualifiers, or parameters that correspond to a different one of these contexts. The use of contexts provides a hierarchal structure for types of information. Contexts and their use will be described further below with reference to the NLP database **218**.

If a context-specific grammar **212** has been enabled, the context-specific grammar **212** is searched for a match to the utterance provided at block **300**. However, if a context-specific grammar **212** has not been enabled, the flow proceeds to block **308** where the general grammar **214** is enabled.

In the preferred embodiment, the general grammar **214** is a BNF file which contains words and phrases which do not, themselves, belong to a parent context, but may have an associated context for which a context-specific grammar file **212** exists. In other words, the words and phrases in the general grammar **214** may be at the root of the hierarchal context structure. For example, in one embodiment applicable to personal computers, the general grammar **214** would contain commands and control phrases.

In block **310**, the general grammar **214** is searched for a matching word or phrase for the utterance provided at block **300**. A decision is made, depending on whether the match is found, at block **312**. If a match is not found, then the dictation grammar **216** is enabled at block **314**. In the preferred embodiment, the dictation grammar **216** is a BNF file that contains a list of words that do not, themselves, have either a parent context or an associated context. For example, in one embodiment applicable to a personal computer, the dictation grammar **216** contains a relatively large list of general words similar to a general dictionary.

In block **316** the dictation grammar is searched for matching words for each word of the



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utterance provided at block **300**. At decision block **318**, if no matching words are found, any relevant context-specific dictation model **217** is enabled at block **317**.

At decision block **319**, if no matching words are found, a visual error message is optionally displayed at the display **104** or an audible error message is optionally reproduced through speaker **112**, at block **320**. The process ends until another utterance is provided to the speech processor **200** at block **300**.

Thus, as can be seen from the above description, when an utterance is provided to the speech processor **200**, the enabled context-specific grammar **212**, if any, is first searched. If there are no matches in the enabled context-specific grammar **212**, then the general grammar **214** is enabled and searched. If there are no matches in the general grammar **214**, then the dictation grammar **316** is enabled and searched. Finally, if there are no matches in the dictation grammar **316**, a context-specific dictation model **217** is enabled **317** and used to interpret the utterance.

In the preferred embodiment, when the speech recognition processor **200** is searching either the context-specific grammar **212** or the general grammar **214**, it is said to be in the "command and control" mode. In this mode, the speech recognition processor **200** compares the entire utterance as a whole to the entries in the grammar. By contrast, when the speech recognition processor **200** is searching the dictation grammar, it is said to be in the "dictation" mode. In this mode, the speech recognition processor **200** compares the utterance to the entries in the dictation grammar **216** one word at a time. Finally, when the speech recognition processor **200** is matching the utterance with a context-specific dictation model **217**, it is said to be in "model matching" mode. It is expected that searching for a match for an entire utterance in the command and control mode will generally be faster than searching for one word at a time in



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dictation or model matching modes.

It is further expected that any individual context-specific grammar **212** will be smaller in size (i.e., fewer total words and phrases) than the general grammar **214**, which in turn will be smaller in size than the dictation grammar **216**. Thus, by searching any enabled context-specific grammar **212** first, it is likely that a match, if any, will be found more quickly, due at least in part to the smaller file size. Likewise, by searching the general grammar **214** before the dictation grammar **216**, it is likely that a match, if any, will be found more quickly.

Additionally, as will be explained further below with regard to the ability of the present embodiment to adaptively add to both the context-specific grammar **212** and the general grammar **214**, they will contain the most common utterances. As such, it is expected that a match is more likely to be found quickly in the context-specific grammar **212** or the general grammar **214** than in the dictation grammar **216**.

Finally, as will be explained further below, the words and phrases in the enabled context-specific grammar **212** are more likely to be uttered by the user because they are words that are highly relevant to the subject matter about which the user was most recently speaking. This also allows the user to speak in a more conversational style, using sentence fragments, with the meaning of his words being interpreted according to the enabled context-specific grammar **212**.

By searching in the above-described sequence, the present embodiment may search more efficiently than if the searching were to occur one entry at a time in a single, large list of all expected words and phrases.

Referring back to decision **306**, if a match is found in the context-specific grammar **212**, then there are three possible next alternatives shown in FIG. 3A. For each matching entry in the



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enabled context-specific grammar **212**, there may be an associated action to be taken by the speech recognition processor **200**. Block **322** shows that one action may be to direct application interface **220** to take some action with respect to a separate software application or entity. For example, application interface **220** may use the Speech Application Programming Interface (SAPI) standard by Microsoft to communicate with an external application. The external application may be directed, for example, to access a particular Internet web site URL or to speak a particular phrase by converting text to speech. Other actions may be taken as will be discussed further below with reference to the NLP database **218** of FIG. 4.

Block **324** shows that another action may be to access a row in the natural language processing (NLP) database **218** directly, thereby bypassing the natural language processing method described further below. Block **326** shows that another action may be to prepend a word or phrase for the enabled context to the matching word or phrase found in the context-specific grammar **306**. For example, if the enabled context were "movies" and the matching utterance were "8 o'clock," the word "movies" would be prepended to the phrase "8 o'clock" to form the phrase "movies at 8 o'clock."

Likewise, if a match is found in the general grammar **214**, then the flow may proceed to block **322** where the application interface **220** is directed to take an action as described above, or to block **324** where a row in the NLP database is directly accessed. However, if a match is found in the general grammar **214**, no prepending of a context occurs because, as stated above, the entries in the general grammar **214** do not, themselves, have a parent context.

Alternatively, manually entered words may be captured, at block **301**, and input into the natural language processor.



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Finally, with reference to FIG. 3A, words may be entered manually via manual input **106**. In this case, no speech recognition is required, and yet natural language processing of the entered words is still desired. Thus, the flow proceeds to FIG. 3B.

In FIG. 3B, at block **328**, the natural language processor **202** formats the phrase for natural language processing analysis. This formatting is accomplished by string formatter **206** and may include such text processing as removing duplicate spaces between words, making all letters lower case (or upper case), expanding contractions (e.g., changing "it's" to "it is"), and the like. The formatting prepares the phrase for parsing.

The flow continues to block **330** where certain "word-variables" are replaced with an associated wildcard function by variable replacer **204** in preparation for accessing the NLP database **218**. As used herein, the term "word-variables" refers to words or phrases that represent amounts, dates, times, currencies, and the like. For example, in one embodiment the phrase "what movies are playing at 8 o'clock" would be transformed at block **330** to "what movies are playing at $time" where "$time" is a wildcard function used to represent any time value. As another example, in one embodiment the phrase "sell IBM stock at 100 dollars" would be transformed at block **330** to "sell IBM stock at $dollars" where "$dollars" is a wildcard function used to represent any dollar value. This block may be accomplished by a simple loop that searches the phrase for key tokens such as the words "dollar" or "o'clock" and replaces the word-variables with a specified wildcard function. In order to keep track of the location in the phrase where the substitution was made, an array may be used. This allows re-substitution of the original word-variable back into the phrase at the some position after the NLP database **218** has been searched.



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The purpose of replacing word-variables with an associated wildcard function at block **330** is to reduce the number of entries that must be present in the NLP database **218**. For example, the NLP database **218** would only contain the phrase "what movies are playing at $time" rather than a separate entry for 8 o'clock, 9 o'clock, 10 o'clock, and so on. The NLP database **218** will be described further below.

At block **332**, pronouns in the phrase are replaced with proper names by pronoun replacer **211**. For example, in one embodiment the pronouns "I," "my," or "mine" would be replaced with the speaker's name. Block **332** allows user-specific facts to be stored and accessed in the NLP database **218**. For example, the sentence "who are my children" would be transformed into "who are Dean's children" where "Dean" is the speaker's proper name. Again, this block may be performed in a simple loop that searches the phrase for pronouns, and replaces the pronouns found with an appropriate proper name. In order to keep track of the locations in the phrase where a substitution was made, an array may be used.

In block **334**, the individual words in the phrase are weighted according to their relative "importance" or "significance" to the overall meaning of the phrase by word weighter **208**. For example, in one embodiment there are three weighting factors assigned. The lowest weighting factor is assigned to words such as "a," "an," "the," and other articles. The highest weighting factor is given to words that are likely to have a significant relation to the meaning of the phrase. For example, these may include all verbs, nouns, adjectives, and proper names in the NLP database **218**. A medium weighting factor is given to all other words in the phrase. The purpose of this weighting is to allow for more powerful searching of the NLP database **218**.

An example of selected columns of the NLP database **218** of one embodiment is shown in



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FIG. 4. The NLP database **218** comprises a plurality of columns **400-410**, and a plurality of rows **412A-412N**. In column **400**, the entries represent phrases that are "known" to the NLP database. In column **402**, a number of required words for each entry in column **400** is shown. In column **404**, an associated context or subcontext for each entry in column **400** is shown. In columns **408** and **410**, one or more associated actions are shown for each entry in column **400**. It should be noted that the NLP database **218** shown in FIG. 4 is merely a simplified example for the purpose of teaching the present embodiment. Other embodiments may have more or fewer columns with different entries.

Referring back to FIG. 3B, at block **336**, the NLP database **218** is searched for possible matches to the phrase, based on whether the entry in column **400** of the NLP database **218** contains any of the words in the phrase (or their synonyms), and the relative weights of those words. At block **338**, a confidence value is generated for each of the possible matching entries based on the number of occurrences of each of the words in the phrase and their relative weights. Weighted word searching of a database is well known in the art and may be performed by commercially available search engines such as the product "dtsearch" by DT Software, Inc. of Arlington, Virginia. Likewise, searching using synonyms is well known in the art and may be accomplished using such publicly available tools such as "WordNet," developed by the Cognitive Science Laboratory of Princeton University in Princeton, New Jersey. The search engine may be an integral part of the natural language processor **202**.

At decision **340**, the natural language processor **202** determines whether any of the possible matching entries has a confidence value greater than or equal to some predetermined minimum threshold, T. The threshold T represents the lowest acceptable confidence value for



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which a decision can be made as to whether the phrase matched any of the entries in the NLP database **218**. If there is no possible matching entry with a confidence value greater than or equal to T, then the flow proceeds to block **342** where an optional error message is either visually displayed to the user over display **104** or audibly reproduced over speaker **112**. In one embodiment, the type of error message, if any, displayed to the user may depend on how many "hits" (i.e., how many matching words from the phrase) were found in the highest-confidence NLP database entry. A different type of error message would be generated if there was zero or one hits, than if there were two or more hits.

If, however, there is at least one entry in the NLP database **218** for which a confidence value greater than or equal to T exists, then the flow proceeds to block **344** where the "noise" words are discarded from the phrase. The "noise" words include words that do not contribute significantly to the overall meaning of the phrase relative to the other words in the phrase. These may include articles, pronouns, conjunctions, and words of a similar nature. "Non-noise" words would include words that contribute significantly to the overall meaning of the phrase. "Non-noise" words would include verbs, nouns, adjectives, proper names, and words of a similar nature.

The flow proceeds to FIG. 3C where the non-noise word requirement is retrieved from column **402** of the NLP database **218** for the highest-confidence matching entry at block **346**. For example, if the highest-confidence matching phrase was the entry in row **412A**, (e.g., "what movies are playing at $time"), then the number of required non-noise words is 3.

At decision **348**, a test is made to determine whether the number of required non-noise words from the phrase is actually present in the highest-confidence entry retrieved from the NLP



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database **218**. This test is a verification of the accuracy of the relevance-style search performed at block **336**, it being understood that an entry may generate a confidence value higher than the minimum threshold, T, without being an acceptable match for the phrase.

The nature of the test performed at decision **348** is a boolean "AND" test performed by boolean tester **210**. The test determines whether each one of the non-noise words in the phrase (or its synonym) is actually present in the highest-confidence entry. If there are a sufficient number of required words actually present in the highest-confidence entry, then the flow proceeds to block **350**, where the natural language processor **202** directs application interface **220** to take an associated action from column **408** or **410**. It is understood that additional action columns may also be present.

For example, if the highest confidence entry was the entry in row **412A**, and the boolean test of decision **348** determined that there actually were 3 non-noise words from the phrase in the entry in column **400**, then the associated action in column **408** (e.g., access movie web site) would be taken. Other entries in the NLP database have other associated actions. For example, if the highest-confidence entry is that in row **412E** (e.g., "what time is it"), the associated action may be for natural language processor **202** to direct a text-to-speech application (not shown) to speak the present time to the user through the speaker **112**. As another example, if the highest-confidence entry is that in row **412F** (e.g., "show me the news"), the first associated action may be to access a predetermined news web site on the Internet, and a second associated action may be to direct an image display application (not shown) to display images associated with the news. Different or additional actions may also be performed.

Also, if the highest-confidence entry contains the required number of non-noise words



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from the phrase as determined at decision **348**, the natural language processor **202** instructs the speech recognition processor **200** to enable the context-specific grammar **212** for the associated context of column **404**. Thus, for row **412A**, context-specific grammar **212** for the context "movies" would be enabled. Thus, when the next utterance is provided to the speech recognition processor **200** in block **300** of FIG. 3A, it would search the enabled context-specific grammar **212** for "movies" before searching the general grammar **214**. As previously stated, enabling the appropriate context-specific grammar **212** greatly increases the likelihood of fast, successful speech recognition, and enhances the user's ability to communicate with the computer in a conversational style.

If, however, back at decision **348**, the required number of non-noise words from the phrase is not actually present in the highest-confidence entry retrieved from the NLP database **218**, then the flow proceeds to block **354** where the user is prompted over display **104** or speaker **112** whether the highest-confidence entry was meant, and record the inquiry in the dialogue generation log **219**. For example, if the user uttered "How much is IBM stock selling for today," the highest-confidence entry in the NLP database **218** may be the entry in row **412B**. In this case, although the relevance factor may be high, the number of required words (or their synonyms) may not be sufficient. Thus, the user would be prompted at block **354** whether he meant "what is the price of IBM stock on August 28, 1998."

The user may respond either affirmatively or negatively. If it is determined at decision **356** that the user has responded affirmatively, then the action associated with the highest-confidence entry is taken at block **350**, and the associated context-specific grammar **212** enabled at block **352**. The speech made by the user is also recorded as an entry of the dialogue generation



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log **219**.

If, however, it is determined at decision **356** that the user has responded negatively, then the flow proceeds to FIG. 3D where the associated context from column **404** of NLP database **218** is retrieved for the highest-confidence entry, and the user is prompted for information using a context-based interactive dialog at block **360**. For example, if the user uttered "what is the price of XICOR stock today," and the highest confidence entry from the NLP database **218** was row **412B** (e.g., "what is the price of IBM stock on $date"), then the user would be prompted at block **354** whether that was what he meant.

If the user responds negatively, then the context "stock" is retrieved from column **404** at block **358**, and the context-based interactive dialog for the stock context is presented to the user over the display **104** and speaker **112**. Such a context-based interactive dialog may entail prompting the user for the name and stock ticker symbol of XICOR stock. The user may respond by speaking the required information. A different context-based interactive dialog may be used for each of the possible contexts. For example, the "weather" context-based interactive dialog may entail prompting the user for the name of the location (e.g., the city) about which weather information is desired. Also, the "news" context-based interactive dialog may entail prompting the user for types of articles, news source, Internet URL for the news site, or other related information.

Upon completion of the context-based interactive dialog, the NLP database **218**, general grammar **214**, and context-specific grammar **212** are updated to include the new information, at block **362**. In this way, the next time the user asks for that information, a proper match will be found, and the appropriate action taken without prompting the user for more information. Thus,



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the present embodiment adaptively "learns" to recognize phrases uttered by the user.

In one embodiment, one or more of the NLP database **218**, context-specific grammar **212**, general grammar **214**, and dictation grammar **216** also contain time-stamp values (not shown) associated with each entry. Each time a matching entry is used, the time-stamp value associated with that entry is updated. At periodic intervals, or when initiated by the user, the entries that have a time-stamp value before a certain date and time are removed from their respective databases/grammars. In this way, the databases/grammars may be kept to an efficient size by "purging" old or out-of-date entries. This also assists in avoiding false matches.

In an alternate embodiment, the updates to the NLP database **218**, general grammar **214**, and context-specific grammar **212** are stored in a user global user registry **800**, shown in FIG. 9. A global user registry entry **800a** would be comprised of any general grammar additions **214a**, context-specific grammar additions **212a**, and NLP database additions **218a** created by the user training. Since each user of the system would have a different global user registry entry **800a**, the embodiment would be flexible enough to allow for special customizations and could adapt to the idiosyncrasies of individual users.

In yet another embodiment, the updates to global user registry entry **800** also contain dialogue generation log additions **219a**, user preferences **802**, and remembered information **804**, as shown in FIG. 9. The dialogue generation log additions **219a** would be comprised of the dialogue exchanged between the system and an individual user. The addition of dialogue generation log additions **219a** allow the system greater intelligence in its conversations with an individual user, to be transparent and mobile across different computers. User preferences **802** represents the stored system preferences of an individual user. Examples of such user preferences



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802, include, but are not limited to: window color and placement, system sounds, font preferences, and other user-interface preferences. Remembered information 804 includes. user schedule information, learned facts derived from the dialogue generation log 219, and any other user (but non-user-interface) stored data not included in user preferences. For example, if the system is told, "I own a dog," the remembered information will include that fact. Remembered information may be stored or represented by any information storage format known in the art, including any database format.

Moreover, in some embodiments, the global user registry 800 would be stored locally and mirrored at known server locations. The mirrored copy, referred to as the "travelling" global user registry entry, enables users to access their phrases "adaptively" learned by the embodiment, even when the user is logged into a different location. FIG. 10A illustrates an embodiment that accesses customized global user registry entries 800a at local and remote (travelling) locations. Initially, a valid system user is verified, by any means known in the art, and then the system searches for a locally stored global user registry entry. For example, the system queries users for their login ID and password as shown in block 900. If the password and login ID match, as determined by decision block 905, the user is deemed to be a valid user. It is well understood that this login ID and password are but one of many methods known in the art to verify valid users, and that all such validation systems could be easily substituted. If no local global user registry entry is found, block 910, the system searches for a travelling global user registry entry, block 920. If either search turns up a global user registry entry, the global user registry entry is loaded, blocks 915 and 925, respectively. Provided that the retrieval of the global user registry entry 800a is successful, blocks 930 and 935, the global user registry entry 800a is enabled at block



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940 by extracting the general grammar additions **214a**, context-specific grammar additions **212a**, NLP database additions **218a**, dialogue generation log additions **219a**, user preferences **802**, and remembered information **804**. These "learned" adaptations are then used by the system, as discussed earlier with the method of FIGS 3A-3D. If the retrieval of the travelling global user registry entry **800a** is unsuccessful, standard (non-custom user) processing is performed as reflected at block **945**.

Alternatively, in some embodiments, the user only logs into the system when accessing a terminal that does not recognize the user as a local user. This embodiment is shown in FIG. 10B. From this remote system, the user is required to specify an ID and a password. Initially, the system determines whether the user has a locally stored voice profile, block **910**. If the user has a local voice profile, it is loaded at block **915**, and flow continues at decision block **950**. If the user does not have a locally stored global user registry entry, the system queries the user for a login identifier and a password at block **900**. If the user is valid, the travelling global user registry entry is retrieved at block **925**, and flow continues at block **950**. Otherwise, the user is treated as a user with standard (non-custom) processing, at block **945**. Provided that the retrieval of the global user registry entry **800a** is successful, block **950**, the global user registry entry **800a** is enabled at block **940** by extracting the general grammar additions **214a**, context-specific grammar additions **212a**, NLP database additions **218a**, dialogue generation log additions **219a**, user preferences **802**, and remembered information **804**. These "learned" adaptations are then used by the system, as discussed earlier with the method of FIGS 3A-3D.

In one embodiment, speech recognition and natural language processing may be used to interact with objects, such as help files (".hlp" files), World-Wide-Web ("WWW" or "web")



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pages, or any other objects that have a context-sensitive voice-based interface.

FIG. 5 illustrates an exemplary Dialog Definition File (DDF) **500** which represents information necessary to associate the speech recognition and natural language processing to an internet object, such as a text or graphics file or, in the preferred embodiment, a web-page or help file. Although in its simplest embodiment the Dialog Definition File **500** consists of an object table **510**, the DDF may also contain additional context-specific grammar files **214** and additional entries for the natural language processing (NLP) database **218**, as illustrated in FIG. 5. The preferred embodiment of the DDF **500** includes an object table **510**, a context-specific grammar file **214**, a context-specific dictation model **217**, and a file containing entries to the natural language processing database **218**. These components may be compressed and combined into the DDF file **500** by any method known in the art, such as through Lempel-Ziv compression. The context-specific specific grammar file **214** and the natural language processing database **218** are as described in earlier sections. The object table **510** is a memory structure, such as a memory tree, chain or table, which associates an address of a resource with various actions, grammars, or entries in the NLP database **218**.

An exemplary embodiment of the object table **510** is illustrated in FIG. 6. FIG. 6 illustrates a memory table which may contain entry columns for: an object **520**, a Text-to-Speech (TTS) flag **522**, a text speech **524**, a use grammar flag **526**, an append grammar flag **528**, an "is yes/no?" flag, and "do yes" **532** and "do no" **534** actions. Each row in the table **540A-540*n*** would represent the grammar and speech related to an individual object. The exemplary embodiment would refer to objects **520** through a Universal Resource Locator (URL). A URL is a standard method of specifying the address of any resource on the Internet that is part of the



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World-Wide-Web. As this standard is well known in the art for describing the location of Internet resources and objects, the details of URLs will therefore not be discussed herein. One advantage of URLs is that they can specify information in a large variety of object formats, including hypertext, graphical, database and other files, in addition to a number of object devices and communication protocols. However, as shown in FIG. 6, URLs and other method of specifying objects can be used.

When combined with the text speech **524**, the Text-to-Speech (TTS) flag **522** indicates whether an initial statement should be voiced over speaker **112** when the corresponding object is transferred. For example, when transferring the web page listed in the object column **520** of row **540A** (`http://www.our-pet-store.com`), the TTS flag **522** is marked, indicating the text speech **524**, "Hello, welcome to...," is to be voiced over speaker **112**.

In some embodiments, the utterance of the initial statement may be dependent on the dialogue generation log **219**. In these embodiments, the system first checks to see if the statement was made recently to a user, before re-voicing the statement. There are several advantages in doing this. By consulting the dialogue generation log **219**, a conversation can be made more intelligent by using the dialogue generation log **219** as a "conversational memory." Moreover, a conversational memory formed by the dialogue generation log **219** also acts as a "sanity check" to make sure conversations do not become repetitive.

The use of the dialogue generation log **219** is best illustrated by example. Suppose a user was examining a speech-enhanced pet-store web-site using the present embodiment. Initially, an object table **510** is transferred from the web-site to the user's computer system **100**. When transferring the web page listed in the object column **520**, the system notes that the TTS flag **522**



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is marked, indicating the text speech **524**, "Hello, welcome to our pet store, would you like to see our dog specials?" Since this is the user's first visit to the web page, no context or statement-related entries are found in the dialogue generation log **219**, so the statement is to be voiced over speaker **112**. The user responds, "no," and decides to surf a different web page instead. Transparent to the user, the system records both statements in the dialogue generation log **219**. Moments later, the user presses the web-browser "back" key, returning to the original pet-store web page. At this time, the user returns to the web page, and again, the system notes that the TTS flag **522** is marked, indicating the text speech **524**, "Hello, welcome to our pet store, would you like to see our dog specials?" Since this is the user's subsequent visit to the web page, a statement-related entry is found in the dialogue generation log **219**. Since statement was recently voiced over the speaker, it is not voiced on again on a subsequent visit.

The next three object table **510** flags relate to the use of grammars associated with this object. The affirmative marking of the "use grammar" **526** or "append grammar" **528** flags indicate the presence of a content-specific grammar file **214** related to the indicated object. The marking of the "use grammar" flag **526** indicates that the new content-specific grammar file **214** replaces the existing content-specific grammar file, and the existing file is disabled. The "append grammar" flag **528** indicates that the new content-specific grammar file should be enabled concurrently with the existing content-specific grammar file.

Lastly, the remaining column entries relate to a "yes/no" grammar structure. If the "Is yes/no?" flag **530** is marked, then a standard "yes/no" grammar is enabled. When a standard "yes/no" grammar is enabled, affirmative commands spoken to the computer result in the computer executing the command indicated in the "Do Yes" entry **532**. Similarly, a negative



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command spoken to the computer results in the computer executing the command indicated in the "Do No" entry **534**. The entries in the "Do Yes" **532** and "Do No" **534** columns may either be commands or pointers to commands imbedded in the NLP Database **218**. For example, as shown in row **540B**, the "Is Yes/No?" flag is marked. An affirmative answer, such as "yes," given to the computer, would result in executing the corresponding command in the "Do Yes" entry **532**; in this specific case, the entry is the number "210," a reference to the 210th command in the NLP database. An answer of "no" would result in the computer executing the 211th command in the NLP database.

Turning now to FIG. 7A, a method and system of providing speech and voice commands to objects, such as a computer reading a help file or browsing the World-Wide-Web, is illustrated. The method of FIGS. 7A-7D may be used in conjunction with the method of FIGS 3A-3D and FIG. 10. In block **602**, an object location is provided to a help file reader or World-Wide-Web browser. A help file reader/browser is a program used to examine hypertext documents that are written to help users accomplish tasks or solve problems, and is well known in the art. The web browser is a program used to navigate through the Internet, and is well known in the art. Block **602**, which providing an object location to the browser, can be as simple as a user clicking on a program "help" menu item, manually typing in a URL, or having a user select a "link" at a chosen web-site. It also may be the result of a voiced command as described earlier with reference to the action associated with each entry in the NLP database **218**. Given the object location, the computer must decide on whether it can resolve object location specified, at block **604**. This resolution process is a process well known in the art. If the computer is unable to resolve the object location or internet address, an error message is displayed in the



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browser window, at block **605**, and the system is returned to its initial starting state **600**. If the object location or Internet address is resolved, the computer retrieves the object at block **606**. For a networked object, for example, a web browser sends the web-site a request to for the web page, at block **606**. For a help file application, the help reader reads the help file off of storage media **108**, at block **606**.

A decision is made, depending upon whether the object is retrieved, at block **608**. If the object cannot be retrieved, an error message is displayed in the browser window, at block **605**, and the system is returned to its initial starting state **600**. If the object is retrieved, it is displayed in the help-reader or web-site browser, as appropriate, at block **610**.

In decision block **612**, the computer **100** determines whether the DDF file **500** corresponding to the object is already present on the computer **100**. If the DDF file is present, the flow proceeds to FIG. 7C, if not the flow proceeds to FIG. 7B.

Moving to FIG. 7B, if the DDF file **500** is not present, the computer examines whether the DDF file **500** location is encoded within the object. For example, the DDF file location could be encoded within web page HyperText Markup Language (HTML) as a URL. (Note that HTML is well known in the art, and the details of the language will therefore not be discussed herein.) Encoding DDF file location within HTML code may be done either through listing the DDF file location in an initial HTML meta-tag such as:

```
<meta DDF= "http://www.our-pet-store.com/ConverseIt.ddf">
```

or directly through a scripting tag written into the variation of HTML supported by the browser,

```
<!--
      <DDF= "http://www.our-pet-store.com/ConverseIt.ddf">
-->
```



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If the DDF file location information is encoded within the web page, the location's Internet address is resolved, at block **616**, and the computer requests transfer of the DDF file **500**, at block **626**. An equivalent encoding scheme could be used within help file hypertext.

Alternatively, if the DDF file **500** location is not encoded within the object, there are several alternate places that it may be stored. It may be stored in a pre-defined location at a web-site, such as a certain file location in the root directory, or at a different centralized location, such as another Internet server or the storage medium **108** of FIG. 1. Blocks **618** and **620** test for these possibilities. Block **618** determines whether the DDF file is located at the web-site. At block **618**, the computer sends query to the web-site inquiring about the presence of the DDF file **500**. If the DDF file **500** is present at the web-site, the computer requests transfer of the DDF file **500**, at block **626**. If the DDF file **500** is not located at the web-site, the computer queries the centralized location about the presence of a DDF file for the web-site, at block **620**. If the DDF file is present at the web-site, the computer requests transfer of the DDF file, at block **626**. If the DDF file **500** cannot be found, the existing components of any present DDF file, such as the object table **510**, context-specific dictation model **217**, NLP database **218** associated with the object, and context-specific grammar **214** for any previously-viewed object, are deactivated in block **622**. Furthermore, the object is treated as a non-voice-activated object, and only standard grammar files are used, at block **624**. Standard grammar files are the grammar files existing on the system excluding any grammars associated with the content-specific grammar file associated with the object.

If the DDF file **500** is requested at block **626**, and its transfer is unsuccessful, any existing components of any present DDF file **500** are deactivated, at block **622**, and the web-site is treated



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as a non-voice-activated object, and only standard grammar files are used, at block **624**.

If the DDF file **500** is requested at block **626** and its transfer is successful at block **628**, it replaces any prior DDF file, at block **630**. Any components of the DDF file **500**, such as the object table **510**, context-specific-grammar files **214**, context-specific-dictation models **217**, and NLP database **218** are extracted at block **632**. A similar technique may be used for obtaining the software necessary to implement the method illustrated in FIGS. 3A-3D, comprising the functional elements of FIG. 2.

The flow moves to FIG. 7C. The object table **510** is read into memory by the computer in block **634**. If the object is present in the site object table **510**, as determined by block **636**, it will be represented by a row **540A-540*n*** of the table, as shown in FIG. 6. Each row of the object table represents the speech-interactions available to a user for that particular object. If no row corresponding to the object exists, then no-speech interaction exists for the web page, and processing ends.

If the object location is present in the site object table **510**, as determined by block **636**, the computer checks if the TTS flag **522** is marked, to determine whether a text speech **524** is associated with the web-page, at block **638**. If there is a text speech **524**, a decision must be made on whether it is appropriate to play the spoken statement **639**. For example, if a user was queried, "Would you like to hear about the history of Mars?" in the past five minutes, it would be inappropriate, and probably annoying, to ask the user the same question again. In making such a determination, the system checks whether the statement has been made to the user recently by examining the dialogue generation log **219**.

An individual user may be matched with a statement or statement context within a recent



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interval. Suppose the system asked, "Do you own a cat?" and the user replied, "No, I hate cats." The conversation would be recorded in the dialogue generation log **219**, noting that the context of the conversation is about cats. On a subsequent visit to a pet-store web-site, the system notes that the TTS flag **522** is marked, indicating the text speech **524**, "Hello, welcome to our pet store, would you like to see our cat specials?" Since the text-to-speech statement is an inquiry about cats, the system performs a check in the dialogue generation log 219 to see if there are past conversations with a context **1108** of "cat." The context of "cat" is located, and the system notes that the user responded "no," therefore the user does not own a cat. Consequently, the system realizes that a negative match has been made, and it would be inappropriate to voice the question to the user.

Thus, since dialogue generation log entries **1112** are time dependent, they must be kept up-to-date by the system, and old entries should be culled and removed on a periodic basis. After all, in the case of the above example, it is possible that the user eventually acquires a cat. Old entries may be removed after a certain time-period expires, or after the dialogue generation log **219** reaches a specific size. Dialogue generation log entries **1112** for each user can be removed on a first-in-first-out (FIFO) basis, so that older entries are removed before more recent entries.

If it is appropriate, the statement is voiced at block **640**, and flow continues on to FIG 7D. If there is a context-specific grammar file associated with the object, as determined by decision block **642**, it is enabled at block **644**, and then the NLP database **218** is enabled at block **646**. If no context-specific grammar file is associated with the object, only the NLP database **218** is enabled at block **646**. Once the NLP database is enabled **646**, the system behaves as shown in FIG. 3A-3C, as described above.



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In summary, the present embodiment provides a method and system for an object interactive user-interface for a computer. By the use of context-specific grammars that are tied to internet-objects through a Dialog Definition File, the present embodiment decreases speech recognition time and increases the user's ability to communicate with local and networked objects, such as help files or web-pages, in a conversational style. Adaptive updating of the various grammars and the NLP database, the present embodiment further increases interactive efficiency. The adaptive updates can be incorporated into global user registry entries that can be stored locally and remotely, to allow users access to the global user registry entries at various locations.

The previous description of the embodiments is provided to enable any person skilled in the art to make or use the present invention. The various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments without the use of inventive faculty. Thus, the present invention is not intended to be limited to the embodiments shown herein, but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.



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I CLAIM:

# CLAIMS

1. A method for interacting with an object via a computer using utterances, the method comprising:

retrieving an object table associated with the object;

searching the object table for a matching entry for the object;

locating an action associated with the matching entry, if the matching entry is found in the object table;

determining whether the action associated with the matching entry is appropriate;

performing the action associated with the matching entry, if the action is deemed appropriate.

2. The method of claim 1 wherein the action associated with the matching entry is voicing a text statement.

3. The method of claim 2 wherein the process of determining whether the action associated with the matching entry is appropriate further comprises:

identifying a context of the voiced text statement associated with the matching entry;

searching a log containing log entries with context and timestamp information to locate matching log entries with the same context as the voiced text statement;

determining whether the voiced text statement is appropriate based on the timestamp of the matching log entries.

4. The method of claim 2 wherein the process of determining whether the action associated with the matching entry is appropriate further comprises:



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searching a log containing log entries with statement and timestamp information to locate matching log entries with the same voiced text statement;

determining whether the voiced text statement is appropriate based on the timestamp of the matching log entries.

5. The method of claim 3 or 4 wherein the object table is read from a web-site.

6. The method of claim 3 or 4 wherein the object table is read from a location that stores object tables for multiple objects.

7. A method for interacting with an object via a computer using utterances, the method comprising:

searching a context-specific grammar file for a matching phrase for the utterance;

searching a general grammar file for the matching phrase if the matching phrase is not found in the context-specific grammar file;

searching a dictation grammar for the matching phrase if the matching phrase is not found in the general grammar file;

searching a context-specific dictation model for the matching phrase if the matching phrase is not found in the dictation grammar file;

searching a database for a matching entry for the matching phrase; and

performing an action associated with the matching entry and saving the utterances to a log file if the matching entry is found in the database.

8. The method of claim 7 the log is a dialogue generation log.

9. The method of claim 8 further comprising:

replacing at least one word in the matching phrase prior to the searching the database.



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10. The method of claim 9 wherein the replacing the at least one word comprises substituting a wildcard for the at least one word.

11. The method of claim 10 wherein the replacing at least one word comprises substituting a proper name for the at least one word.

12. The method of claim 11 further comprising:

text formatting the matching phrase prior to the searching of the database.

13. The method of claim 12 further comprising:

weighting individual words in the matching phrase according to a relative significance of the individual words prior to the searching of the database.

14. The method of claim 13 further comprising:

updating a global user registry entry with the dialogue generation log with utterances spoken by a user.

15. The method of claim 13 further comprising:

updating the global user registry entry with at least one of the database, the context-specific grammar file and the general grammar file with the matching phrase if the matching entry is not found in the database.

16. The method of claim 15 further comprising:

generating a confidence values for the matching entry;

comparing the confidence value with a threshold value;

determining whether a required number of words from the matching phrase are present in the matching entry;

determining the utterance has been spoken before by examining the dialogue generation



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log; and

prompting a user whether the matching entry is a correct interpretation of the utterance if the required number of words from the matching phrase are not present in the matching entry, nor present in the dialogue generation log.

17. The method of claim 16 further comprising:

prompting a user for additional information if the matching entry is not a correct interpretation of the utterance.

18. The method of claim 17 further comprising:

updating at least one of the database, the context-specific grammar file, the general grammar file, and the dialogue generation log with the additional information.

19. A system for interacting with a computer using utterances, the system comprising:

a speech processor for searching a context-specific grammar file for a matching phrase for the utterance, for searching a general grammar file for the matching phrase if the matching phrase is not found in the context-specific grammar file, for searching a dictation grammar for the matching phrase if the matching phrase is not found in the general grammar file, and for searching a context-specific dictation model if the matching phrase is not found in the dictation grammar;

a natural language processor for searching a database for a matching entry for the matching phrase and for searching a dialogue generation log for a matching log entry for the utterance; and

an application interface for performing an action associated with the matching entry if the matching entry is found in the database and the action is appropriate if the matching log entry is found in the dialogue generation log.

20. A computer readable medium encoded with executable program code, the code comprising:



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retrieving an object table associated with the object;

searching the object table for a matching entry for the object;

locating an action associated with the matching entry, if the matching entry is found in the object table;

determining whether the action associated with the matching entry is appropriate;

performing the action associated with the matching entry, if the action is deemed appropriate.

21. The computer readable medium of claim 20 wherein the action associated with the matching entry is voicing a text statement.

22. The computer readable medium of claim 21 wherein the process of determining whether the action associated with the matching entry is appropriate further comprises:

identifying a context of the voiced text statement associated with the matching entry;

searching a log containing log entries with context and timestamp information to locate matching log entries with the same context as the voiced text statement;

determining whether the voiced text statement is appropriate based on the timestamp of the matching log entries.

23. The computer readable medium of claim 21 wherein the process of determining whether the action associated with the matching entry is appropriate further comprises:

searching a log containing log entries with statement and timestamp information to locate matching log entries with the same voiced text statement;

determining whether the voiced text statement is appropriate based on the timestamp of the matching log entries.



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24. The computer readable medium of claim 22 or 23 wherein the object table is read from a web-site.

25. The computer readable medium of claim 22 or 23 wherein the object table is read from a location that stores object tables for multiple objects.

26. A computer readable medium encoded with executable program code, the code comprising:

searching a context-specific grammar file for a matching phrase for the utterance;

searching a general grammar file for the matching phrase if the matching phrase is not found in the context-specific grammar file;

searching a dictation grammar for the matching phrase if the matching phrase is not found in the general grammar file;

searching a context-specific dictation model for the matching phrase if the matching phrase is not found in the dictation grammar file;

searching a database for a matching entry for the matching phrase; and

performing an action associated with the matching entry and saving the utterances to a log file if the matching entry is found in the database.

27. The computer readable medium of claim 26 wherein the log is a dialogue generation log.

28. The computer readable medium of claim 27 further comprising:

replacing at least one word in the matching phrase prior to the searching the database.

29. The computer readable medium of claim 28 wherein the replacing the at least one word comprises substituting a wildcard for the at least one word.

30. The computer readable medium of claim 29 wherein the replacing at least one word



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comprises substituting a proper name for the at least one word.

31. The computer readable medium of claim 30 further comprising:

text formatting the matching phrase prior to the searching of the database.

32. The computer readable medium of claim 31 further comprising:

weighting individual words in the matching phrase according to a relative significance of the individual words prior to the searching of the database.

33. The computer readable medium of claim 32 further comprising:

updating a global user registry entry with the dialogue generation log with utterances spoken by a user.

34. The computer readable medium of claim 32 further comprising:

updating the global user registry entry with at least one of the database, the context-specific grammar file and the general grammar file with the matching phrase if the matching entry is not found in the database.

35. The computer readable medium of claim 34 further comprising:

generating a confidence values for the matching entry;

comparing the confidence value with a threshold value;

determining whether a required number of words from the matching phrase are present in the matching entry;

determining the utterance has been spoken before by examining the dialogue generation log; and

prompting a user whether the matching entry is a correct interpretation of the utterance if the required number of words from the matching phrase are not present in the matching entry, nor



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present in the dialogue generation log.

36. The computer readable medium of claim 35 further comprising:

prompting a user for additional information if the matching entry is not a correct interpretation of the utterance.

37. The computer readable medium of claim 36 further comprising:

updating at least one of the database, the context-specific grammar file, the general grammar file, and the dialogue generation log with the additional information.



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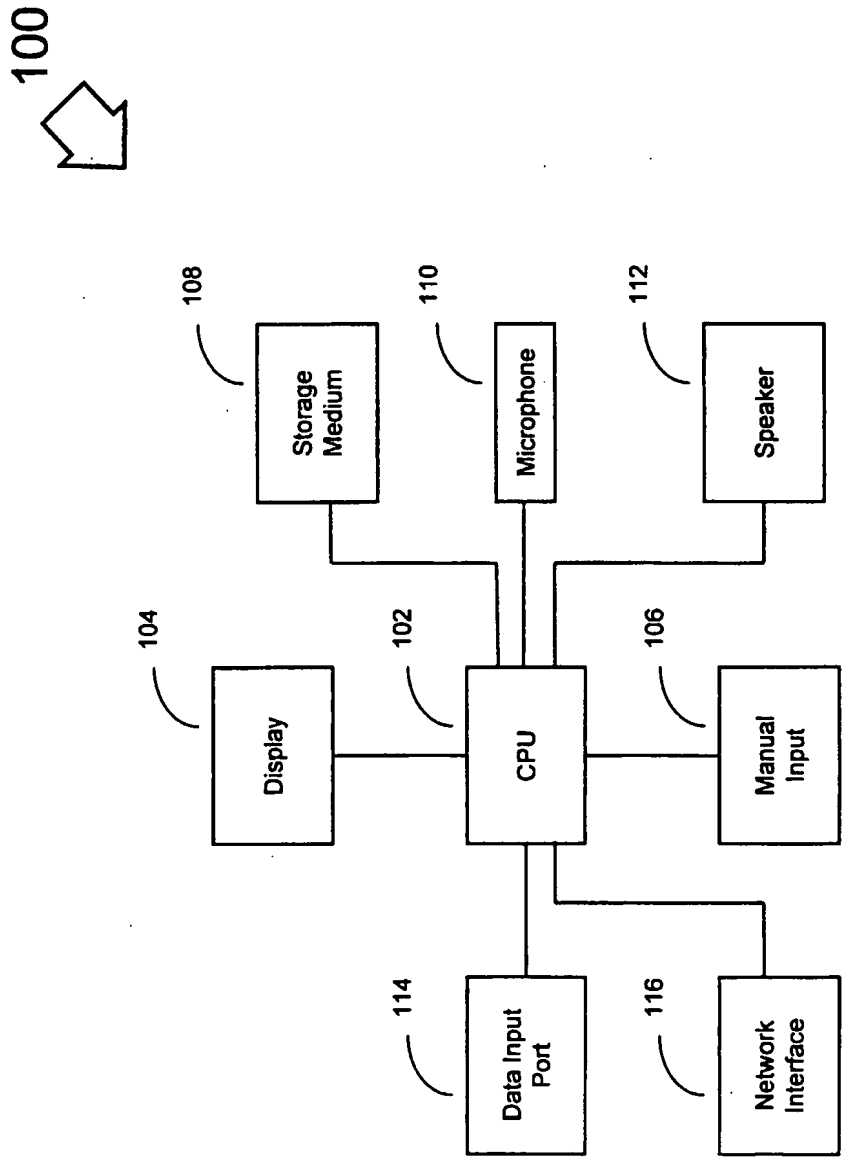

100
108
Storage Medium
110
Microphone
112
Speaker
104
Display
102
CPU
106
Manual Input
114
Data Input Port
116
Network Interface

FIG. 1

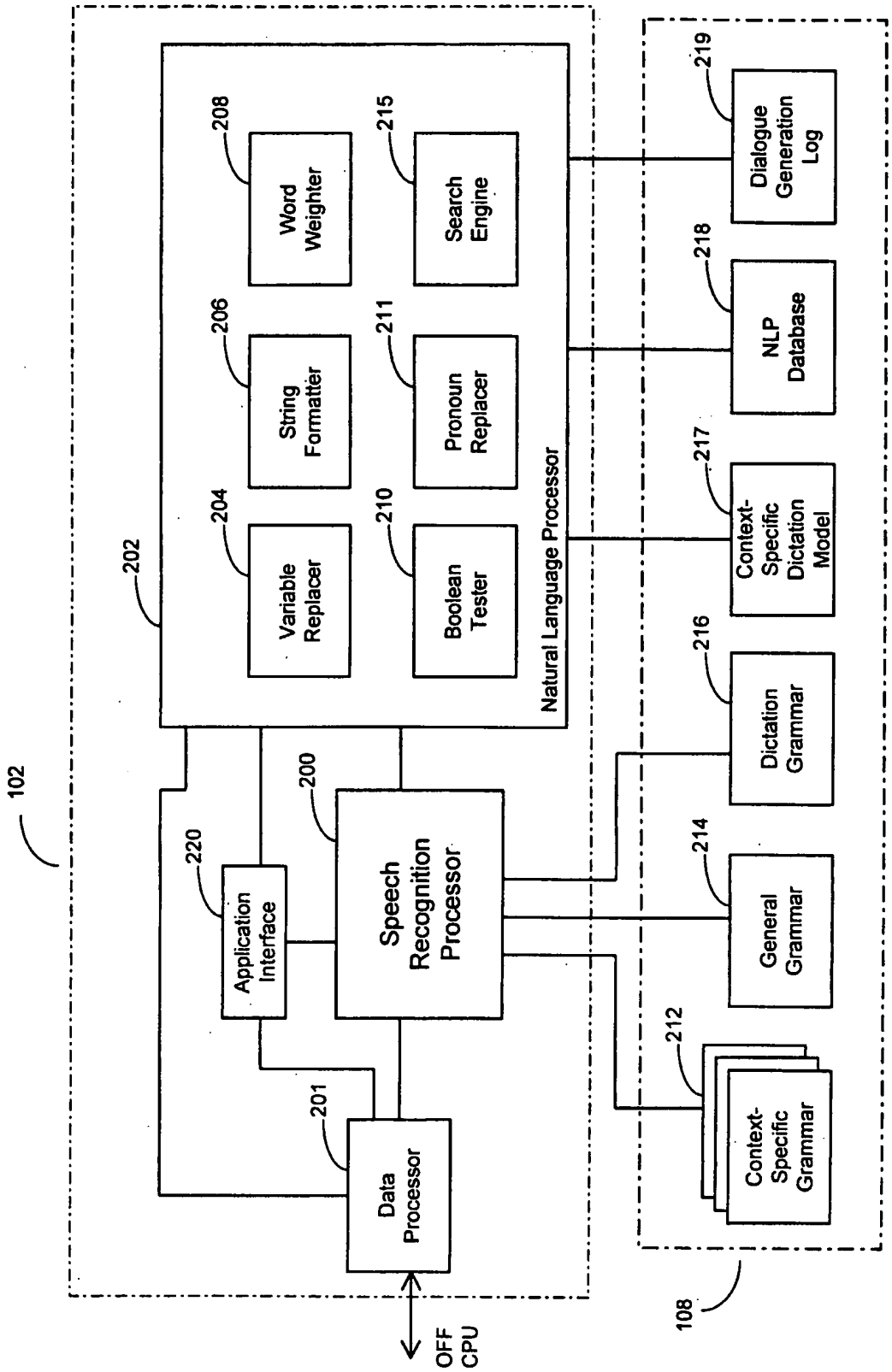

102
202
Natural Language Processor
208
Word Weighter
215
Search Engine
206
String Formatter
211
Pronoun Replacer
204
Variable Replacer
210
Boolean Tester
200
Speech Recognition Processor
220
Application Interface
201
Data Processor
OFF CPU
219
Dialogue Generation Log
218
NLP Database
217
Context-Specific Dictation Model
216
Dictation Grammar
214
General Grammar
212
Context-Specific Grammar
108

FIG. 2

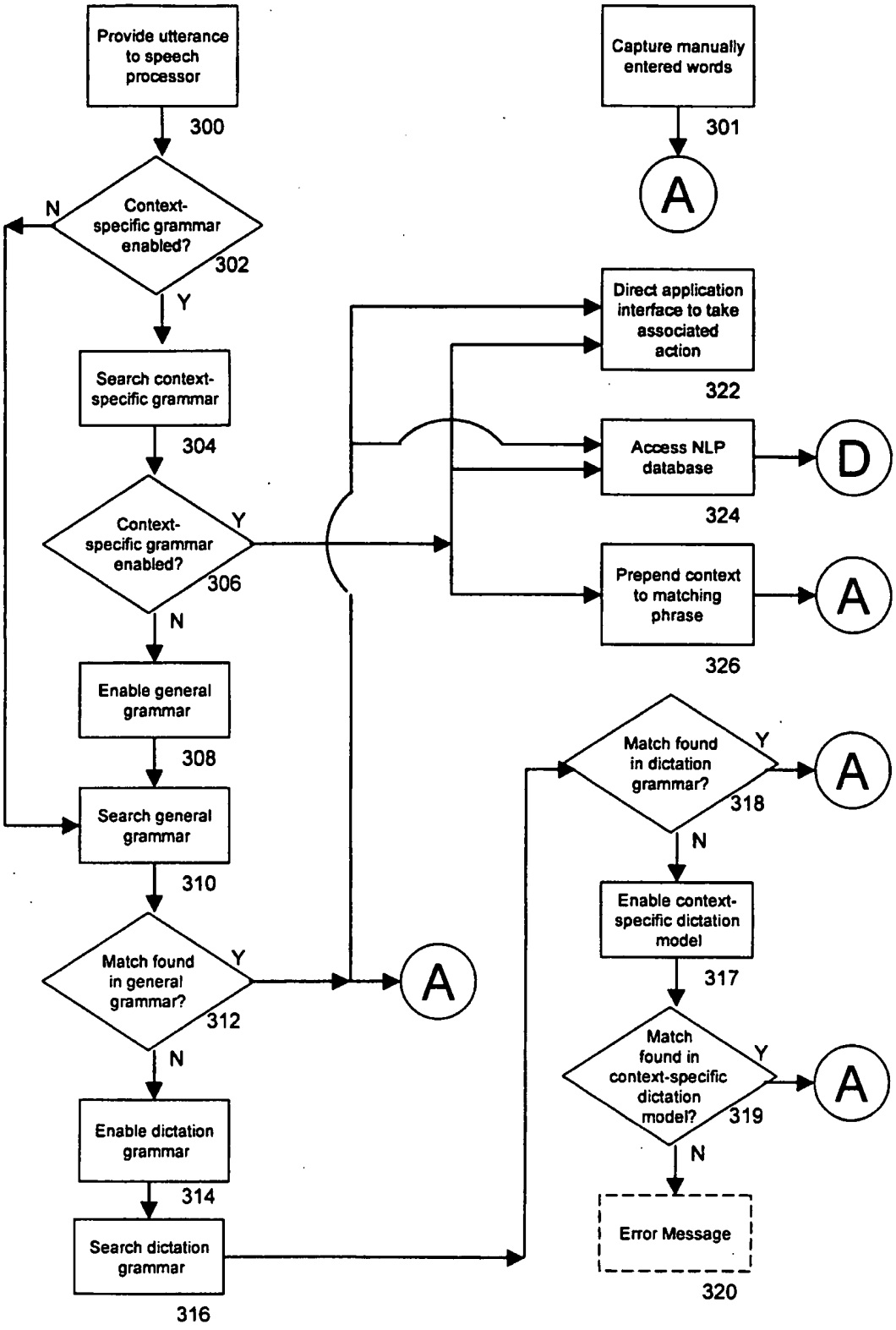

Provide utterance to speech processor
300
Context-specific grammar enabled?
302
N
Y
Search context-specific grammar
304
Context-specific grammar enabled?
306
Y
N
Enable general grammar
308
Search general grammar
310
Match found in general grammar?
312
Y
N
A
Enable dictation grammar
314
Search dictation grammar
316
Capture manually entered words
301
A
Direct application interface to take associated action
322
Access NLP database
324
D
Prepend context to matching phrase
326
A
Match found in dictation grammar?
318
Y
N
A
Enable context-specific dictation model
317
Match found in context-specific dictation model?
319
Y
N
A
Error Message
320

FIG. 3A

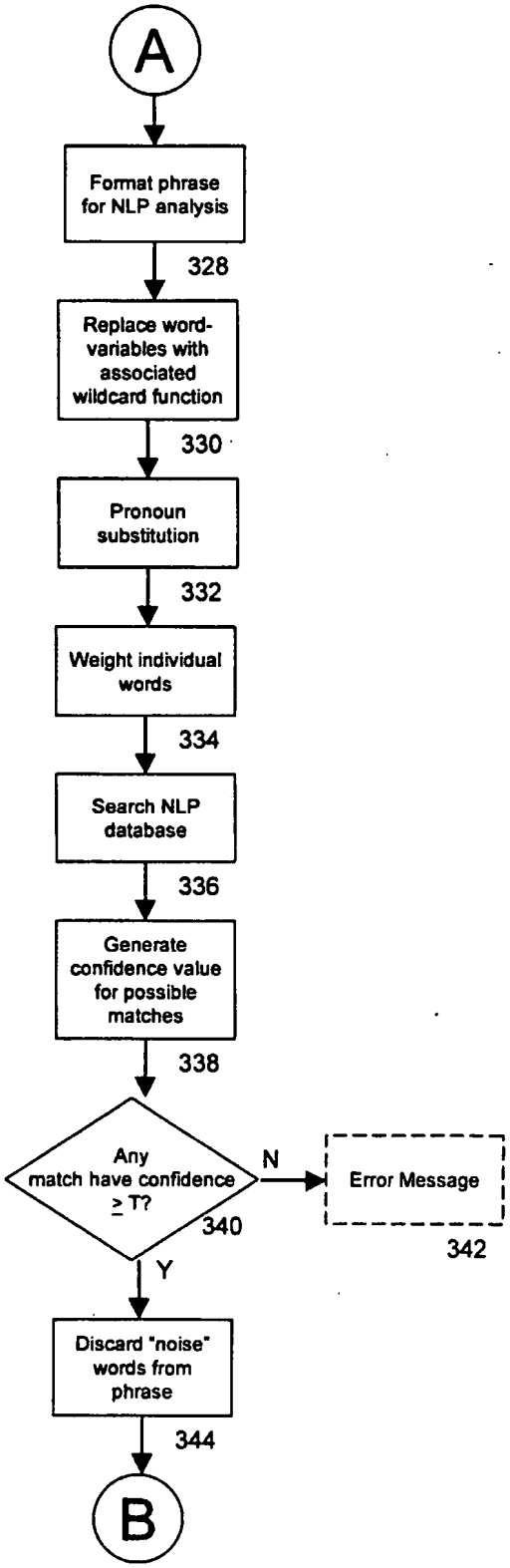

A
Format phrase for NLP analysis
328
Replace word-variables with associated wildcard function
330
Pronoun substitution
332
Weight individual words
334
Search NLP database
336
Generate confidence value for possible matches
338
Any match have confidence ≥ T?
340
N
Error Message
342
Y
Discard "noise" words from phrase
344
B

FIG. 3B

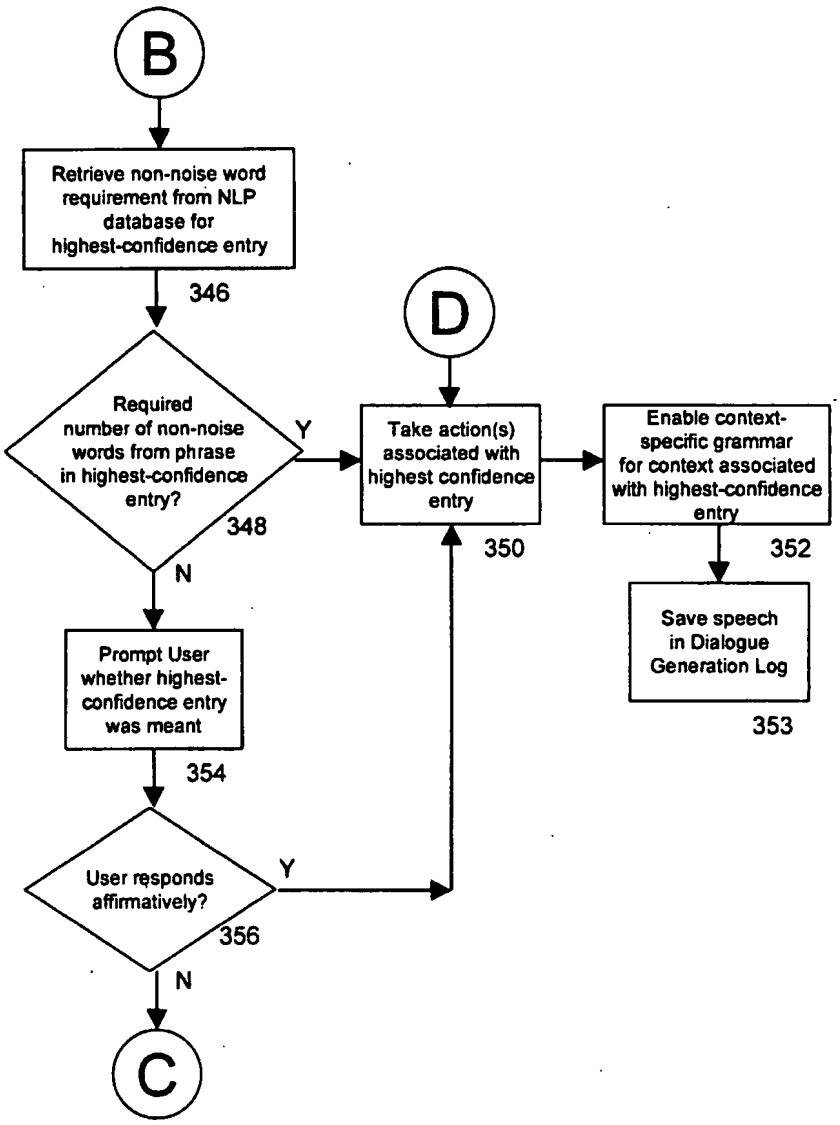

B
Retrieve non-noise word requirement from NLP database for highest-confidence entry
346
Required number of non-noise words from phrase in highest-confidence entry?
348
Y
N
D
Take action(s) associated with highest confidence entry
350
Enable context-specific grammar for context associated with highest-confidence entry
352
Save speech in Dialogue Generation Log
353
Prompt User whether highest-confidence entry was meant
354
User responds affirmatively?
356
Y
N
C

FIG. 3C

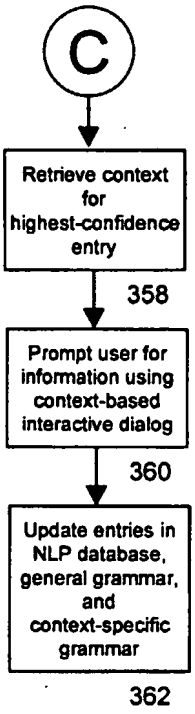

C
Retrieve context for highest-confidence entry
358
Prompt user for information using context-based interactive dialog
360
Update entries in NLP database, general grammar, and context-specific grammar
362

FIG. 3D

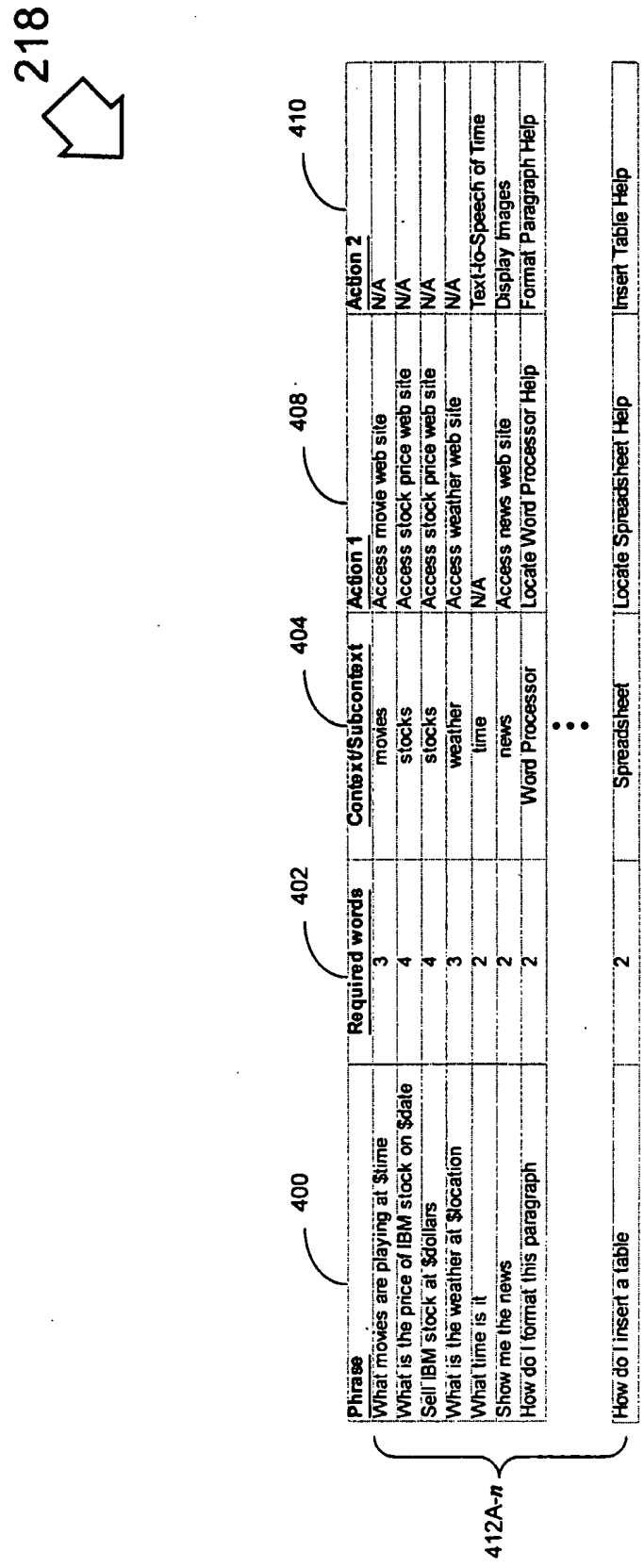

218
400
402
404
408
410
412A-n
Phrase
Required words
Context/Subcontext
Action 1
Action 2
What movies are playing at $time
3
movies
Access movie web site
N/A
What is the price of IBM stock on $date
4
stocks
Access stock price web site
N/A
Sell IBM stock at $dollars
4
stocks
Access stock price web site
N/A
What is the weather at $location
3
weather
Access weather web site
N/A
What time is it
2
time
N/A
Text-to-Speech of Time
Show me the news
2
news
Access news web site
Display Images
How do I format this paragraph
2
Word Processor
Locate Word Processor Help
Format Paragraph Help
How do I insert a table
2
Spreadsheet
Locate Spreadsheet Help
Insert Table Help

FIG. 4

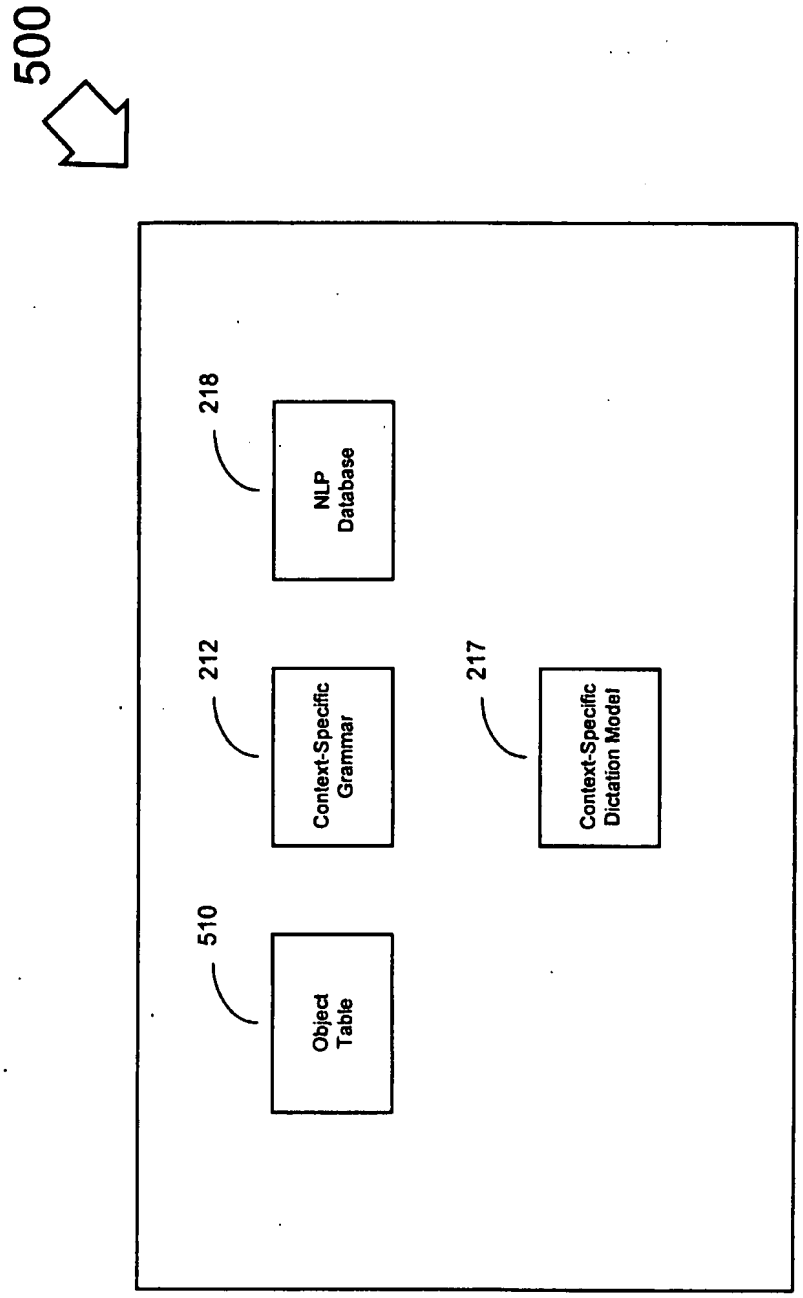

500
218
NLP Database
212
Context-Specific Grammar
217
Context-Specific Dictation Model
510
Object Table

FIG. 5

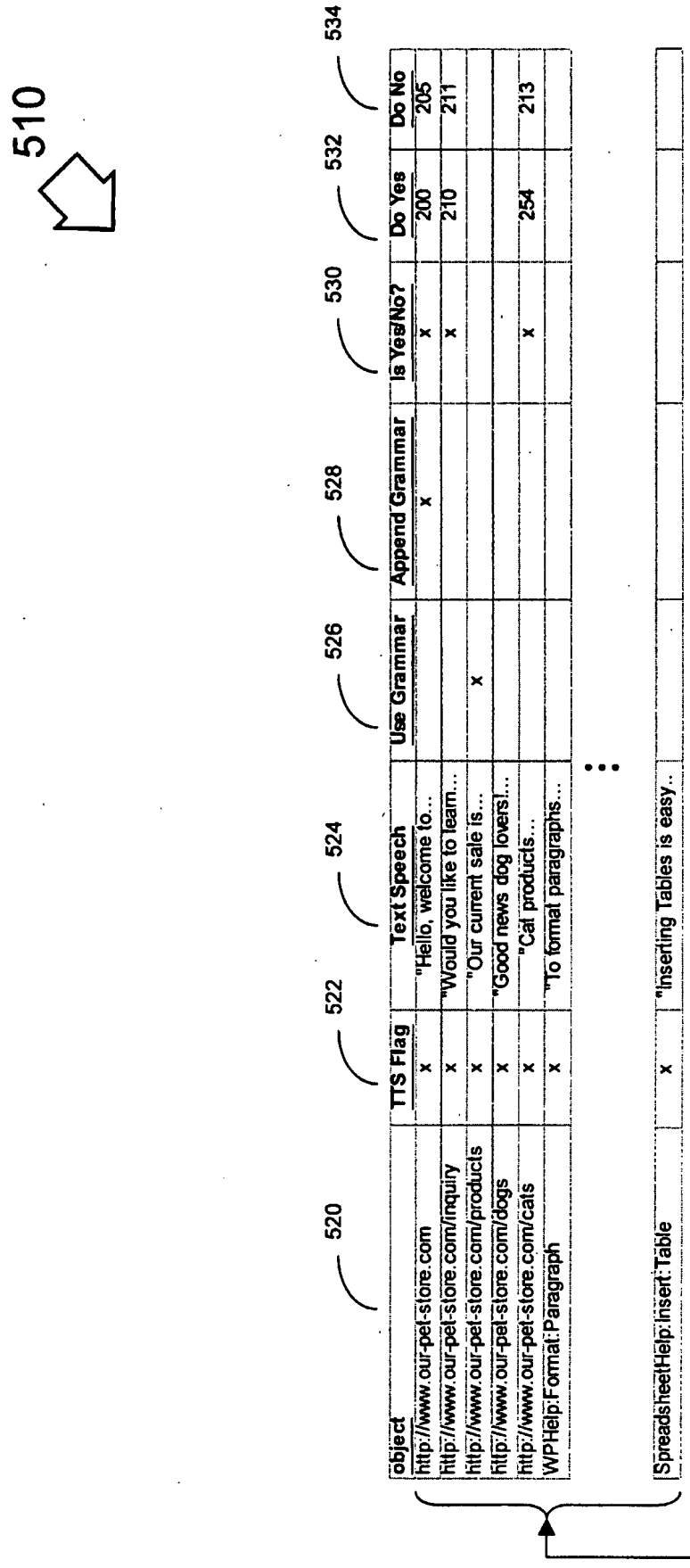

510
520
522
524
526
528
530
532
534
object
TTS Flag
Text Speech
Use Grammar
Append Grammar
Is Yes/No?
Do Yes
Do No
http://www.our-pet-store.com
x
"Hello, welcome to...
x
200
205
http://www.our-pet-store.com/inquiry
x
"Would you like to learn...
x
x
210
211
http://www.our-pet-store.com/products
x
"Our current sale is...
x
http://www.our-pet-store.com/dogs
x
"Good news dog lovers!...
http://www.our-pet-store.com/cats
x
"Cat products...
x
x
254
213
WPHelp:Format:Paragraph
x
"To format paragraphs...
SpreadsheetHelp:Insert:Table
x
"Inserting Tables is easy..
540A-n

FIG. 6

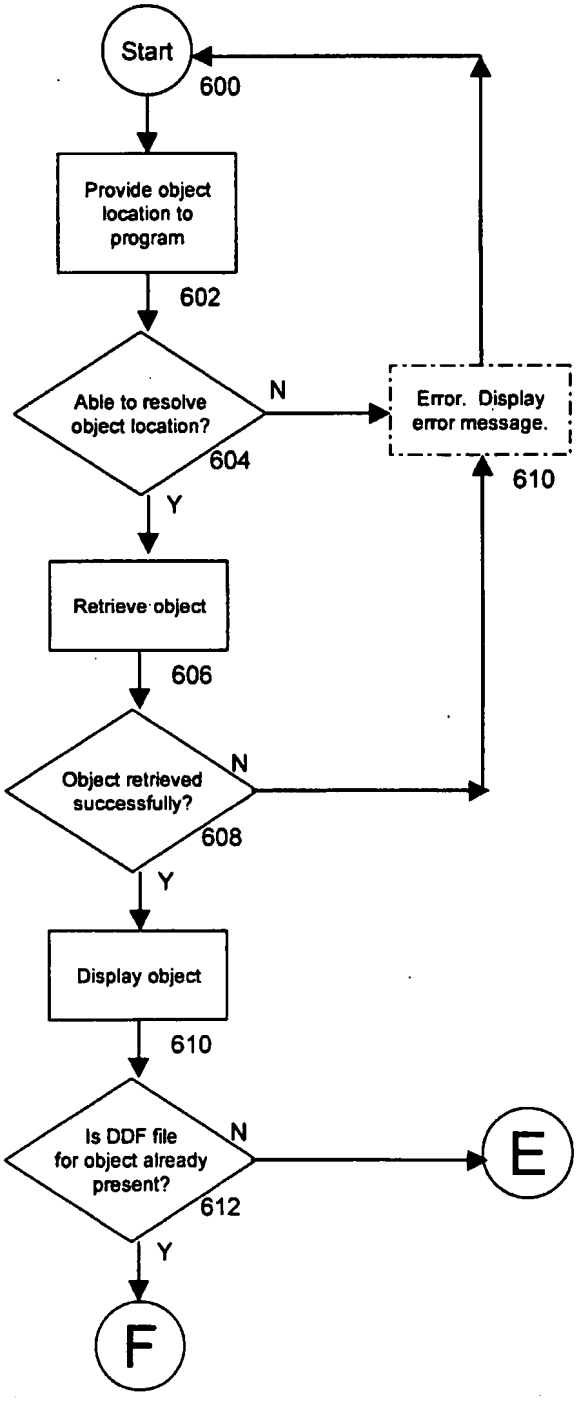

Start
600
Provide object location to program
602
Able to resolve object location?
604
N
Error. Display error message.
610
Y
Retrieve object
606
Object retrieved successfully?
608
N
Y
Display object
610
Is DDF file for object already present?
612
N
E
Y
F

FIG. 7A

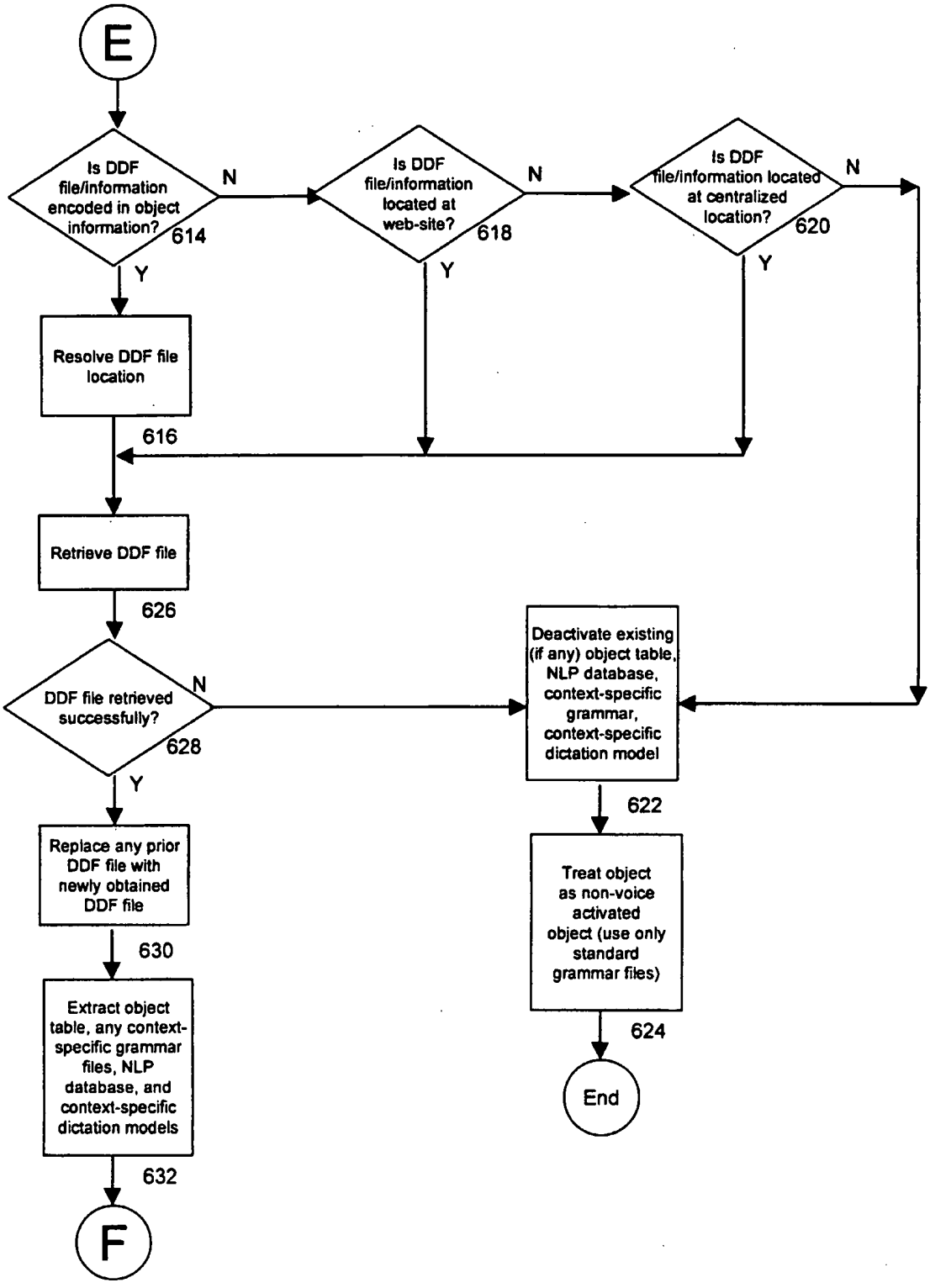

E
Is DDF file/information encoded in object information?
614
N
Y
Is DDF file/information located at web-site?
618
N
Y
Is DDF file/information located at centralized location?
620
N
Y
Resolve DDF file location
616
Retrieve DDF file
626
DDF file retrieved successfully?
628
N
Y
Deactivate existing (if any) object table, NLP database, context-specific grammar, context-specific dictation model
622
Treat object as non-voice activated object (use only standard grammar files)
624
End
Replace any prior DDF file with newly obtained DDF file
630
Extract object table, any context-specific grammar files, NLP database, and context-specific dictation models
632
F

FIG. 7B

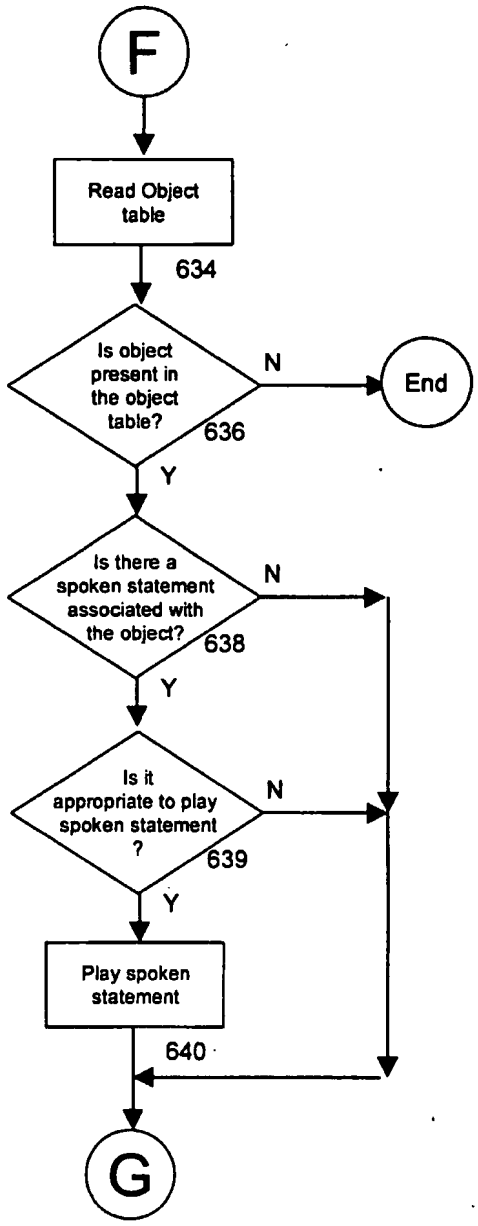

F
Read Object table
634
Is object present in the object table?
636
N
End
Y
Is there a spoken statement associated with the object?
638
N
Y
Is it appropriate to play spoken statement ?
639
N
Y
Play spoken statement
640
G

FIG. 7C

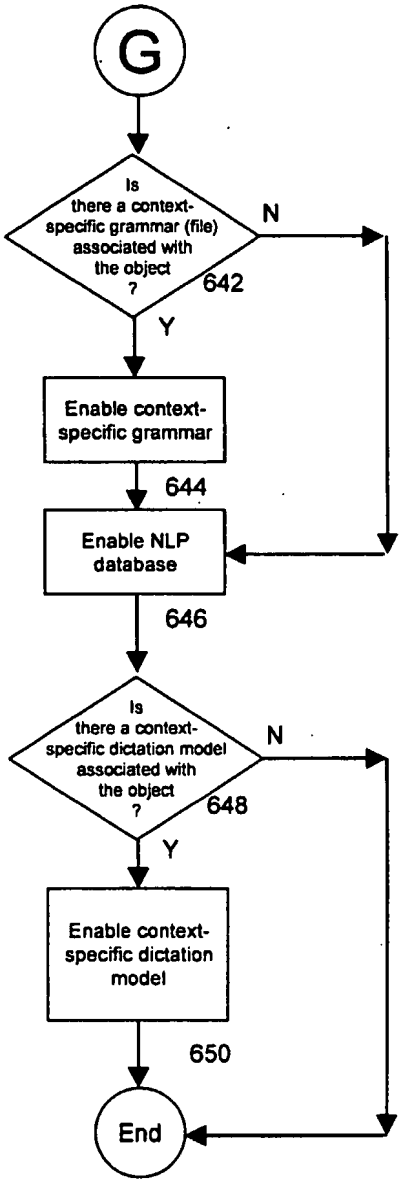

G
Is there a context-specific grammar (file) associated with the object ?
642
N
Y
Enable context-specific grammar
644
Enable NLP database
646
Is there a context-specific dictation model associated with the object ?
648
N
Y
Enable context-specific dictation model
650
End

FIG. 7D

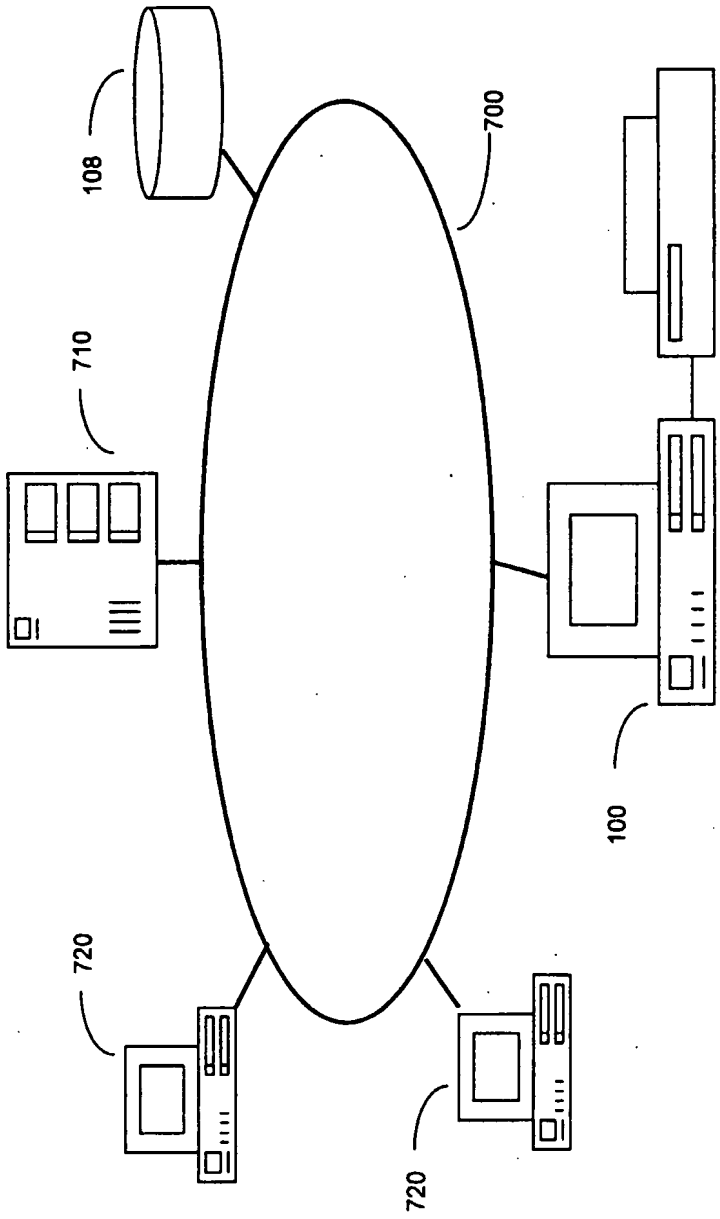



FIG. 8

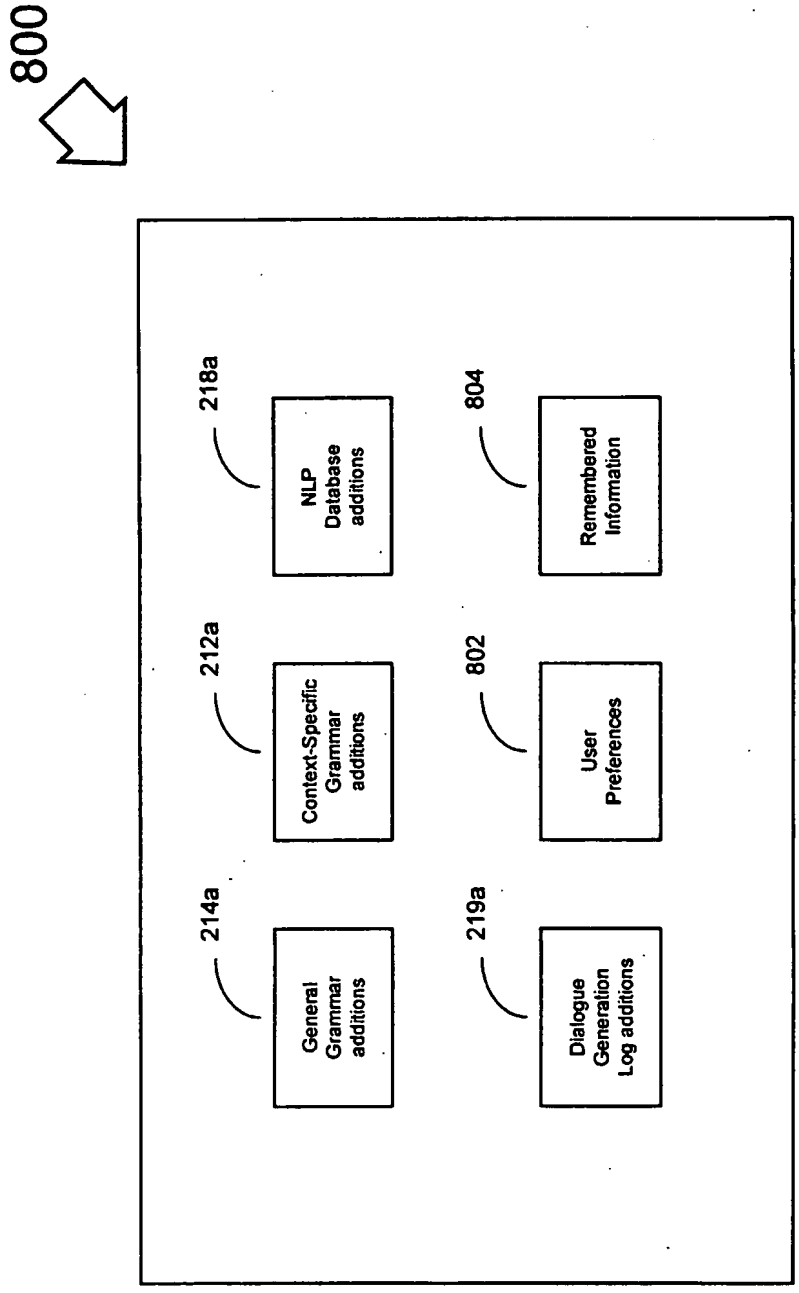

800
218a
NLP Database additions
804
Remembered Information
212a
Context-Specific Grammar additions
802
User Preferences
214a
General Grammar additions
219a
Dialogue Generation Log additions

FIG. 9

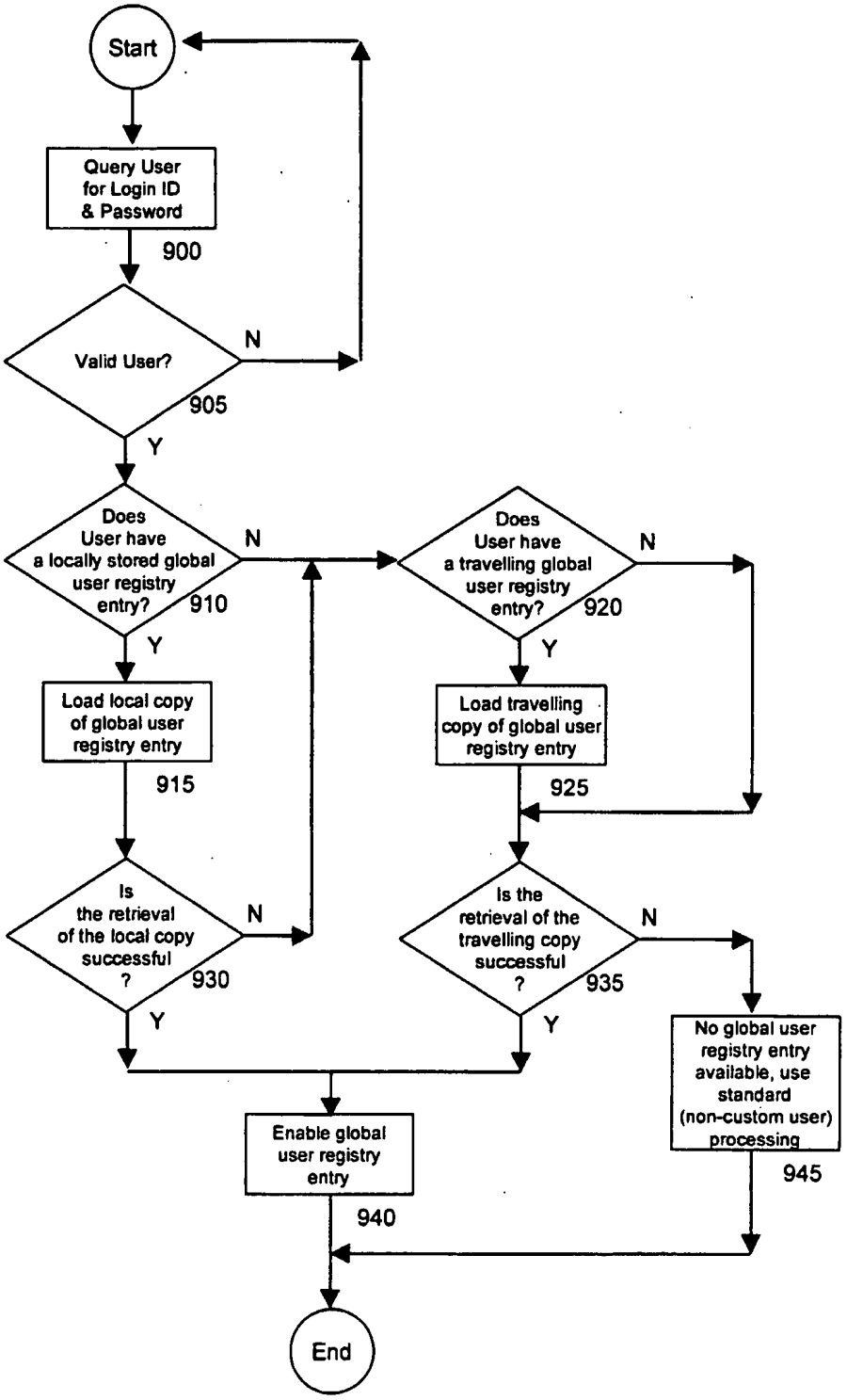

Start
Query User for Login ID & Password
900
Valid User?
N
905
Y
Does User have a locally stored global user registry entry?
N
910
Y
Load local copy of global user registry entry
915
Is the retrieval of the local copy successful ?
N
930
Y
Does User have a travelling global user registry entry?
N
920
Y
Load travelling copy of global user registry entry
925
Is the retrieval of the travelling copy successful ?
N
935
Y
No global user registry entry available, use standard (non-custom user) processing
945
Enable global user registry entry
940
End

FIG. 10A

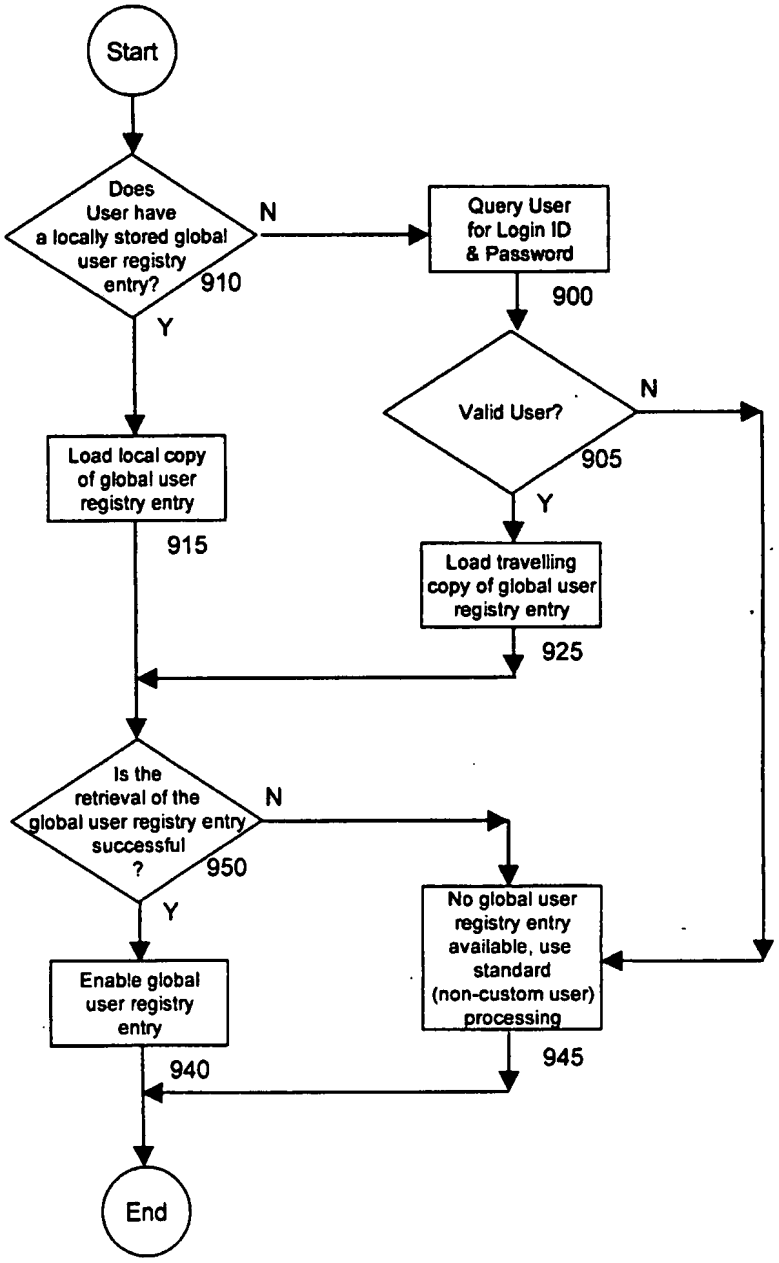

Start
Does User have a locally stored global user registry entry?
910
N
Y
Query User for Login ID & Password
900
Valid User?
905
N
Y
Load local copy of global user registry entry
915
Load travelling copy of global user registry entry
925
Is the retrieval of the global user registry entry successful ?
950
N
Y
No global user registry entry available, use standard (non-custom user) processing
945
Enable global user registry entry
940
End

FIG. 10B

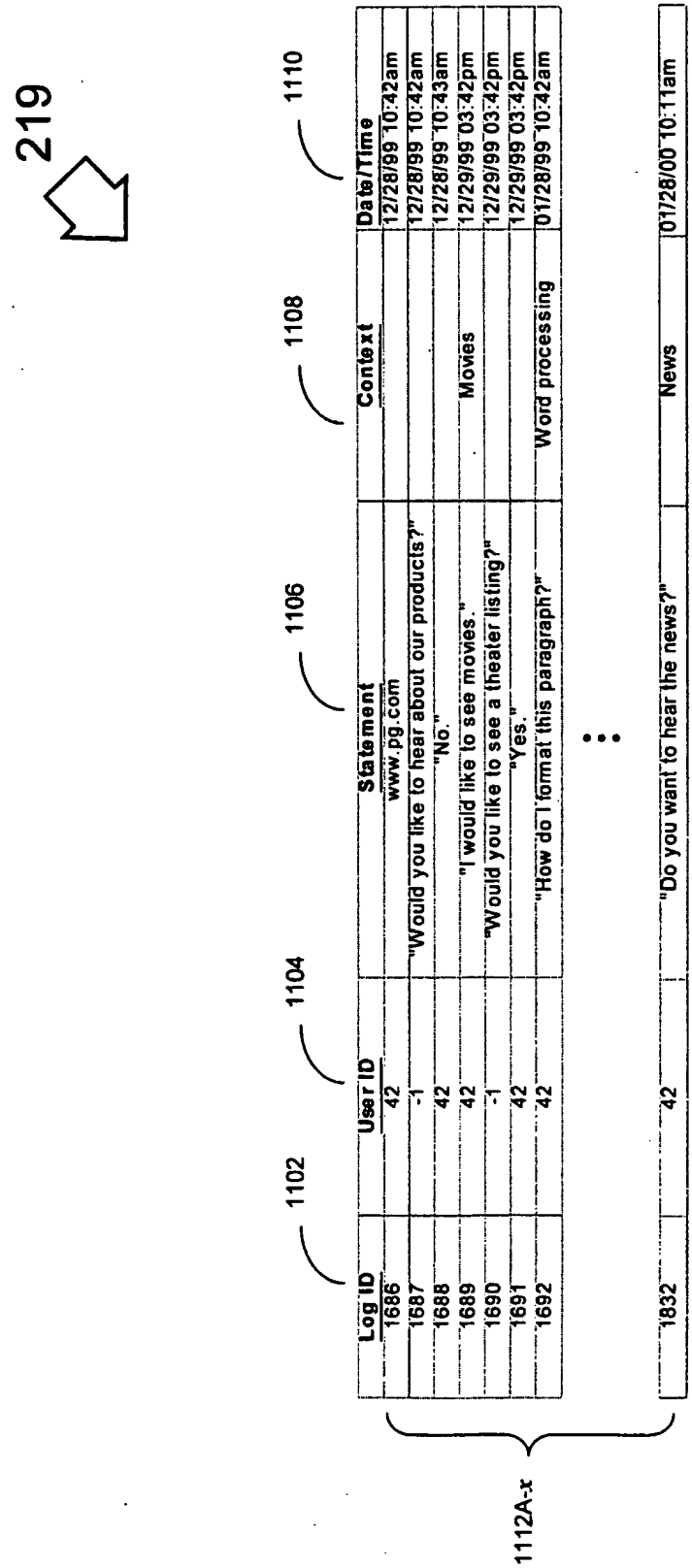

219
1102
1104
1106
1108
1110
Log ID
User ID
Statement
Context
Date/Time
1686
42
www.pg.com
12/28/99 10:42am
1687
-1
"Would you like to hear about our products?"
12/28/99 10:42am
1688
42
"No."
12/28/99 10:43am
1689
42
"I would like to see movies."
Movies
12/29/99 03:42pm
1690
-1
"Would you like to see a theater listing?"
12/29/99 03:42pm
1691
42
"Yes."
12/29/99 03:42pm
1692
42
"How do I format this paragraph?"
Word processing
01/28/99 10:42am
1832
42
"Do you want to hear the news?"
News
01/28/00 10:11am
1112A-x

FIG. 11

# INTERNATIONAL SEARCH REPORT

In nal Application No
PCT/US 01/11138

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G10L15/22 G10L15/26

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)
IPC 7 G10L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | WO 00 14728 A (WEBER DEAN C ;ONE VOICE TECHNOLOGIES INC (US)) 16 March 2000 (2000-03-16) the whole document --- | 1-37 |
| X | WO 00 14727 A (WEBER DEAN C ;ONE VOICE TECHNOLOGIES INC (US)) 16 March 2000 (2000-03-16) the whole document --- | 1,2, 5-21, 24-37 |
| A | US 5 761 631 A (NASUKAWA ) 2 June 1998 (1998-06-02) abstract --- -/-- | 3-5, 15-18, 22-24, 34-37 |

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° 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 document 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 |
|---|---|
| 29 August 2001 | 06/09/2001 |

| Name and mailing address of the ISA | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Quélavoine, R |

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# INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/11138

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication,where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | WYARD P J ET AL: "SPOKEN LANGUAGE SYSTEMS - BEYOND PROMPT AND RESPONSE" BT TECHNOLOGY JOURNAL, BT LABORATORIES, GB, vol. 14, no. 1, 1996, pages 187-207, XP000554648 ISSN: 1358-3948 abstract | 1-8, 19-27 |
| A | US 5 311 429 A (TOMINAGA ) 10 May 1994 (1994-05-10) abstract | 15-18, 34-37 |

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

Google Exhibit 1021
Page 00174

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Ir ›nal Application No
PCT/US 01/11138

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| WO 0014728 A | 16-03-2000 | AU 5813099 A | 27-03-2000 |
| | | AU 6243999 A | 27-03-2000 |
| | | EP 1110206 A | 27-06-2001 |
| | | EP 1110205 A | 27-06-2001 |
| | | WO 0014727 A | 16-03-2000 |
| WO 0014727 A | 16-03-2000 | AU 5813099 A | 27-03-2000 |
| | | AU 6243999 A | 27-03-2000 |
| | | EP 1110206 A | 27-06-2001 |
| | | EP 1110205 A | 27-06-2001 |
| | | WO 0014728 A | 16-03-2000 |
| US 5761631 A | 02-06-1998 | JP 2855409 B | 10-02-1999 |
| | | JP 8147299 A | 07-06-1996 |
| US 5311429 A | 10-05-1994 | JP 2301869 A | 13-12-1990 |



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Page 00175

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 | 4708 |

909 7590 03/18/2008

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

| EXAMINER | |
|---|---|
| LERNER, MARTIN | |
| ART UNIT | PAPER NUMBER |
| 2626 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 03/18/2008 | PAPER |

**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.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 11/747,547 | KENNEWICK ET AL. | |
| | Examiner | Art Unit | |
| | MARTIN LERNER | 2626 | |

*-- 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* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ 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**

4)☒ Claim(s) *1 to 15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 to 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities:

The Specification, Page 1, should be updated to include continuity data: "This application is a divisional of U.S. Application Serial No. 10/452,147, filed 03 June 2003."

On Page 1, ¶[02], "communications)may" should be "communications) may".

On Page 4, ¶[10], "packages or modules" should be "package or module".

On Page 4, ¶[10], "manger" should be "manager".

On Page 14, ¶[27], "improved" should be "improve".

On Page 14, ¶[29], "to find," should be "to find".

On Page 30, ¶[61], "value to condition to determine" is not grammatical.

On Page 32, ¶[65], "from the users speech" should be "from the user's speech".

On Page 33, ¶[67], "ration" should be "ratio".

On Page 34, ¶[69], "can simply asked" should be "can simply ask".

On Page 35, ¶[72], "good by" should be "good bye".

On Page 35, ¶[73], "speech recognition engine 124" should be "speech recognition engine 120". (Figure 1)

On Page 37, ¶[77], a question mark should be inserted after "such-and-such".

On Page 40, ¶[85], "scrapping" should be "scraping".

On Page 41, ¶[87], "results is" should be "results are".

On Page 41, ¶[87], "can inferred" should be "can be inferred".

On Page 42, ¶[89], "scrapping" should be "scraping".

On Page 42, ¶[89], "scarping" should be "scraping".

On Page 45, ¶[95], "subject the query" should be "subject of the query".

On Page 46, ¶[96], "it is parse and interpret" should be "it is parsed and interpreted".

On Page 48, ¶[97], "it is parse and interpret" should be "it is parsed and interpreted".

On Page 49, ¶[98], "dictionary and phrases module 124" should be "dictionary and phrases module 112". (Figure 1)

On Page 49, ¶[98], "databases 104" should be "databases 102". (Figure 1)

On Page 50, ¶[98], an element 504 for interpreting the input should be added to correspond to what is illustrated in Figure 5.

On Page 50, ¶[98], "In other words, whether the score given to. . . ." is not a complete sentence.

On Page 51, ¶[99], "Referring to Fig. 6, . . . ." is not a complete sentence.

On Page 52, ¶[99], "among;" should be "among:".

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 9, the scope of the claim is indefinite because it is unclear whether prior probabilities or fuzzy probabilities are applied only to keyword matching, or to each of keyword matching, user profile, and dialog history. Moreover, it is unclear if "based on at least one of" refers only to prior probabilities or fuzzy probabilities, or whether "based on at least one of" refers to keyword matching, user profile, and dialog history. That is, Applicants should clarify whether the list of elements is intended to be a Markush group, where the claim is anticipated by any one of the recited elements, or whether all the elements must be disclosed by the prior art to anticipate the claim.

Regarding claim 13, the scope of the claim is indefinite because it is unclear whether the scoring is based on all of the group of recited elements, *i.e.* results already received, context of the user utterance, user utterance criteria, history of dialog between the user and the system, a user profile or domain specific information, or only to one of the group of recited elements. Moreover, it is unclear whether probabilistic or fuzzy scoring techniques are intended to be applied only to domain specific information or to be applied to each one of the group of recited elements.

### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 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 –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 to 5, 7, and 10 to 12 are rejected under 35 U.S.C. 102(e) as being anticipated by *Halverson et al*.

Regarding independent claim 1, *Halverson et al*. discloses a system for speech-based navigation, comprising:

"an event manager, the event manager coordinating interaction between components of the system" – facilitator 600 coordinates and integrates results received from different client agents on various sub-goals, in order to satisfy an overall goal; facilitator 600 receives requests from a user interface (UI) agent 650, and delegates requests to appropriate client agents in a community (column 13, lines 15 to 51); a functionality of each client agent is made available to the agent community through registration of the client agent's capabilities with a facilitator (column 14, lines 25 to 64: Figure 6);

"a plurality of domain agents, the domain agents being autonomous executable that receives, processes and responds to at least one of a query or a command" –a resulting ICL goal expression is routed to appropriate agents including video-on-demand database agent 640, user interface (UI) agent 650, email agent 660, telephone agent 670, and VCR controller agent 680 (column 14, lines 25 to 64: Figure 6); a statement "show me the movies starring John Wayne" is a command, and a question,

"What is the weather in Miami?" is a query (column 9, lines 47 to 56; column 14, lines 25 to 34).

"a parser that determines a domain for the user generated natural language utterance based on the content and context of the user utterance" – speech recognition engine 310 processes acoustic voice data and attempts to generate a text stream of recognized words; a speech recognition engine is provided with a vocabulary lexicon of likely words or phrases that the recognition engine can match against its analysis of acoustical signals for purposes of a given application; preferably a lexicon for a speech recognition engine is dynamically adjusted to reflect the current user context ("based on . . . the context of the user utterance"); a natural language interpreter (or parser) 320 linguistically parses and interprets a textual output of a speech recognition engine; a natural language interpreter attempts to determine both the meaning of spoken words (semantic processing) as well as a grammar of the statement (syntactic processing) (column 7, line 42 to column 8, line 5: Figure 3); thus, at least speech recognition engine 310 determines a content of acoustic voice data as recognized words from a vocabulary lexicon ("based on the content . . . of the user utterance"), where the lexicon is dynamically adjusted to reflect a context ("based on . . . the context of the user utterance"); facilitator 600 asks speech recognition agent 610 and natural language (NL) agent 620 to interpret the query, and return the interpretation in ICL format, where the resulting ICL goal expression is routed to appropriate agents ("that determines a domain for the user generated natural language utterance") (column 14, lines 25 to 47: Figure 5).

Regarding claim 2, *Halverson et al*. discloses a user's voice input is captured by a voice input device 102, such as a microphone; a data navigation system is driven by natural language input (column 4, line 63 to column 5, line 1: Figures 1a and 1b).

Regarding claim 3, *Halverson et al*. discloses the voice data may preferably be transmitted in compressed digitized form across a network 106 (column 4, lines 4 to 10: Figure 1a); "notice" is taken that a compressed digitized form of voice data involves "a speech code", implicitly.

Regarding claim 4, *Halverson et al*. discloses a statement "show me the movies starring John Wayne", which is a command, and a question, "What is the weather in Miami?", which is a query (column 9, lines 47 to 56; column 14, lines 25 to 34).

Regarding claim 5, *Halverson et al*. discloses a speech recognition engine is provided with a vocabulary lexicon ("a dictionary") of likely words or phrases ("a phrase module") that the recognition engine can match against its analysis of acoustic signals (column 7, lines 42 to 45).

Regarding claim 7, *Halverson et al*. discloses a text to speech agent coupled to facilitator 600 (Figure 6).

Regarding claims 10 and 11, *Halverson et al*. discloses that facilitator 600 can retrieve desired video content by a video database agent 640 or can invoke a web database agent 630 to access desired information from an appropriate Internet site (column 14, lines 34 to 52: Figure 6); query construction logic 330 and query refinement logic 340 construct queries as required in order to access desired information

electronically from a particular database or source of interest (column 8, line 63 to column 9, line 5: Figure 3); thus, query construction logic 330 directs a query or command "to the system or a remote or local device"; implicitly, a video database is "a local information source" and an appropriate Internet site is "a network information source".

Regarding claim 12, *Halverson et al*. discloses that web database agent 630 preferably includes or is coupled to an appropriate embodiment of query construction logic 330 and query refinement logic 340, including a scraping utility such as WebL (column 14, lines 48 to 55); "notice" is taken that a scraping utility such as WebL is a web crawler that implicitly "evaluates multiple responses from multiple sources", because a web crawler compiles search results from a plurality of web pages.

### *Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 6, 8, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Halverson et al*. in view of *Handel et al*.

*Halverson et al*. omits formatting generated responses using available format templates based on a user profile, a personality module, and performing variable

substitutions and transformations to produce a response best understood and most natural to the user. However, *Handel et al*. teaches an agent based system, where an agent is personalized ("a personality module") to an individual user's goals, habits, and preferences. (Column 1, Lines 5 to 20) Specifically, a user's interface to a particular application program is modified according to a user's profile information, and presented in a format based on information in the user's profile on a display. (Abstract; Column 1, Lines 51 to 61) An Intelligent Agent Coordinator determines which format to send the information. If a user is at her desk and using the web client, the Intelligent Agent Coordinator would know to send any necessary information there as a full-featured graphically intense version. If a user has left the building, the Intelligent Agent Coordinator assumes that you are reachable via your handheld device (for which it knows the capabilities) and sends the text of an urgent message there, rather than a more graphically-oriented version. (Column 40, Lines 23 to 47) Sending text rather than a graphically-oriented version involves a substitution and transformation of format to produce a response best understood and most natural to the user in a current location, either at her computer or outside the building. An objective is to use advanced profiling and filtering to learn about the user, and provide a user interface that is crafted to satisfy a particular user's needs, preferences, and current context. (Column 29, Line38 to Column 30, Line 14) It would have been obvious to one having ordinary skill in the art to format responses based on a user profile as taught by *Handel et al.* in a method and system for speech-based data navigation of *Halverson et al*. for a purpose of providing a user interface that is crafted to satisfy a particular user's needs.

8. Claims 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Halverson et al*. in view of *Reisman*.

*Halverson et al*. discloses that natural language interface "learns" from past usage patterns of a particular user or group of users, which is equivalent to a "user profile" and a "dialog history" (column 8, lines 42 to 49), and discloses "keyword matching" because a query is constructed as keyword search terms for "Clint Eastwood", etc. (column 11, lines 55 to 58). However, *Halverson et al*. does not expressly disclose applying prior probabilities to keyword matching, user profile, and dialog history or using probabilistic or fuzzy scoring techniques. Still, *Reisman* teaches task/domain segmentation for responding to a current user command associated with one of a plurality of tasks. (Abstract) The system seeks a user history, including a current history (current session) and prior history as to a particular user's task/domain behavior from a user/task/domain associated data database 14. User and query information is combined to infer likely task/domains based on algorithms that rank highest the task/domains most commonly associated with the current user and the current query. (Column 9, Lines 15 to 56: Figure 3) Ranking of task/domains that are commonly associated with a current user and a current query is equivalent to "applying prior probabilities to . . . user profile, and dialog history" or "using probabilistic . . . techniques". An objective is to improve discovery searching and signifier mapping by utilizing heuristic, adaptive feedback-based techniques, while at the same time customizing use of the feedback to particular tasks or domains. (Column 2, Lines 9 to 21; Column 3, Line 63 to Column 4, Line 9) It would have been obvious to one having

ordinary skill in the art to apply prior probabilities and probabilistic techniques to user profile and dialog history as taught by *Reisman* in a system of speech-based data navigation by agents of *Halverson et al*. for a purpose of improving searching by utilizing feedback that is customized to particular tasks or domains.

## ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (571) 272-7608. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. 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

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/Martin Lerner/
Primary Examiner, Art Unit 2626
March 10, 2008

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**APPLICANTS**

ROBERT A. KENNEWICK, Seattle, WA;
David Locke, Redmond, WA;
Michael R. Kennewick SR., Bellevue, WA;
Michael R Kennewick JR., Bellevue, WA;
Richard Kennewick, Woodinville, WA;
Tom Freeman, Mercer Island, WA;

**** CONTINUING DATA ***************************

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**ADDRESS**

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102
UNITED STATES

**TITLE**

SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

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| | Examiner | Art Unit |
| | MARTIN LERNER | 2626 |

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| 707 | 3, 4, 5 | 3/10/2008 | ML |

| SEARCH NOTES | | |
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| Parent Application Checked | 3/10/2008 | ML |
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| Robert A. KENNEWICK *et al.* | |
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| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
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| L1 | 117 | ("20020143535" \| "20030182132" \| "20040044516" \| "20040193420" \| "20050021826" \| "5155743" \| "5386556" \| "5424947" \| "5471318" \| "5475733" \| "5499289" \| "5517560" \| "5533108" \| "5537436" \| "5539744" \| "5557667" \| "5563937" \| "5590039" \| "5633922" \| "5675629" \| "5708422" \| "5721938" \| "5722084" \| "5742763" \| "5752052" \| "5754784" \| "5761631" \| "5794050" \| "5799276" \| "5802510" \| "5832221" \| "5878386" \| "5895466" \| "5911120" \| "5918222" \| "5926784" \| "5933822" \| "5953393" \| "5963894" \| "5963940" \| "5987404" \| "5991721" \| "5995119" \| "6009382" \| "6014559" \| "6021384" \| "6044347" \| "6049602" \| "6058187" \| "6078886" \| "6081774" \| "6101241" \| "6119087" \| "6134235" \| "6144667" \| "6160883" \| "6173279" \| "6175858" \| "6185535" \| "6192110" \| "6192338" \| "6195651" \| "6208972" \| "6219346" \| "6219643" \| "6233556" \| "6233559" \| "6246981" \| "6272455" \| "6292767" \| "6314402" \| "6366886" \| "6385646" \| "6393428" \| "6404878" \| "6408272" \| "6411810" \| "6418210" \| "6420975" \| "6430285" \| "6434523" \| "6434524" \| "6442522" \| "6446114" \| "6453153" \| "6453292" \| "6456711" \| "6498797" \| "6499013" \| | US-PGPUB; USPAT | OR | OFF | 2008/02/29 10:15 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | "6501833" \| "6501834" \| "6523061" \| "6532444" \| "6539348" \| "6553372" \| "6556973" \| "6560576" \| "6570964" \| "6574624" \| "6576778" \| "6594257" \| "6604077" \| "6611692" \| "6614773" \| "6615172" \| "6629066" \| "6650747" \| "6691151" \| "6741931" \| "6937977" \| "6980092" \| "6996531" \| "7020609" \| "7027975" \| "7062488" \| "7092928" \| "7137126"). PN. | | | | |
| L2 | 12 | 1 and agents and natural adj language | US-PGPUB; USPAT | OR | OFF | 2008/02/29 10:15 |
| L3 | 10 | 1 and agents and natural adj language and @ad<"20020603" | US-PGPUB; USPAT | OR | OFF | 2008/02/29 10:16 |
| L4 | 649 | agents and natural adj language and @ad<"20020603" | US-PGPUB; USPAT | OR | OFF | 2008/02/29 10:22 |
| L5 | 354 | agents and natural adj language and @ad<"20020603" and speech | US-PGPUB; USPAT | OR | OFF | 2008/02/29 10:22 |
| L6 | 1 | 1 and reisman.in. | US-PGPUB; USPAT | OR | OFF | 2008/02/29 10:52 |
| L7 | 22 | 1 and profile | US-PGPUB; USPAT | OR | OFF | 2008/02/29 10:55 |
| L8 | 10 | 1 and profile and history | US-PGPUB; USPAT | OR | OFF | 2008/02/29 10:55 |
| L9 | 8 | 8 and @ad<"20020603" | US-PGPUB; USPAT | OR | OFF | 2008/02/29 10:56 |
| L10 | 8 | 1 and user adj profile | US-PGPUB; USPAT | OR | OFF | 2008/02/29 11:09 |

2/29/08 11:27:31 AM
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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|---|---|---|---|
| APPLICANTS : | Robert A. KENNEWICK et al. | CONFIRMATION NO.: | 4708 |
| SERIAL NUMBER : | 11/747,547 | EXAMINER: | Martin Lerner |
| FILING DATE : | May 11, 2007 | ART UNIT: | 2626 |
| FOR : | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | | |

# RESPONSE TO NON-FINAL OFFICE ACTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Non-Final Office Action mailed **March 18, 2008**, please amend the above-identified application as follows:

**Amendments to the Specification** begin on page 2 of this paper.

**Amendments to the Claims** begin on page 19 of this paper.

**Remarks/Arguments** begin on page 26 of this paper.

It is not believed that extensions of time or fees for net addition of claims are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned for under 37 C.F.R. § 1.136(a), and any fees required therefore (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 033975 (**Ref. No. 090611-0361350**).

# AMENDMENT

**Amendments to the Specification**: (identifying insertions and ~~deletions~~).

Please amend paragraph **[02]**, which begins on page 1, as follows:

**[02]** A machine's ability to communicate with humans in a natural manner remains a difficult problem. Cognitive research on human interaction shows that a person asking a question or giving a command typically relies heavily on context and the domain knowledge of the person answering. On the other hand, machine-based queries (e.g., questions, commands, requests, ~~a query may be a question, a command, a request~~ and/or other types of communications) may be highly structured and are not inherently natural to the human user. Thus, human questions and machine processing of queries may be fundamentally incompatible. Yet the ability to allow a person to make natural language speech-based queries remains a desirable goal.

Please amend paragraph **[09]**, which begins on page 3, as follows:

**[09]** According to another aspect of the invention, the computer device or system may comprise a stand alone or networked PC, a PDA or other portable computer device, or other computer device or system. For convenience, these and other computer alternatives shall be ~~simple~~ referred to simply as a computer. One aspect of the invention comprises software that is installed onto the computer, where the software comprises one or more of the following modules: a speech recognition module for capturing the user input; a parser for parsing the input, a text to speech engine module for converting text to speech; a network interface for enabling the computer to interface with one or more networks; a graphical user interface module; and an event manager for managing events. Preferably, the event manager is in communication with a dictionary and phrases module, a user profile module that enables user profiles to be created, modified, and accessed, a personality module that enables various personalities to be created and used, an agent module, an update manager, and one or more databases.

Please amend paragraph **[10]**, which begins on page 4, as follows:

**[10]** According to another aspect of the invention domain specific behavior and information is organized into agents. Agents are autonomous executables that receive, process and respond to user questions, queries, and commands. The agents provide [[a]] complete, convenient and re-distributable packages or modules of functionality, typically for a specific domain [[of]] or application. Agents can be complete packages of executable code, scripts, links to information, and other forms of communication data, required to provide a specific package of functionality, usually in a specific domain. In other words, an agent includes everything that is needed to extend the functionality of the invention to a new domain. Further, agents and their associated data can be updated remotely over a network as new behavior is added or new information becomes available. Agents can use system resources and the services of other, typically more specialized, agents. Agents can be distributed and redistributed in a number of ways including on removable storage media, transfer over networks or attached to emails and other messages. An update ~~manger~~ manager is used to add new agents to the system or update existing agents.

Please amend paragraph **[23]**, which begins on page 12, as follows:

**[23]** The system may be used in conjunction with a wide range of platform environments. These environments include, as a peripheral to a PC, a portable or wearable computer or other computer, embedded in a PC or other computer, on a personal digital assistant (e.g., a PDA with wireless networking capability, in a specialized device such as a bar code scanner or payment terminal, on a wireless telephone, or other platforms). If the invention is used with a mobile or portable device that has position location capability, the location data can be used by the invention as part of the context for user questions. A user may use the system on one or more devices. In this case history and profile information for the user may be synchronized between the multiple devices on a periodic basis or other basis.

Please amend paragraph **[27]**, which begins on page 13, as follows:

**[27]** According to another aspect of the invention, the system may allow users to disseminate their knowledge without programming. The system may include mechanisms that allow users to post and distribute agents and information in their particular areas of expertise, to improve ~~improved~~ system capability. Further, users can extend the system and configure it to their own preferences, add information to their profile to define new questions or queries, extend and modify existing questions and queries, add new data sources, update data sources, set preferences and specify presentation parameters for results.

Please amend paragraph **[29]**, which begins on page 14, as follows:

**[29]** Some example applications for the invention ~~includes~~ include, but are not limited to, the following:

- white pages and yellow pages lookups to find[[,]] email addresses, telephone numbers, street addresses and other information for businesses and individuals;
- personal address book, calendars and reminders for each user;
- automatic telephone dialing, reading and sending emails and pages by voice and other communications control functions;
- map, location and direction applications;
- movie or other entertainment locator, review information and ticket purchasing;
- television, radio or other home entertainment schedule, review information and device control from a local or remote user;
- weather information for the local area or other locations;
- stock and other investment information including, prices, company reports, profiles, company information, business news stories, company reports, analysis, price alerts, news alerts, portfolio reports, portfolio plans, etc.;
- flight or other scheduled transportation information and ticketing;
- reservations for hotels, rental cars and other travel services;

- local, national and international news information including headlines of interest by subject or location, story summaries, full stories, audio and video retrieval and play for stories[[.]];
- sports scores, news stories, schedules, alerts, statistics, back ground and history information, etc.;
- ability to subscribe interactively to multimedia information channels, including sports, news, business, different types of music and entertainment, applying user specific preferences for extracting and presenting information;
- rights management for information or content used or published;
- horoscopes, daily jokes and comics, crossword puzzle retrieval and display and related entertainment or diversions;
- recipes, meal planning, nutrition information and planning, shopping lists and other home organization related activities;
- as an interface to auctions and online shopping, and where the system can manage payment or an electronic wallet;
- management of network communications and conferencing, including telecommunications, email, instant messaging, Voice over IP communications and conferencing, local and wide area video and audio conferencing, pages and alerts;
- location, selection, management of play lists and play control of interactive entertainment from local or network sources including, video on demand, digital audio, such as MP3 format material, interactive games, web radio and video broadcasts;
- organization and calendar management for families, businesses and other groups of users including the management of, meetings, appointments, and events; and
- interactive educational programs using local and network material, with lesson material level set based on user's profile, and including, interactive multimedia lessons, religious instruction, calculator, dictionary and spelling, language training, foreign language translation and encyclopedias and other reference material.

Please amend paragraph **[48]**, which begins on page 22, as follows:

**[61]** The agents **106** return results of questions as responses to users. The response may be created using the results of information queries, the system personality **108** and the user preferences or other data in the user profile **110**. The agents **106** generally present these results using the speech unit **128**. The agents **106** ~~creates~~ create a response string, which is sent to the text to speech engine **124**. The text to speech engine **124** creates the required utterances, which may be encoded and compressed by the speech coder **122**. Once coded, the utterances are transmitted from the main unit **98** by the transceiver **126** to the transceiver **130** on the speech unit **128**. The utterance is then decoded and decompressed by the speech coder **138** and output by the speaker **136**.

Please amend paragraph **[55]**, which begins on page 25, as follows:

**[55]** When a user requires or selects a new domain agent **156** or database element **102**, the update manager **104** may connect to their source on the network **136** though the network interface **116**, download and install the agent or data. To save system resources and to comply with any license conditions, the update ~~manger~~ manager **104** may uninstall agents that are no longer in use. In one embodiment of the invention, the update manager **104** periodically queries one or more sources of the licensed agents and database components to locate and ~~down load~~ download updates to agent executables, scripts or data as they become available. Alternatively, the agent sources may initiate the downloading of agent updates of the registered or licensed agents to the update manager as they become available.

Please amend paragraph **[56]**, which begins on page 26, as follows:

**[56]** The agent manager **154** may provide a license management client capable of executing most any license terms and conditions. When a particular agent **106** and/or database element **102** is required by a command, the agent ~~manger~~ manager **154** verifies that the use of the agent or data element is within the allowed terms and conditions, and if so, invokes the agent or allows access to the data element. License management schemes that can be implemented through the agent manager **154** include outright purchase, subscription for updates, one time or limited time use. Use of shared agents and data elements (such as those ~~down-loaded~~

downloaded from web sites maintained by groups of domain experts) may also be managed by the agent manager **154**.

Please amend paragraph **[61]**, which begins on page 30, as follows:

**[61]** End users may use the data driven agent **156** extension and modification facilities and values stored in user profiles **110** to create special reports, packages of queries, alerts and output formats. A single alert or report can be configured to use multiple data sources, values, and other variables (i.e., time, location, etc.) ~~value~~ to condition ~~to~~ or otherwise determine when an alert should be sent. For example, an alert can be generated by sampling a stock price every fifteen minutes ~~15 min~~ and sending an alert if the price drops below some value. To create a report, the user first specifies a set of commands or questions. Next, the user creates or selects a format for the report. Finally the user may name the report. A report can have variable parameters. For example, a user may create a company stock report, and execute the report by stating its name and the company name, which gives the user selected information and in a specified format for that company. In another example, a user can create a "morning" report, which presents selected multimedia information from different sources (news, sports, traffic, weather) in the order and formats desired. Alerts and reports can be created using only voice commands and responses, commands and responses through the graphical user interface **114**, or a combination of the two. To create a report, alert, or other specialized behavior, the user performs a number of steps including:

- specify the command to run a report or alert;
- specify the question or questions, including keywords, used for a query;
- set the criteria for running the report such as on command or when a particular condition is met;
- define preferred information sources;
- define preferences for order of result evaluation by source, value, etc.;
- specify the presentation medium for a report or alert, such as an email, the text to speech engine, a message to a pager, or a text and graphics display; and

- specify the preferred format for the report, such as information to be presented, order of information to be presented, preferred abbreviations or other variable substitutions.

Please amend paragraph **[65]**, which begins on page 32, as follows:

**[65]** The speech unit **128**, according to an embodiment of the invention, may use an analog or digital filter **132** between the array microphone **134** and the speech coder **138**. The pass band of the filter is set to optimize the signal to noise ratio at the input to the speech recognition engine **120**. In some embodiments, the filter is adaptive, using band shaping combined with notch filtering to reject narrow-band noise. In one embodiment of the invention, the system **90** may employ adaptive echo cancellation in the filter. The echo cancellation helps prevent cross talk between output from the text to speech engine and detection of the user's speech as well as suppression of environmentally caused echoes. Algorithms comparing the background noise to the signal received from the ~~users~~ user's speech are used to optimize the band-shaping parameters of the adaptive filter. Those skilled in the art will be familiar with multiple techniques used to construct suitable digital and analog filters.

Please amend paragraph **[67]**, which begins on page 33, as follows:

**[67]** In an alternative embodiment, the array microphone can be replaced by a set of physically distributed microphones or a headset worn by the user. The distributed microphones can be placed in different parts of a room or in different rooms. The distributed microphones can create a three-dimensional array to improve signal to noise ~~ration~~ ratio. The headset may use a wireless or wired connection.

Please amend paragraph **[69]**, which begins on page 34, as follows:

**[69]** The voice query language may be sensitive to the contents of the context stack. Thus, a following-on question can be asked using an abbreviated grammar, since ~~key words~~ keywords and criteria can be inherited from the stack. For example, the user can simply ask ~~asked~~ about another keyword if the criteria of the question remain constant.

Please amend paragraph **[72]**, which begins on page 35, as follows:

**[72]** A user may start a dialog with the system **90** when they first address it. This can be done by speaking a generic word ("computer") or addressing a specific name ("Fred"), which may be generally tied to a system personality **108**. Once the user starts the dialog, it may be recognized by the speech recognition engine **120**, using unique characteristics of the user's speech. At the end of a dialog or to interrupt a dialog, the user may utter a dismissal word ("good [[by]] bye").

Please amend paragraph **[73]**, which begins on page 35, as follows:

**[73]** According to another embodiment of the invention, the system **90** may employ a speech recognition engine **120** ~~**124**~~ seeding for improved word recognition accuracy, using data from the dictionary and phrase tables **112**, user profiles **110**, and the agents **106**. At the same time, the fuzzy set possibilities or prior probabilities for the words in the dictionary and phrase tables may be dynamically updated to maximize the probability of correct recognition at each stage of the dialog. The probabilities or possibilities may be dynamically updated based on a number of criteria including the application domain, the questions or commands, contexts, the user profile and preferences, user dialog history, the recognizer dictionary and phrase tables, and word spellings.

Please amend paragraph **[77]**, which begins on page 36, as follows:

**[77]** The parser **118** uses a scoring system to determine the mostly likely context or domain for a user's question and/or command. The score is determined from weighting a number of factors, including[[,]] the user profile **110**, the domain agent's data content, and previous context. Based on this scoring, the system **90** invokes the correct agent. If the confidence level of the score is not high enough to ensure a reliable response, the system **90** may ask the user to verify whether the question and/or command is correctly understood. In general, the question that is asked by the system **90** may be phrased to indicate the context of the question including all criteria or parameters. For example, the question can be in the form of: "Did I understand that you want such-and-such?" If the user confirms that the question is correct the system proceeds to produce a response. Otherwise, the user can rephrase the original

question, perhaps adding additional information to remove ambiguity, or the system can ask one or more questions to attempt to resolve the ambiguity.

Please amend paragraph **[85]**, which begins on page 40, as follows:

**[85]** The local information sources can be stored in one or more system databases **102** or can be on any local data storage such as a set of CDs or DVDs in a player or other local data storage. Network information sources can be connected to the Internet **136** or other network and accessed through a series of plug-ins or adaptors, known [[a]] as pluggable sources, in the network interface **116**. The pluggable sources in the network interface **116** may be capable of executing the protocols and interpreting the data formats for the data sources of interest. The pluggable sources may provide information ~~scrapping~~ scraping data and procedures for each source to the domain agents **156**. If a new type of data source is to be used, a new plug-in or adaptor can be added to the network interface **116**.

Please amend paragraph **[87]**, which begins on page 41, as follows:

**[87]** Based on the continuous scoring processes, the domain agent **156** may determine if a single best answer can be extracted. For most questions the desired result has a set of tokens that must be found to formulate an answer. Once a value has been found for each of these tokens the results [[is]] are ready for presentation to the user. For example, for a question on weather, the tokens can include the date, day of week, predicted high temperature, predicted low temperature, chance of precipitation, expected cloud cover, expected type of precipitation and other tokens. Results processed in this manner include error messages. For subjective questions this determination is made by determining a most likely answer or answers, extracted by matching of the results received. If no satisfactory answer can be inferred from the results of the query the agent can do one of the following:

1. Ask the user for more information, typically through the speech interface, and based on the results obtained formulate new queries. This approach is applied when an irresolvable ambiguity arises in the formulation of a response.
2. Formulate new queries based on the results received from the first set of queries. This approach is typically applied in cases where the responses received do not contain

all the required information. Information sources to query can be inferred from the results already obtained (i.e., links in an HTML document) or from other sources. Using this approach one or more sets of queries and responses can be chained without the need for action by the user.

3. Wait for additional queries to return results.

Please amend paragraph **[89]**, which begins on page 42, as follows:

**[89]** The domain agent **156** may apply conditional scraping operations to each query response as it is received. The conditional scraping actions depend on the context, the criteria, user profile **110**, and domain agent coding and data. For each token to be extracted, a scraping criteria **152** may be created using the services of the system agent **150**. The scraping criteria use format specific scraping methods including, tables, lists, text, and other ~~scrapping~~ scraping methods. One or more scraping criteria can be applied to a page or results set. Once additional results are received, the domain agent **156** can create new scraping criteria to apply to results already acquired. The conditional ~~scarping~~ scraping process removes extraneous information, such as graphics, which need not be further processed or stored, improving system performance.

Please amend paragraph **[95]**, which begins on page 44, as follows:

**[95]** **FIG. 3** is a high level process **300** for receiving natural language speech-based queries and/or commands and generating a response according to an embodiment of the invention. The process **300** comprises of individual steps, several of which may be repetitive in order to accommodate partial failures. The process **300** may begin when a user's utterance is received and processed at **302**. The user utterance may be a query and/or a command and may be of a natural language speech-based form. After receiving the natural language query and/or command, the query and/or command may be processed so that the data is in a more machine understandable format such as in a digital format. Once the utterance has been converted into an understandable format, the utterance may be processed so that at least an approximate meaning of the utterance can be determined at **304**. This may be accomplished by, for example, the use of stored dictionaries, phrases, user profiles, domain agent data, and other

data. Based on the approximate meaning of the utterance, one or more correctly formatted queries and/or commands may be generated. A user created query and/or command may require that multiple queries and/or commands may be needed in order to generate the desired response or action. Further, depending upon the context (e.g., who is the user, what is the subject of the query and/or command directed to, at what time or location is the query and/or command being directed to, and other parameters used in defining the query and/or command) in which the query and/or command has been submitted, a specific format for the query and/or command may be required. For instance, each of the domain agents **156** may require that queries and/or commands be formatted in a specific manner. Thus at **306**, one or more properly formatted queries and/or commands may be generated. Steps **304** and **306** may be operations which may have to be repeated in order to obtain the correct interpretation of the user utterance and result in the desired response and/or action. Once[[,]] the properly formatted queries and/or commands are generated, the appropriate action may be taken at **308**. This may require that the properly formatted queries and/or commands be sent to specific domain agent[s], information source[s], device[s], or other appropriate destination[s] that can fulfill the requirements of the query and/or command. Once the appropriate action[s] have been executed, this event may be recorded to, for example, the user's profile, database and/or one or more agents at **310**. Such data may be useful for future user inquires and commands. After the action[s] have been performed, a response, if need be, may be generated and forwarded to the user and/or third parties at **312**. In the case of a query for retrieving data, the response would contain the requested information. In the case of a command, the response may be a confirmation that a specific action[s] has been executed. The response may be in the form of a natural language format. The response may also be formatted to reflect a particular personality or tone to the response in order to make the response more "human." The response may be relayed to the user and/or third parties as an audio message and/or a visual message displayed on a user interface.

Please amend paragraph **[96]**, which begins on page 46, as follows:

[96] **FIG. 4A** is a process **400** for receiving natural language speech-based queries and/or commands and generating a response using the system **90** according to another embodiment of the invention. The process **400** may begin when a user's utterance (i.e., user query and/or command) is captured through accurate speech recognition operating in a variety of real-world environments at **402**. Once the utterance is captured, it is ~~parse~~ parsed and ~~interpret~~ interpreted to determine the query and/or command that is contained in the utterance at **404**. Next, review of the query and/or command and determine the domain of expertise required and the context of the query, invoking the proper resources including, for example, agents at **406**. The original query and/or command submitted by the user will often require that multiple queries and/or commands be generated. For instance, suppose a user is interested in retrieving the value of her stock portfolio. The user may utter "please get the value of my stock portfolio." The system **90** may review this request together with stored data such as the user's profile and determine keywords such as "get the value" and "my stock portfolio." The system **90** may then generate queries to determine the stocks in the user's portfolio, the number of shares and the source for current pricing information. These queries may then be sent to one or more agent domains, such as a domain which may access a database containing the user's profile and a domain which accesses stock pricing sources to determine the answers to these questions. Queries may be sent to these domain agents or sources in order to obtain the desired data. Thus, at **408** formulate one or more queries that are sent to one or more local and/or network data sources and/or send appropriate commands to local or remote devices or the system itself. The queries are then sent to the designated agent[s]. The agents may then, in turn, generate their own queries and/or commands to be sent to, for example, local or remote information sources to retrieve needed data. The agent generated queries and/or commands may be formatted according to the requirements of the target sources and variable substitutions and transformations are performed to modify the queries to a form most likely to yield desired results from the available sources at **410**. Once the queries are formatted correctly, they may be executed in an asynchronous manner and dealing gracefully with failures at **412**. As a result of the execution of the queries, results may be returned by the domain agents and/or sources. The system **90** may then extract or scrape the desired

information from the one or more results, which may be returned in any one of a number of different formats at **414**. That is, the results sought by a user may be the summary or the results of further processing of information obtained from several sources for example. Next, the results may be evaluated and interpreted including processing of errors, and gathering and combining them into a single best result judged to be "best" even if the results are ambiguous, incomplete, or conflicting at **416**. Once the best results are determined, perform any required formatting, variable substitutions and transformations to modify the results to a form most easily understood by the user at **418**. Finally, the compound results may be presented through the text to speech engine **124**, to the user in a useful and expected manner at **420**. The process **400** may be performed while accounting for the domain of expertise required, the context in which the question or command is presented, the domain specific information available, the history of the user's interaction, the user preferences, the information sources or commands that are available, and responses obtained from the sources. At each stage of the process **400**, probabilistic or fuzzy set decision and matching methods may be applied to deal with inconsistent, ambiguous, conflicting and incomplete information or responses. In addition, the use of asynchronous queries that may result in rapid and graceful failure of some queries or commands may allow the system **90** to robustly return results quickly and in a manner that seems natural to the user.

Please amend paragraph **[97]**, which begins on page 48, as follows:

**[97]** **FIG. 4B** is a process **450** for receiving natural language speech-based commands in order to locally or remotely control functions of the system **90** or for other devices according to another embodiment of the invention. The process **450** may begin when a user's utterance (i.e., user query and/or command) is captured through accurate speech recognition operating in a variety of real-world environments at **452**. Once the utterance is captured, it is ~~parse~~ parsed and interpreted ~~interpret~~ to determine the command that is contained in the utterance at **454**. Next, ~~review~~ the command is reviewed and ~~determine~~ the domain determined for the command and context, invoking the proper resources, including selecting of agents at **456**. The original command submitted by the user will often require that multiple queries and/or

commands be generated. For instance, suppose a user is interested in recorded his favorite television program. The user may utter "please record my favorite TV program." The system **90** may review this request together with stored data such as the user's profile and determine keywords such as "record" and "my favorite TV program." The system **90** may then generate queries to determine the name, the channel, and time for the user's favorite TV program. These queries may then be sent to a domain agent ~~domain~~, which may access a database containing the user's profile and determine the answers to these questions. A command may then be sent to a video recorder ordering the video recorder to record the selected TV program. Thus, at **458** formulate one or more queries that are to be sent to one or more local and/or network data sources and/or send appropriate commands to local or remote devices or the system itself. Next, route the generated commands to the appropriate system[s] and/or external devices at **460**. Once the commands have been executed, results including errors may be received and processed at **462**. The results of the executed commands may be optionally presented to the user at **464**.

Please amend paragraph **[98]**, which begins on page 49, as follows:

**[98]** Some of the steps depicting in **FIG. 4A** may actually require multiple steps that may also be repetitive. For instance, in step **404**, the user's utterance is parsed and interpreted in order to determine the meaning of the utterance. The system **90** may make an initial interpretation of the utterance based on the data stored in, for example, the dictionary and phrases module ~~124~~ **112**, user profiles[[,]] **110**, agents **106** and the databases ~~104~~ **102**. A real-time scoring system or other techniques may be applied to the interpretation results in order to generate a domain or a context score. If the confidence level of the domain or context score is not high enough to ensure a reliable response, the system **90** can request that the user verify the question or command is correctly understood. In general, the question may be phrased to indicate the context of the question including all criteria or parameters. If the user confirms that the question is correct, the system **90** may proceed to produce a response. Otherwise, either the user can rephrase the original question, perhaps adding additional information to remove ambiguity, or the system may ask one or more questions to attempt to resolve the

ambiguity or other actions may taken. **FIG. 5** is a process **500** for correctly interpreting a user's utterance according to one embodiment of the invention. The process **500** generally represents steps **402** and **404** of process **400**. Initially the user's utterance is inputted into the system **90** at **502**. The input is then interpreted at **504** using, for example, various sources of stored data such as user profiles, agent data, dictionary and phrases, and other relevant data. The interpretation is then scored using, for instance, a weighted scoring system as described previously at **506**. Once a score is obtained, a determination is made as to ~~determine~~ whether the confidence level of the interpretation is satisfactory at **508**. In other words, the determination relates to whether the score or confidence level given to the interpretation exceeds a certain value. If the confidence level is determined to be unsatisfactory then a request may be submitted to the user requesting that the user verify the interpretation at **510** and **512**. If the user is unsatisfied with the interpretation, he/she may be asked to rephrase the utterance and/or provide additional information at **514**. Once the user provides the rephrased utterance and/or additional information, the process **500** returns to the beginning at **502**. If, on the other hand, the user is satisfied with the interpretation, then the process **400** for receiving a natural language speech-based queries and/or commands and generating a response may continue at **516**.

Please amend paragraph **[99]**, which begins on page 51, as follows:

**[99]** Once the meaning of the utterance has been determined, the appropriate domain agent[s] and the query and/or commands properly formatted for the agent[s] may be determined. Referring to **FIG. 6**, ~~which is~~ a process **600** is illustrated for determining the proper domain agent[s] to invoke and the ~~properly formatted~~ proper formatting of queries and/or commands that [[is]] are to be submitted to the agents **106**, as generally depicted in steps **406-408** of **FIG. 4A** according to one embodiment of the invention. In order to formulate a question or command in the regular grammar used by agents **106**, a determination may be made as to the required and optional values for the criteria or parameters of the queries and/or commands. These criteria may have been explicitly supplied by the user or may need to be inferred. Thus, the properly interpreted query and/or command that is generated by, for

example, steps **404** and **454** of **FIGS. 4A** and **4B**, is parsed at **602**. The content of the properly interpreted query and/or command is then analyzed to determine the criteria and/or parameters of the properly interpreted query and/or command at **604**. A context sensitive procedure for extracting the criteria or parameters from the properly interpreted query and/or command may be used. Some criteria are determined by executing algorithms in the agent, while others may be determined by applying probabilistic of fuzzy reasoning to tables of possible values. Prior probabilities or fuzzy possibilities and associated values are received from a number of sources including the history of the dialog, the user profile **110**, and the agent. Based on user responses, the prior probabilities or fuzzy possibilities are updated as the system **90** learns the desired behavior. For a weather context, examples of criteria include, location, date and time. Other criteria can include command criteria (i.e., yes/no, on/off, pause, stop), and spelling. The process for determining criteria may be iterative or recursive in order to eliminate ambiguity in the user's question or command. For example, if the user has a place name (or other proper noun) in their utterance, tables in the databases **102** may be reviewed for place names or an attempt may be made to determine which word is the proper noun from the syntax of the utterance. In another example, the user asks "what about flight one hundred and twenty too?" In such a situation, flight information in the database and network information along with context may be used to determine the most plausible interpretation among[[;]]: flight ~~100~~ one-hundred and flight ~~20~~ twenty also, flight ~~100~~ one-hundred and flight ~~22~~ twenty-two, flight ~~122~~ one hundred twenty-two, and the like. Once the parameters and criteria for the query and/or command have been established, the proper agents **106** may be selected at **606**. After selecting the agents **106**, a properly formatted query and/or command that will be submitted to the agents **106** may be determined at **608**. The query and/or command may be in a standard format or may be a hierarchical data structure used for processing by the agent **106**. In order to submit the properly formatted query and/or command to the agent **106**, all of the required and some optional tokens for the grammar of the context may be filled in. Often the tokens must be transformed to values and forms acceptable to the agents. The required transformations may be obtained from the agents, dialog history or user profile **110**. Examples of transformations or substitutions that may be

performed were provided above. Once the properly formatted queries and/or commands are generated, the process (e.g., process **400**) may continue at **610**.

**Amendments to the Claims**: Please replace all prior versions and listings of claims with the following listing of claims.

**LISTING OF CLAIMS:**

1. (**Currently Amended**) A system responsive to a user generated natural language speech utterance, comprising:

~~an event manager, the event manager coordinating interaction between components of the system;~~

an agent architecture that includes a plurality of domain agents, each of the plurality of domain agents being an autonomous executable that receives, processes, and responds to ~~at least one of a query or a command~~ requests associated with a respective context; ~~and~~

a parser that determines a context ~~domain~~ for one or more keywords contained in the ~~user generated natural language~~ utterance ~~based on the content and context~~ to determine a meaning of the ~~user~~ utterance, wherein the parser selects at least one of the plurality of domain agents based on the determined meaning, wherein the selected domain agent receives, processes, and responds to requests associated with the context for the one or more keywords; and

an event manager that coordinates interaction between the parser and the agent architecture.

2. (**Currently Amended**) The system according to claim 1, further comprising a speech unit that receives ~~for receiving~~ the ~~user generated natural language~~ utterance from the user.

3. (**Currently Amended**) The system according to claim 2, wherein the speech unit ~~further comprises~~ includes a speech ~~code~~ coder that creates a digitized speech signal from the utterance.

4. (**Currently Amended**) The system according to claim 1, wherein the utterance contains at least one request that includes ~~comprising~~ at least one of a ~~user~~ query ~~and~~ or a ~~user~~ command.

5. (**Currently Amended**) The system according to claim 1, further comprising a speech recognition engine that ~~processes~~ recognizes words and phrases contained in the received user ~~generated natural language~~ utterance using ~~data~~ information in [[a]] one or more dictionary and phrase ~~module~~ tables, wherein the parser examines the recognized words and phrases to identify the one or more keywords.

6. (**Currently Amended**) The system according to claim [[1]] 5, ~~further comprising~~ wherein the speech recognition engine further recognizes an identity of the user based on information contained in one or more user profiles.

7. (**Currently Amended**) The system according to claim 1, further comprising a text to speech engine that creates one or more utterances to be presented as output to the user.

8. (**Currently Amended**) The system according to claim [[1]] 7, further comprising a personality module that ~~facilitates~~ includes one or more characteristics for formatting the utterances to be presented as the output to ~~of a response generated by~~ the ~~system~~ user.

9. (**Currently Amended**) The system according to claim 1, wherein the parser determines [[a]] the context for [[of]] the one or more keywords by ~~user utterance based on at least one of~~ applying prior probabilities or fuzzy possibilities to one or more of keyword matching, a user profile, ~~and~~ or a dialog history.

10. (**Currently Amended**) The system according to claim 1, wherein at least one of the plurality of domain agents creates ~~and directs~~ a query to at least one ~~of a~~ local ~~information~~

~~source and a network~~ or external information source when processing a request that includes a question.

11. (**Currently Amended**) The system according to claim 1, wherein at least one of the plurality of domain agents ~~creates and~~ directs a command to the system or ~~a remote or local device~~ an external entity when processing a request that includes a command.

12. (**Currently Amended**) The system according to claim [[10]] 1, wherein at least one of plurality of the domain agents creates a plurality of duplicate queries to a plurality of local or external information sources and asynchronously evaluates multiple responses from ~~multiple~~ the plurality of information sources ~~in response to the query~~ when processing a request that includes a question.

13. (**Currently Amended**) The system according to claim 12, wherein the at least one ~~of the~~ domain ~~agents~~ agent evaluates the multiple responses using probabilistic or fuzzy scoring techniques to score ~~by scoring~~ each of the responses ~~response~~ based on ~~results already~~ one or more of previously received responses, the context ~~of~~ for the ~~user utterance~~ keywords, ~~user utterance~~ one or more criteria for the request, a dialog history ~~of dialog between the user and the system~~, a user profile, or ~~domain specific~~ information ~~using probabilistic or fuzzy scoring techniques~~ specific to the at least one domain agent.

14. (**Currently Amended**) The system according to claim 1, wherein at least one of the plurality of domain agents uses one or more presentation ~~formats generated responses using available format~~ templates to format a response to a request ~~and~~ based on ~~user utterance~~ the context for the keywords, one or more ~~user utterance~~ criteria for the request, a dialog history, or a user profile.

15. (**Currently Amended**) The system according to claim 14, wherein the at least one domain agent applies one or more ~~responses are generated by performing~~ variable

substitutions ~~and~~ or transformations to ~~produce a~~ format the response in a manner best understood and most natural to the user.

16. (**New**) The system according to claim 1, wherein the parser formulates at least one request in accordance with a grammar that the selected domain agent uses to process requests associated with the context for the one or more keywords contained in the utterance.

17. (**New**) The system according to claim 16, wherein the parser provides the formulated request to the event manager to invoke the selected domain agent, and the event manager sends and receives one or more events to the agent architecture to process the formulated request, the event manager thereby coordinating interaction between the parser and the agent architecture.

18. (**New**) The system according to claim 1, wherein the agent architecture further includes a system agent that provides default functionality and basic services, wherein each of the plurality of domain agents can use the functionality and services of the system agent.

19. (**New**) The system according to claim 18, wherein the system agent manages one or more criteria handlers used to determine the context for the one or more keywords, wherein each of the system agent and the plurality of domain agents can use the criteria handlers.

20. (**New**) The system according to claim 18, wherein the agent architecture further includes an agent library that contains one or more utilities for commonly used functions, wherein each of the system agent and the plurality of domain agents can use the utilities contained in the agent library.

21. (**New**) The system according to claim 20, wherein the utilities contained in the agent library include at least one of text and string handling, network communications, database lookup and management, fuzzy and probabilistic evaluation, or text to speech formats.

22. (**New**) The system according to claim 20, further comprising an update manager that uses a network interface to download, distribute, and install updates relating to one or more of the system agent, the plurality of domain agents, the agent library, one or more databases available to the agent architecture, or entries in the dictionary and phrase tables.

23. (**New**) The system according to claim 22, wherein the updates include one or more of a new domain agent, additional domain knowledge for a domain agent, new keywords for a domain agent, preferred information sources for a domain agent, updated domain information for a domain agent, or updated content for a domain agent.

24. (**New**) The system according to claim 18, wherein the agent architecture further includes an agent manager that loads and initializes each of the system agent and the plurality of domain agents when the system starts up, and that unloads each of the system agent and the plurality of domain agents when the system shuts down.

25. (**New**) The system according to claim 18, wherein the parser formulates at least one request in accordance with a grammar that the selected domain agent uses to process requests associated with the context for the one or more keywords contained in the utterance.

26. (**New**) The system according to claim 18, further comprising a speech recognition engine that recognizes words and phrases contained in the received user utterance using information in one or more dictionary and phrase tables, wherein the parser examines the recognized words and phrases to identify the one or more keywords.

27. (**New**) The system according to claim 1, further comprising an update manager that enables the user to purchase one or more domain agents from a third party on a one-time or subscription basis.

28. (**New**) The system according to claim 27, wherein the update manager downloads updates for one or more domain agents and uninstalls one or more unused domain agents pursuant to a license with the third party.

29. (**New**) The system according to claim 28, wherein the agent architecture further includes an agent manager that verifies compliance with terms and conditions of the license.

30. (**New**) The system according to claim 29, wherein the agent manager uses a network interface to locate a suitable domain agent for a request that requires a domain agent not currently loaded on the system, the agent manager causing the update manager to load the located domain agent pursuant to the terms and conditions of the license.

31. (**New**) The system according to claim 27, wherein the parser formulates at least one request in accordance with a grammar that the selected domain agent uses to process requests associated with the context for the one or more keywords contained in the utterance.

32. (**New**) The system according to claim 27, further comprising a speech recognition engine that recognizes words and phrases contained in the received user utterance using information in one or more dictionary and phrase tables, wherein the parser examines the recognized words and phrases to identify the one or more keywords.

33. (**New**) The system according to claim 1, further comprising an extension and modification facility that allows users and content developers to configure behavior of the agent architecture.

34. (**New**) The system according to claim 33, wherein the extension and modification facility can be used to extend or modify behavior of the plurality of domain agents.

35. (**New**) The system according to claim 34, wherein the users and content developers can add one or more of new commands, keywords, information, or information sources to the agent architecture to extend or modify the behavior of the plurality of domain agents.

36. (**New**) The system according to claim 33, wherein the extension and modification facility provides a generic agent that can be used to create a new domain agent.

37. (**New**) The system according to claim 33, wherein the users and content developers can configure the behavior of the agent architecture using one or more of a scripting language, a graphical user interface, or natural language utterances.

38. (**New**) The system according to claim 33, wherein the users and content developers can create one or more of special reports, packages of queries, alerts, or output formats using the extension and modification facility.

39. (**New**) The system according to claim 33, wherein the parser formulates at least one request in accordance with a grammar that the selected domain agent uses to process requests associated with the context for the one or more keywords contained in the utterance.

40. (**New**) The system according to claim 33, further comprising a speech recognition engine that recognizes words and phrases contained in the received user utterance using information in one or more dictionary and phrase tables, wherein the parser examines the recognized words and phrases to identify the one or more keywords.

# REMARKS

Upon entry of the foregoing Amendment, claims 1-40 are pending in the application. Claims 1-15 have been amended. No claims have been cancelled. Claims 16-40 have been newly added. Applicants believe that this Amendment does not add new matter. In view of the foregoing Amendment and the following Remarks, allowance of all the pending claims is requested.

## SPECIFICATION OBJECTIONS

The Examiner has objected to the disclosure because of alleged informalities. Applicants note that the foregoing Amendment includes various amendments to the Specification that address minor typographical errors and other informalities.

Additionally, in response to the Examiner's request that the Specification "should be updated to include continuity data," Applicants note that the requested continuity data was provided in the Application Data Sheet filed on May 11, 2007. In particular, pursuant to 37 C.F.R. § 1.76(b)(5), "[p]roviding this information in the application data sheet constitutes the specific reference required . . . , and need not otherwise be made part of the specification."

Accordingly, for at least the foregoing reasons, Applicants have fully addressed the objections to the disclosure that the Examiner has raised in the Office Action. Applicants therefore request withdrawal of this objection.

## REJECTION UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

The Examiner has rejected claims 9 and 13 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. In particular, the Examiner requests clarification as to the nature of the elements recited in claims 9 and 13. Applicants note that claims 9 and 13 have been amended as indicated above, and that amended claims 9 and 13 are clear and definite, particularly pointing out and distinctly claiming the subject matter which Applicants regard as the invention.

In particular, amended claim 9 recites that "the parser determines the context for the one or more keywords by applying prior probabilities or fuzzy possibilities to one or more of keyword matching, a user profile, or a dialog history." As such, amended claim 9 clearly recites that the parser may apply prior probabilities or fuzzy possibilities to keyword matching, a user profile, and/or a dialog history in order to determine the context of one or more keywords.

Additionally, amended claim 13 recites that domain agents may evaluate "multiple responses using probabilistic or fuzzy scoring techniques." Amended claim 13 further recites that evaluating the multiple responses may entail scoring "each of the responses based on one or more of previously received responses, the context for the keywords, one or more criteria for the request, a dialog history, a user profile, or information specific to the at least one domain agent."

Accordingly, for at least the reason that amended claims 9 and 13 do particularly point out and distinctly claim the subject matter that Applicants regard as the invention, Applicants request that the Examiner withdraw this rejection of the claims.

## REJECTION UNDER 35 U.S.C. § 102

The Examiner has rejected claims 1-5, 7, and 10-12 under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,523,061 to Halverson et al. ("Halverson"). This rejection is improper and must be withdrawn for at least the reason that Halverson fails to disclose each and every feature of the claimed invention.

More particularly, Halverson does not disclose at least the feature of "a parser that determines a context for one or more keywords contained in the utterance to determine a meaning of the utterance," as recited in independent claim 1, for example. The Examiner alleges, however, that Halverson discloses "a natural language interpreter (or parser)" that "attempts to determine both the meaning of spoken words (semantic processing) as well as a grammar of the statement." Applicants disagree with the Examiner's assessment for at least the reason that the natural language interpreter (or parser) described in Halverson does not "determine[] a context for one or more keywords contained in the utterance" to determine the meaning of the utterance.

For example, as the Examiner acknowledges on page 6 of the Office Action, Halverson indicates that a speech recognition engine employs a "lexicon [that] is dynamically adjusted to reflect the current user context" (col. 7, lines 42-47). However, the speech recognition engine does not use context-related information to determine the meaning of an utterance, but instead creates "a transcription of the engine's best guess at what the user has said" (col. 7, lines 42-63). As Halverson illustrates in Figure 3, the speech recognition engine is a distinct component from "the natural language interpreter [that] attempts to determine . . . the meaning of spoken words" (*see* Figure 3, elements 310, 320 and accompanying text).

Furthermore, assuming *arguendo* that the natural language interpreter described in Halverson could be considered reasonably analogous to the "parser" recited in the claimed invention, Halverson explicitly states that the "natural language interpreter" does not determine "a context for one or more keywords contained in the utterance to determine a meaning of the utterance," as recited in independent claim 1, for example. Rather, Halverson clearly states that the natural language interpreter "applies a set of syntactic and semantic grammar rules to a word string using a bottom-up parser to generate a logical form, which is a structured representation of the ***context-independent*** meaning of the string" (col. 8, lines 14-17). Halverson further indicates that grammars used in the natural language interpreter (or parser) "may be compiled into [a] ***context-free grammar***" (col. 8, lines 31-33).

Accordingly, to the extent that Halverson describes a parser that can determine the meaning of an utterance, Halverson nonetheless fails to disclose that the "parser determines a context for one or more keywords contained in the utterance to determine" the meaning. Moreover, to the extent that Halverson describes adapting a speech recognition engine's lexicon based on context, Halverson does not disclose that the speech recognition engine actually determines the context or the meaning of the utterance. For at least these reasons, Halverson fails to disclose at least the foregoing feature recited in independent claim 1. The rejection is therefore improper and must be withdrawn.

Dependent claims 2-5, 7, and 10-12 depend from and add features to independent claim 1. Thus, the rejection of these claims is likewise improper and must be withdrawn for at least the same reasons.

## REJECTION UNDER 35 U.S.C. § 103

The Examiner has rejected claims 6, 8, and 14-15 under 35 U.S.C. § 103 as allegedly being unpatentable over Halverson in view of U.S. Patent No. 6,195,651 to Handel et al. ("Handel"), and claims 9 and 13 under 35 U.S.C. § 103 as allegedly being unpatentable over Halverson in view of U.S. Patent No. 7,062,488 to Reisman ("Reisman"). These rejections are improper and must be withdrawn because the Examiner has failed to establish a *prima facie* case of obviousness, for at least the reason that the references relied upon, either alone or in combination, fail to disclose, teach, or suggest each and every feature of the claimed invention.

More particularly, for at least the reasons discussed above, Halverson does not disclose, teach, or suggest at least the feature of "a parser that determines a context for one or more keywords contained in the utterance to determine a meaning of the utterance," as recited in independent claim 1, for example. Handel and Reisman each fail to cure at least this deficiency of Halverson.

Accordingly, for at least the foregoing reasons, the references relied upon, either alone or in combination, fail to disclose, teach, or suggest each and every feature of independent claim 1. Dependent claims 6, 8-9, and 13-15 depend from and add features to independent claim 1. Thus, the rejections of these claims are improper and must be withdrawn for at least the foregoing reasons.

## CONCLUSION

Having addressed each of the foregoing rejections, it is respectfully submitted that a full and complete response has been made to the outstanding Office Action. As such, the application is in condition for allowance. Notice to that effect is respectfully requested.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Date: **June 18, 2008**

Respectfully submitted,

By: _____

Syed Jafar Ali
Registration No. 58,780

PILLSBURY WINTHROP SHAW PITTMAN LLP
P.O. Box 10500
McLean, Virginia 22102
Main: 703-770-7900
Direct: 703-770-7540
Fax: 703-770-7901

| INFORMATION DISCLOSURE CITATION IN AN APPLICATION | Docket Number | Application Number |
|---|---|---|
| | 090611-0361350 | 11/747,547 |
| | Applicant(s) | |
| | Robert A. KENNEWICK *et al.* | |
| | Filing Date | Group Art Unit |
| Form PTO-1449 | May 11, 2007 | 2626 |

## U.S. PATENT DOCUMENTS

| *EXAMINER INITIAL | REF | DOCUMENT NO. | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
|---|---|---|---|---|---|---|---|
| | A | 5,696,965 | 12/09/1997 | Dedrick | 395 | 610 | |
| | B | 5,878,385 | 03/02/1999 | Bralich *et al.* | 704 | 9 | |
| | C | 6,415,257 | 07/02/2002 | Junqua *et al.* | 704 | 275 | |
| | D | 6,466,654 | 10/15/2002 | Cooper *et al.* | 379 | 88.01 | |
| | E | 6,567,797 | 05/20/2003 | Schuetze *et al.* | 707 | 2 | |
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## FOREIGN PATENT DOCUMENTS

| | REF | DOCUMENT NO. | DATE | COUNTRY | CLASS | SUBCLASS | Translations YES | Translations NO |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
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| | R | TURUNEN, "Adaptive Interaction Methods in Speech User Interfaces", Conference on Human Factors in Computing Systems, Seattle, Washington, 2001, pages 91-92. |

| EXAMINER | DATE CONSIDERED |
|---|---|
| | |

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

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 11747547 |
| **Filing Date:** | 11-May-2007 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| First Named Inventor/Applicant Name: | ROBERT A. KENNEWICK |
| **Filer:** | Syed Jafar Ali/Kathy Oliver |
| **Attorney Docket Number:** | 090611-0361350 |

Filed as Small Entity

**Utility Filing Fees**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| Claims in excess of 20 | 2202 | 20 | 25 | 500 |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| Post-Allowance-and-Post-Issuance: | | | | |
| **Extension-of-Time:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Miscellaneous:** | | | | |
| Submission- Information Disclosure Stmt | 1806 | 1 | 180 | 180 |
| | | **Total in USD ($)** | | **680** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 3478879 |
| **Application Number:** | 11747547 |
| **International Application Number:** | |
| **Confirmation Number:** | 4708 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| **First Named Inventor/Applicant Name:** | ROBERT A. KENNEWICK |
| **Customer Number:** | 909 |
| **Filer:** | Syed Jafar Ali/Kathy Oliver |
| **Filer Authorized By:** | Syed Jafar Ali |
| **Attorney Docket Number:** | 090611-0361350 |
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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 | | 0361350Rsp.pdf | 1717040<br>f87eb931dbf99c55335e427b2645f4d7c2824c68 | yes | 42 |

**Multipart Description/PDF files in .zip description**

| Document Description | Start | End |
|---|---|---|
| Amendment - After Non-Final Rejection | 1 | 1 |
| Specification | 2 | 18 |
| Claims | 19 | 25 |
| Applicant Arguments/Remarks Made in an Amendment | 26 | 30 |
| Information Disclosure Statement Letter | 31 | 41 |
| Information Disclosure Statement (IDS) Filed | 42 | 42 |

**Warnings:**

**Information:**

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| 2 | NPL Documents | CHAI.pdf | 1036235<br>82e5c44d0c4460a84b5763f6ca9858e2072a4f38 | no | 10 |

**Warnings:**

**Information:**

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| 3 | NPL Documents | CHEYER.pdf | 136285<br>5e49cb5ed1eb7cad08bed8e144f0d4292d0d5744 | no | 11 |

**Warnings:**

**Information:**

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| 4 | NPL Documents | ELIO.pdf | 934896<br>d46aa8144b37e3a1d338415605eb1066ae6fc010 | no | 10 |

**Warnings:**

**Information:**

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| 5 | NPL Documents | TURUNEN.pdf | 179163<br>b47bbd1deaa06420e04206c4216ccee446a68755 | no | 2 |

**Warnings:**

**Information:**

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| 6 | Fee Worksheet (PTO-06) | fee-info.pdf | 8361<br>f7dbc2da8519fd7962d2abd2a3ddee9561f4280e | no | 2 |

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| **Warnings:** | |
| **Information:** | |
| **Total Files Size (in bytes):** | 4011980 |

**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.**

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

| | | | |
|---|---|---|---|
| APPLICANTS : | Robert A. KENNEWICK *et al.* | CONFIRMATION NO.: | 4708 |
| SERIAL NUMBER : | 11/747,547 | EXAMINER: | Martin Lerner |
| FILING DATE : | May 11, 2007 | ART UNIT: | 2626 |
| FOR : | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | | |

**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, Applicants hereby make of record in the above-identified application the documents listed on the attached Form PTO-1449.

Applicants have listed publication dates on the attached PTO-1449 based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the date indicated. Where the publication date of a listed document does not provide a month of publication, the year of publication of the listed document is sufficiently earlier than the effective U.S. filing date and any foreign priority date so that the month of publication is not an issue.

Applicants reserve the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered.

This Supplemental Information Disclosure Statement is being filed more than three months after the filing date of a national application other than a continued prosecution application under 37 C.F.R. §1.53(d), or more than three months after the date of entry of the national stage as set forth in 37 C.F.R. §1.491 in an international application, and after the mailing date of the first Office Action on the merits, but before the mailing date of any of a Final Action under 37 C.F.R. §1.113, a Notice of Allowance under 37 C.F.R. §1.311, or an action that otherwise closes prosecution in the application. 37 C.F.R. §1.97(c).

Please charge the $180.00 fee [37 C.F.R. §1.17(p)] to Deposit Account No. 03-3975. In addition, please charge any fee deficiencies, or credit any overpayment, to Deposit Account No. 03-3975 as needed to ensure consideration of the Supplemental Information Disclosure Statement.

Documents E, F, H, I, and M-P were cited in a search report by a foreign patent office in a counterpart foreign application. Document A was cited in a search report by a foreign patent office in another counterpart foreign application. Submission of English language versions of the search reports that indicate the degree of relevance found by the foreign offices are provided.

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

By _____
Syed Jafar Ali
Registration No.: 58,780

P. O. Box 10500
McLean, Virginia 22102
Telephone: (703) 770-7900
Telefax: (703) 770-7901

Customer No.
00909

Dated: June 18, 2008



Google Exhibit 1021
Page 00236

UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 | 4708 |

909 7590 09/09/2008

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

| EXAMINER | |
|---|---|
| LERNER, MARTIN | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2626 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 09/09/2008 | PAPER |

**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.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 11/747,547 | KENNEWICK ET AL. | |
| | Examiner | Art Unit | |
| | MARTIN LERNER | 2626 | |

*-- 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* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *18 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ 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**

4)☒ Claim(s) *1 to 40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 to 26 and 33 to 40* is/are rejected.

7)☒ Claim(s) *27 to 32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/18/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities:

Applicants' amendments to the Specification, filed 18 June 2008, appears to have erroneously amended ¶[0048] as ¶[0061]. The directions for entry request an amendment to ¶[0048], but ¶[0061] is the number of the paragraph.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 to 5, 7, 10 to 12, 16 to 26, 33 to 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Halverson et al*. in view of *Howard et al. ('006)*.

Concerning independent claim 1, *Halverson et al*. discloses a system for speech-based navigation, comprising:

"an agent architecture that includes a plurality of domain agents, the domain agents being an autonomous executable that receives, processes and responds to

requests [associated with a respective context]" – facilitator 600 coordinates and integrates results received from different client agents on various sub-goals, in order to satisfy an overall goal; facilitator 600 receives requests from a user interface (UI) agent 650, and delegates requests to appropriate client agents in a community (column 13, lines 15 to 51); a resulting ICL goal expression is routed to appropriate agents including video-on-demand database agent 640, user interface (UI) agent 650, email agent 660, telephone agent 670, and VCR controller agent 680 (column 14, lines 25 to 64: Figure 6); a statement "show me the movies starring John Wayne" is a request (column 9, lines 47 to 56; column 14, lines 25 to 34).

"a parser that determines [a context for one or more keywords contained in the utterance to determine] a meaning of the utterance, wherein the parser selects at least one of the plurality of domain agents based on the determined meaning, wherein the selected domain agent receives, processes, and responds to requests [associated with the context for the one or more keywords]" – natural language parser 320 linguistically parses and interprets textual output of a speech recognition engine; the natural language parser attempts to determine the meaning of spoken words (column 7, line 64 to column 8, line 5: Figure 3); voice data received from a user is interpreted in order to understand the user's request for information; preferably, this includes performing speech recognition in order to extract words from voice data, and further includes natural language parsing of those words (column 7, lines 22 to 28: Figure 4: Step 404); a speech recognition engine is provided with a vocabulary of likely words or phrases that the recognition engine can match against its analysis of acoustic signals, and may

be preferably adjusted to favor relevant words and phrases (column 7, lines 42 to 56); extracted words are equivalent to "keywords"; facilitator 600 asks natural language (NL) agent 620 and speech recognition agent 610 to interpret the query and return an interpretation in ICL format; the resulting ICL goal expression is then routed by facilitator 600 to appropriate agents to execute the request (column 14, lines 28 to 37: Figure 6); thus, natural language parser 320, through facilitator 600, selects an agent corresponding to a meaning of an ICL goal expression;

"an event manager that coordinates interaction between the parser and the agent architecture" – facilitator 600 ("an event manager") coordinates and integrates results received from different client agents on various sub-goals, in order to satisfy an overall goal; facilitator 600 receives requests from a user interface (UI) agent 650, and delegates requests to appropriate client agents in a community (column 13, lines 15 to 51); a functionality of each client agent is made available to the agent community through registration of the client agent's capabilities with a facilitator (column 14, lines 25 to 64: Figure 6); facilitator 600 asks natural language (NL) agent 620 and speech recognition agent 610 to interpret the query and return an interpretation in ICL format; the resulting ICL goal expression is then routed by facilitator 600 to appropriate agents to execute the request (column 14, lines 28 to 37: Figure 6); thus, facilitator 600 interacts with natural language (NL) agent 620, which includes natural language parser 320, and domain agents 630, 640, 660, 670, 680, *etc*.

Concerning independent claim 1, the only elements not clearly disclosed by *Halverson et al*. are that the parser determines a "context" and that the words

recognized by speech recognition engine and natural language parser are "keywords". However, *Halverson et al*. discloses ICL goal expressions that are equivalent to a “context” because a goal is expressed as a capability that can performed by an agent. Moreover, those skilled in the art would know that keywords are the same as words and phrases that are likely for a given application.

Concerning independent claim 1, though, *Howard et al. (‘006)* teaches speech recognition and a natural language parser for automatic control of household activity, where a natural language parser 112 operates on a goal-oriented basis, identifying keywords and phrases from recognized speech, and using those recognized words and phrases to fill slots in pre-defined templates or frames that represent different goal-oriented tasks. (Column 5, Lines 15 to 24: Figure 2) A local parser 260 can identify predetermined task-related fragments. (Column 6, Lines 60 to 62: Figure 3) Natural language parser 112 extracts semantically important and meaningful topics from natural language text, and translates the natural language text input to a new representation by generating well-structured tags containing topic information. (Column 7, Line 64 to Column 8, Line 8) Thus, *Howard et al. (‘006)* expressly teaches keywords, and goals or topics, where a goal or topic is equivalent to a "context". An objective is to provide control for components for performing a variety of home automation functions, including lighting control functions, heating and cooling system control functions, telephone answering and switching functions, *etc.* (Column 3, Lines 46 to 56) It would have been obvious to one having ordinary skill in the art to determine a context for one or more

keywords as taught by *Howard et al. ('006)* in a natural language agent architecture of *Halverson et al*. for a purpose of controlling a plurality of home automation functions.

Concerning claim 2, *Halverson et al*. discloses a user's voice input is captured by a voice input device 102, such as a microphone; a data navigation system is driven by natural language input (column 4, line 63 to column 5, line 1: Figures 1a and 1b).

Concerning claim 3, *Halverson et al*. discloses the voice data may preferably be transmitted in compressed digitized form across a network 106 (column 4, lines 4 to 10: Figure 1a); "notice" is taken that a compressed digitized form of voice data involves "a speech coder", implicitly.

Concerning claim 4, *Halverson et al*. discloses a statement "show me the movies starring John Wayne", which is a command, and a question, "What is the weather in Miami?", which is a query (column 9, lines 47 to 56; column 14, lines 25 to 34).

Concerning claims 5, 26, and 40, *Halverson et al*. discloses a speech recognition engine is provided with a vocabulary lexicon ("a dictionary") of likely words or phrases ("a phrase table") that the recognition engine can match against its analysis of acoustic signals (column 7, lines 42 to 45).

Concerning claim 7, *Halverson et al*. discloses a text to speech agent coupled to facilitator 600 (Figure 6).

Concerning claims 10 and 11, *Halverson et al*. discloses that facilitator 600 can retrieve desired video content by a video database agent 640 or can invoke a web database agent 630 to access desired information from an appropriate Internet site

(column 14, lines 34 to 52: Figure 6); query construction logic 330 and query refinement logic 340 construct queries as required in order to access desired information electronically from a particular database or source of interest (column 8, line 63 to column 9, line 5: Figure 3); implicitly, a video database is “a local information source” and an appropriate Internet site is “an external information source” or “an external entity”.

Concerning claim 12, *Halverson et al*. discloses that web database agent 630 preferably includes or is coupled to an appropriate embodiment of query construction logic 330 and query refinement logic 340, including a scraping utility such as WebL (column 14, lines 48 to 55); "notice" is taken that a scraping utility such as WebL is a web crawler that implicitly “creates a plurality of duplicate queries” to a plurality of “external information sources” and “evaluates multiple responses from the plurality of information sources”, because a web crawler compiles search results from a plurality of web pages.

Concerning claims 16, 25, and 39, *Howard et al. (‘006)* teaches that natural language parser 112 works in conjunction with a set of grammars 114 (column 5, lines 15 to 28: Figure 2); grammars operate with keywords for identifying tasks or goals, where tasks or goals are equivalent to “the context”.

Concerning claim 17, *Halverson et al*. discloses that facilitator 600 (“event manager”) coordinates and integrates results received from different client agents on various sub-goals, in order to satisfy an overall goal; facilitator 600 receives requests

from a user interface (UI) agent 650, and delegates requests to appropriate client agents in a community (column 13, lines 15 to 51).

Concerning claim 18, *Halverson et al*. discloses "default functionality and basic services" that include speech recognition by speech recognition agent 610, natural language agent 620 that performs parsing, and a text to speech agent for providing output by speech synthesis (column 14, lines 25 to 64: Figure 6); these agents provide default functions and services that can be utilized by all the agents.

Concerning claim 19, *Howard et al. ('006)* teaches that speech understanding module 228 includes a knowledge database 263 to determine whether a particular action related to achieving a goal is possible (column 7, lines 11 to 17); determining whether a particular action can be achieved or is possible equates to a "criteria handler".

Concerning claim 20, *Halverson et al*. discloses an agent library (column 13, lines 27 to 34); agents in an agent library include speech recognition agent 610 for speech recognition, natural language agent 620 that performs parsing, and a text to speech agent for providing output by speech synthesis (column 14, lines 25 to 64: Figure 6); these agents are "utilities for commonly used functions".

Concerning claim 21, *Halverson et al*. discloses a text to speech agent (Figure 6); a text to speech agent is a utility for at least "text to speech formats".

Concerning claims 22, 23, and 35, *Howard et al. ('006)* teaches a mapping update model 122, where updates can be in the form of plug-in modules (column 5, lines 55 to 67: Figure 2); similarly, *Halverson et al*. discloses that additional service

agents can be plugged into the existing platform, immediately enabling the facilitator to respond dynamically to requests for corresponding services (column 15, lines 1 to 10); thus, at least an update is provided for "the agent library"; *Howard et al. ('006)* teaches ever-changing electronic activity guide data is downloaded or updated (column 5, lines 31 to 35: Figure 2); electronic activity guide data is equivalent to "updated domain information for a domain agent" or "updated content for a domain agent".

Concerning claim 24, "notice" is taken that a computer system implicitly performs functions of loading and initializing upon system start up, and unloading upon system shut down; thus, *Halverson et al*. performs these functions, implicitly.

Concerning claims 33, 34, and 36, *Howard et al. ('006)* teaches a mapping update model 122, where updates can be in the form of plug-in modules (column 5, lines 55 to 67: Figure 2); similarly, *Halverson et al*. discloses that additional service agents can be plugged into the existing platform, immediately enabling the facilitator to respond dynamically to requests for corresponding services (column 15, lines 1 to 10); thus, a user or content developer can extend, modify, or configure behavior of the agent architecture by adding additional service agents.

Concerning claim 37, *Howard et al. ('006)* teaches a mapping update model 122, where updates can be in the form of plug-in modules (column 5, lines 55 to 67: Figure 2); an on-screen display is provided for presenting options to a user; implicitly, then a user is presented with "a graphical user interface", or display, to download new electronic activity guide data, which configures the behavior of an agent architecture.

Concerning claim 38, *Halverson et al*. discloses a notify agent (Figure 6), which is equivalent to providing "alerts".

4. Claims 6, 8, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Halverson et al*. in view of *Howard et al. ('006)* as applied to claims 1, 5, and 7 above, and further in view of *Handel et al*.

*Halverson et al*. omits formatting generated responses using available format templates based on a user profile, a personality module, and performing variable substitutions and transformations to produce a response best understood and most natural to the user. However, *Handel et al*. teaches an agent based system, where an agent is personalized ("a personality module") to an individual user's goals, habits, and preferences. (Column 1, Lines 5 to 20) Specifically, a user's interface to a particular application program is modified according to a user's profile information, and presented in a format based on information in the user's profile on a display. (Abstract; Column 1, Lines 51 to 61) An Intelligent Agent Coordinator determines which format to send the information. If a user is at her desk and using the web client, the Intelligent Agent Coordinator would know to send any necessary information there as a full-featured graphically intense version. If a user has left the building, the Intelligent Agent Coordinator assumes that you are reachable via your handheld device (for which it knows the capabilities) and sends the text of an urgent message there, rather than a more graphically-oriented version. (Column 40, Lines 23 to 47) Sending text rather than a graphically-oriented version involves a substitution and transformation of format

to produce a response best understood and most natural to the user in a current location, either at her computer or outside the building. An objective is to use advanced profiling and filtering to learn about the user, and provide a user interface that is crafted to satisfy a particular user's needs, preferences, and current context. (Column 29, Line 38 to Column 30, Line 14) It would have been obvious to one having ordinary skill in the art to format responses based on a user profile as taught by *Handel et al.* in a method and system for speech-based data navigation of *Halverson et al*. for a purpose of providing a user interface that is crafted to satisfy a particular user's needs.

5. Claims 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Halverson et al*. in view of *Howard et al. ('006)* as applied to claims 1 and 12 above, and further in view of *Reisman*.

*Halverson et al*. discloses that a natural language interface "learns" from past usage patterns of a particular user or group of users, which is equivalent to a "user profile" and a "dialog history" (column 8, lines 42 to 49), and discloses "keyword matching" because a query is constructed as keyword search terms for "Clint Eastwood", etc. (column 11, lines 55 to 58). However, *Halverson et al*. does not expressly disclose applying prior probabilities to keyword matching, user profile, and dialog history or using probabilistic or fuzzy scoring techniques. Still, *Reisman* teaches task/domain segmentation for responding to a current user command associated with one of a plurality of tasks. (Abstract) The system seeks a user history, including a current history (current session) and prior history as to a particular user's task/domain

behavior from a user/task/domain associated data database 14. User and query information is combined to infer likely task/domains based on algorithms that rank highest the task/domains most commonly associated with the current user and the current query. (Column 9, Lines 15 to 56: Figure 3) Ranking of task/domains that are commonly associated with a current user and a current query is equivalent to "applying prior probabilities to . . . user profile, and dialog history" or "using probabilistic . . . techniques". An objective is to improve discovery searching and signifier mapping by utilizing heuristic, adaptive feedback-based techniques, while at the same time customizing use of the feedback to particular tasks or domains. (Column 2, Lines 9 to 21; Column 3, Line 63 to Column 4, Line 9) It would have been obvious to one having ordinary skill in the art to apply prior probabilities and probabilistic techniques to user profile and dialog history as taught by *Reisman* in a system of speech-based data navigation by agents of *Halverson et al*. for a purpose of improving searching by utilizing feedback that is customized to particular tasks or domains.

### ***Allowable Subject Matter***

6. Claims 27 to 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or reasonably suggest the limitation of an update manager that enables a user to purchase one or more domain agents from a third party on a one-time or subscription basis. Generally, it is known in the prior art of interactive voice response (IVR) and distributed speech recognition to update functionalities by downloading a plug-in. However, the prior art of record does not disclose or reasonably suggest purchasing domain agents from a third party. Specifically, while it is known to purchase software for downloading over the Internet, the prior art of record does not disclose or reasonably suggest purchasing a domain agent.

### *Response to Arguments*

8. Applicants' arguments filed 18 June 2008 have been considered but are moot in view of the new grounds of rejection, necessitated by amendment.

### *Conclusion*

9. The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure.

Howard et al. ('980), Strubbe et al., Contolini et al., Kennewick et al., and Karaorman et al. disclose related art.

10. Applicants' amendment necessitated the new grounds of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicants are 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 Martin Lerner whose telephone number is (571) 272-7608. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. 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.

/Martin Lerner/
Primary Examiner
Art Unit 2626
September 5, 2008

| Notice of References Cited | Application/Control No. 11/747,547 | Applicant(s)/Patent Under Reexamination KENNEWICK ET AL. | |
|---|---|---|---|
| | Examiner MARTIN LERNER | Art Unit 2626 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|---|---|---|---|
| * | A | US-6,513,006 | 01-2003 | Howard et al. | 704/257 |
| * | B | US-2001/0041980 | 11-2001 | Howard et al. | 704/270 |
| * | C | US-6,795,808 | 09-2004 | Strubbe et al. | 704/275 |
| * | D | US-6,643,620 | 11-2003 | Contolini et al. | 704/270 |
| * | E | US-7,398,209 | 07-2008 | Kennewick et al. | 704/255 |
| * | F | US-6,631,346 | 10-2003 | Karaorman et al. | 704/9 |
| | G | US- | | | |
| | H | US- | | | |
| | I | US- | | | |
| | J | US- | | | |
| | K | US- | | | |
| | L | US- | | | |
| | M | US- | | | |

**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|---|---|---|---|---|---|
| | N | | | | | |
| | O | | | | | |
| | P | | | | | |
| | Q | | | | | |
| | R | | | | | |
| | S | | | | | |
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**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | 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.

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 11747547 | KENNEWICK ET AL. |
| | Examiner | Art Unit |
| | MARTIN LERNER | 2626 |

| SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| 704 | 251, 257, 270, 270.1, 275 | 3/10/2008 | ML |
| 707 | 3, 4, 5 | 3/10/2008 | ML |
| ALL | UPDATED | 9/5/2008 | ML |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Parent Application Checked | 3/10/2008 | ML |
| EAST Search Attached | 3/10/2008 | ML |
| EAST Search Attached | 9/5/2008 | ML |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

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# EAST Search History

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
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| L1 | 1 | ("7398209").PN. | US-PGPUB; USPAT | OR | OFF | 2008/08/14 14:42 |
| L2 | 123 | ("20020143535" \| "20030182132" \| "20040193420" \| "20050021826" \| "5799276" \| "5878385" \| "5918222" \| "5155743" \| "5386556" \| "5424947" \| "5471318" \| "5475733" \| "5499289" \| "5517560" \| "5533108" \| "5537436" \| "5539744" \| "5557667" \| "5563937" \| "5590039" \| "5633922" \| "5675629" \| "5708422" \| "5721938" \| "5722084" \| "5742763" \| "5752052" \| "5754784" \| "5761631" \| "5794050" \| "5802510" \| "5832221" \| "5878386" \| "5895466" \| "5911120" \| "5926784" \| "5933822" \| "5953393" \| "5963894" \| "5963940" \| "5987404" \| "5991721" \| "5995119" \| "6195651" \| "6208972" \| "6233559" \| "6408272" \| "6415257" \| "6420975" \| "6466654" \| "6501833" \| "6556973" \| "6567797" \| "6615172" \| "6691151" \| "6721706" \| "6741931" \| "6785535" \| "6901366" \| "6937977" \| "6980092" \| | US-PGPUB; USPAT | OR | OFF | 2008/08/14 14:48 |

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8/14/08 2:57:27 PM
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EAST Search History

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| L3 | 30 | configur$ with agent with architecture and @ad<"20020630" and speech | US-PGPUB; USPAT | OR | OFF | 2008/09/03 13:47 |
| L4 | 0 | configur$ with agent with architecture and @ad<"20020630" and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 13:48 |
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| L7 | 117 | ("20020143535" \| "20030182132" \| "20040044516" \| "20040193420" \| "20050021826" \| "5155743" \| "5386556" \| "5424947" \| "5471318" \| "5475733" \| "5499289" \| "5517560" \| "5533108" \| "5537436" \| "5539744" \| "5557667" \| "5563937" \| "5590039" \| "5633922" \| "5675629" \| "5708422" \| "5721938" \| "5722084" \| "5742763" \| "5752052" \| "5754784" \| "5761631" \| "5794050" \| "5799276" \| "5802510" \| "5832221" \| "5878386" \| "5895466" \| "5911120" \| "5918222" \| "5926784" \| "5933822" \| "5953393" \| "5963894" \| "5963940" \| "5987404" \| "5991721" \| "5995119" \| "6009382" \| "6014559" \| | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:32 |

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| L9 | 6 | 7 and grammars and agents | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:32 |
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| L11 | 0 | balb$.in. and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:53 |

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| L13 | 0 | updat$ and download and @ad<"20020630" and "704"/$.ccls. and bala$.in. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:54 |
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| L16 | 2 | @ad<"20020630" and "704"/$.ccls. and purchase near2 grammar | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:57 |
| L17 | 0 | @ad<"20020630" and "704"/$.ccls. and purchase near2 agents | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:57 |
| L18 | 54 | @ad<"20020630" and purchase near2 agents | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:58 |
| L19 | 0 | scripting adj language and @ad<"20020630" and "704"/$.ccls. and bala $.in. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 15:06 |
| L20 | 0 | houser.in. and @ad<"20020630" and "704"/$.ccls. and bala$.in. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 15:14 |
| L21 | 1 | houser.in. and @ad<"20020630" and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 15:15 |

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EAST Search History

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
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| L2 | 123 | configur$ with agent with architecture and @ad<"20020630" | US-PGPUB; USPAT | OR | OFF | 2008/09/03 13:47 |
| L3 | 30 | configur$ with agent with architecture and @ad<"20020630" and speech | US-PGPUB; USPAT | OR | OFF | 2008/09/03 13:47 |
| L4 | 0 | configur$ with agent with architecture and @ad<"20020630" and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 13:48 |
| L5 | 1 | ("6195651").PN. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:04 |
| L6 | 0 | purchase near2 domain near2 agents and @ad<"20020630" | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:31 |
| L7 | 117 | ("20020143535" \| "20030182132" \| "20040044516" \| "20040193420" \| "20050021826" \| "5155743" \| "5386556" \| "5424947" \| "5471318" \| "5475733" \| "5499289" \| "5517560" \| "5533108" \| "5537436" \| "5539744" \| "5557667" \| "5563937" \| "5590039" \| "5633922" \| "5675629" \| "5708422" \| "5721938" \| "5722084" \| "5742763" \| "5752052" \| "5754784" \| "5761631" \| "5794050" \| "5799276" \| "5802510" \| "5832221" \| "5878386" \| "5895466" \| "5911120" \| "5918222" \| "5926784" \| "5933822" \| "5953393" \| "5963894" \| "5963940" \| "5987404" \| "5991721" \| "5995119" \| "6009382" \| "6014559" \| | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:32 |

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| L8 | 29 | 7 and grammars | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:32 |
| L9 | 6 | 7 and grammars and agents | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:32 |
| L10 | 0 | cbalb$.in. and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:53 |
| L11 | 0 | balb$.in. and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:53 |

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|---|---|---|---|---|---|---|
| L12 | 358 | updat$ and download and @ad<"20020630" and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:54 |
| L13 | 0 | updat$ and download and @ad<"20020630" and "704"/$.ccls. and bala$.in. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:54 |
| L14 | 4 | @ad<"20020630" and "704"/$.ccls. and balakrishnan.in. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:56 |
| L15 | 0 | @ad<"20020630" and "704"/$.ccls. and purcharse near2 grammar | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:57 |
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| L17 | 0 | @ad<"20020630" and "704"/$.ccls. and purchase near2 agents | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:57 |
| L18 | 54 | @ad<"20020630" and purchase near2 agents | US-PGPUB; USPAT | OR | OFF | 2008/09/03 14:58 |
| L19 | 0 | scripting adj language and @ad<"20020630" and "704"/$.ccls. and bala $.in. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 15:06 |
| L20 | 0 | houser.in. and @ad<"20020630" and "704"/$.ccls. and bala$.in. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 15:14 |
| L21 | 1 | houser.in. and @ad<"20020630" and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/09/03 15:15 |

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| INFORMATION DISCLOSURE CITATION IN AN APPLICATION | Docket Number | Application Number |
|---|---|---|
| | 090611-0361350 | 11/747,547 |
| | Applicant(s) | |
| | Robert A. KENNEWICK *et al.* | |
| | Filing Date | Group Art Unit |
| Form PTO-1449 | May 11, 2007 | 2626 |

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| *EXAMINER INITIAL | REF | DOCUMENT NO. | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
|---|---|---|---|---|---|---|---|
| | A | 5,696,965 | 12/09/1997 | Dedrick | 395 | 610 | |
| | B | 5,878,385 | 03/02/1999 | Bralich *et al.* | 704 | 9 | |
| | C | 6,415,257 | 07/02/2002 | Junqua *et al.* | 704 | 275 | |
| | D | 6,466,654 | 10/15/2002 | Cooper *et al.* | 379 | 88.01 | |
| | E | 6,567,797 | 05/20/2003 | Schuetze *et al.* | 707 | 2 | |
| | F | 6,570,555 | 05/27/2003 | Prevost *et al.* | 345 | 156 | |
| | G | 6,721,706 | 04/13/2004 | Strubbe *et al.* | 704 | 275 | |
| | H | 6,735,592 | 05/11/2004 | Neumann *et al.* | 707 | 101 | |
| | I | 6,757,718 | 06/29/2004 | Halverson *et al.* | 709 | 218 | |
| | J | 6,901,366 | 05/31/2005 | Kuhn *et al.* | 704 | 275 | |
| | K | 7,127,400 | 10/24/2006 | Koch | 704 | 270.1 | |
| | L | 7,289,606 | 10/30/2007 | Sibal *et al.* | 379 | 52 | |
| | M | 2002/0188602 | 12/12/2002 | Stubler *et al.* | 707 | 3 | |
| | N | 2003/0112267 | 06/19/2003 | Belrose | 345 | 728 | |
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## FOREIGN PATENT DOCUMENTS

| | REF | DOCUMENT NO. | DATE | COUNTRY | CLASS | SUBCLASS | Translations YES | Translations NO |
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## OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

| | | |
|---|---|---|
| | O | CHAI *et al.*, "MIND: A Semantics-Based Multimodal Interpretation Framework for Conversational System", Proceedings of the International CLASS Workshop on Natural, Intelligent and Effective Interaction in Multimodal Dialogue Systems, June 2002, pages 37-46. |
| | P | CHEYER *et al.*, "Multimodal Maps: An Agent-Based Approach", International Conference on Cooperative Multimodal Communication (CMC/95), May 24-26, 1995, pages 111-121. |
| | Q | ELIO *et al.*, "On Abstract Task Models and Conversation Policies" in Workshop on Specifying and Implementing Conversation Policies, Autonomous Agents '99, Seattle, 1999, 10 pages. |
| | R | TURUNEN, "Adaptive Interaction Methods in Speech User Interfaces", Conference on Human Factors in Computing Systems, Seattle, Washington, 2001, pages 91-92. |

| EXAMINER | DATE CONSIDERED |
|---|---|
| /Martin Lerner/ | 08/14/2008 |

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

400861878v1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.L./

EAST Search History

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
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| L4 | 1710 | keywords and parser and context | US-PGPUB; USPAT | OR | OFF | 2008/08/14 16:01 |
| L5 | 448 | keywords and parser and context and agents | US-PGPUB; USPAT | OR | OFF | 2008/08/14 16:02 |
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PTO/SB/30 (04-05)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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# Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

| | |
|---|---|
| Application Number | 11/747,547 |
| Filing Date | May 11, 2007 |
| First Named Inventor | ROBERT A. KENNEWICK |
| Art Unit | 2626 |
| Examiner Name | Martin Lerner |
| Attorney Docket Number | 090611-0361350 |

**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. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. 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).

   a. ☐ 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.

      i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

      ii. ☐ Other _____

   b. ☒ Enclosed

      i. ☒ Amendment/Reply

      ii. ☐ Affidavit(s)/ Declaration(s)

      iii. ☒ Information Disclosure Statement (IDS)

      iv. ☐ Other _____

2. Miscellaneous

   a. ☐ 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)

   b. ☐ Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

   a. ☒ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. 033975 . I have enclosed a duplicate copy of this sheet.

      i. ☒ RCE fee required under 37 CFR 1.17(e)

      ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)

      iii. ☐ Other _____

   b. ☐ Check in the amount of $ _____ enclosed

   c. ☐ Payment by credit card (Form PTO-2038 enclosed)

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

***SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED***

| | | | |
|---|---|---|---|
| Signature |  | Date | December 9, 2008 |
| Name (Print/Type) | S. Jafar Ali | Registration No. | 58780 |

***CERTIFICATE OF MAILING OR TRANSMISSION***

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

| | | | |
|---|---|---|---|
| Signature | | | |
| Name (Print/Type) | | Date | |

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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop RCE, 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**

| | | | |
|---|---|---|---|
| APPLICANTS : | Robert A. KENNEWICK et al. | CONFIRMATION NO.: | 4708 |
| SERIAL NUMBER : | 11/747,547 | EXAMINER: | Martin Lerner |
| FILING DATE : | May 11, 2007 | ART UNIT: | 2626 |
| FOR : | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | | |

# REPLY AND AMENDMENT ACCOMPANYING REQUEST FOR CONTINUED EXAMINATION

**Mail Stop RCE**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Final Office Action mailed **September 9, 2008**, please amend the above-identified application as follows:

**Amendments to the Specification** begin on page **2** of this paper.

**Amendments to the Claims** begin on page **3** of this paper.

**Remarks/Arguments** begin on page **10** of this paper.

It is not believed that extensions of time or fees for net addition of claims are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned for under 37 C.F.R. § 1.136(a), and any fees required therefore (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 033975 (**Ref. No. 090611-0361350**).

# AMENDMENT

**Amendments to the Specification**: (identifying insertions and ~~deletions~~).

Please amend paragraph **[48]**, which begins on page 22, as follows:

**[48]** The agents **106** return results of questions as responses to users. The response may be created using the results of information queries, the system personality **108** and the user preferences or other data in the user profile **110**. The agents **106** generally present these results using the speech unit **128**. The agents **106** ~~creates~~ create a response string, which is sent to the text to speech engine **124**. The text to speech engine **124** creates the required utterances, which may be encoded and compressed by the speech coder **122**. Once coded, the utterances are transmitted from the main unit **98** by the transceiver **126** to the transceiver **130** on the speech unit **128**. The utterance is then decoded and decompressed by the speech coder **138** and output by the speaker **136**.

**Amendments to the Claims**: Please replace all prior versions and listings of claims with the following listing of claims.

**LISTING OF CLAIMS:**

1. **(Cancelled)**

2. **(Currently Amended)** The system according to claim [[1]] 27, further comprising a speech unit that receives the utterance from the user.

3. **(Previously Presented)** The system according to claim 2, wherein the speech unit includes a speech coder that creates a digitized speech signal from the utterance.

4. **(Currently Amended)** The system according to claim [[1]] 27, wherein the utterance contains at least one request that includes at least one of a query or a command.

5. **(Currently Amended)** The system according to claim [[1]] 27, further comprising a speech recognition engine that recognizes words and phrases contained in the received user utterance using information in one or more dictionary and phrase tables, wherein the parser examines the recognized words and phrases to identify the one or more keywords.

6. **(Previously Presented)** The system according to claim 5, wherein the speech recognition engine further recognizes an identity of the user based on information contained in one or more user profiles.

7. **(Currently Amended)** The system according to claim [[1]] 27, further comprising a text to speech engine that creates one or more utterances to be presented as output to the user.

8. (**Previously Presented**) The system according to claim 7, further comprising a personality module that includes one or more characteristics for formatting the utterances to be presented as the output to the user.

9. (**Currently Amended**) The system according to claim [[1]] 27, wherein the parser determines the context for the one or more keywords by applying prior probabilities or fuzzy possibilities to one or more of keyword matching, a user profile, or a dialog history.

10. (**Currently Amended**) The system according to claim [[1]] 27, wherein at least one of the plurality of domain agents creates a query to at least one local or external information source when processing a request that includes a question.

11. (**Currently Amended**) The system according to claim [[1]] 27, wherein at least one of the plurality of domain agents directs a command to the system or an external entity when processing a request that includes a command.

12. (**Currently Amended**) The system according to claim [[1]] 27, wherein at least one of plurality of the domain agents creates a plurality of duplicate queries to a plurality of local or external information sources and asynchronously evaluates multiple responses from the plurality of information sources when processing a request that includes a question.

13. (**Previously Presented**) The system according to claim 12, wherein the at least one domain agent evaluates the multiple responses using probabilistic or fuzzy scoring techniques to score each of the responses based on one or more of previously received responses, the context for the keywords, one or more criteria for the request, a dialog history, a user profile, or information specific to the at least one domain agent.

14. (**Currently Amended**) The system according to claim [[1]] 27, wherein at least one of the plurality of domain agents uses one or more presentation templates to format a response

to a request based on the context for the keywords, one or more criteria for the request, a dialog history, or a user profile.

15. (**Previously Presented**) The system according to claim 14, wherein the at least one domain agent applies one or more variable substitutions or transformations to format the response in a manner best understood and most natural to the user.

16. (**Currently Amended**) The system according to claim [[1]] 27, wherein the parser formulates at least one request in accordance with a grammar that the selected domain agent uses to process requests associated with the context for the one or more keywords contained in the utterance.

17. (**Previously Presented**) The system according to claim 16, wherein the parser provides the formulated request to the event manager to invoke the selected domain agent, and the event manager sends and receives one or more events to the agent architecture to process the formulated request, the event manager thereby coordinating interaction between the parser and the agent architecture.

18. (**Currently Amended**) The system according to claim [[1]] 27, wherein the agent architecture further includes a system agent that provides default functionality and basic services, wherein each of the plurality of domain agents can use the functionality and services of the system agent.

19. (**Previously Presented**) The system according to claim 18, wherein the system agent manages one or more criteria handlers used to determine the context for the one or more keywords, wherein each of the system agent and the plurality of domain agents can use the criteria handlers.

20. (**Previously Presented**) The system according to claim 18, wherein the agent architecture further includes an agent library that contains one or more utilities for commonly used functions, wherein each of the system agent and the plurality of domain agents can use the utilities contained in the agent library.

21. (**Previously Presented**) The system according to claim 20, wherein the utilities contained in the agent library include at least one of text and string handling, network communications, database lookup and management, fuzzy and probabilistic evaluation, or text to speech formats.

22. (**Currently Amended**) The system according to claim 20, wherein the ~~further comprising an~~ update manager ~~that~~ uses a network interface to download, distribute, and install updates relating to one or more of the system agent, the plurality of domain agents, the agent library, one or more databases available to the agent architecture, or entries in the dictionary and phrase tables.

23. (**Previously Presented**) The system according to claim 22, wherein the updates include one or more of a new domain agent, additional domain knowledge for a domain agent, new keywords for a domain agent, preferred information sources for a domain agent, updated domain information for a domain agent, or updated content for a domain agent.

24. (**Previously Presented**) The system according to claim 18, wherein the agent architecture further includes an agent manager that loads and initializes each of the system agent and the plurality of domain agents when the system starts up, and that unloads each of the system agent and the plurality of domain agents when the system shuts down.

25. (**Previously Presented**) The system according to claim 18, wherein the parser formulates at least one request in accordance with a grammar that the selected domain agent

uses to process requests associated with the context for the one or more keywords contained in the utterance.

26. (**Previously Presented**) The system according to claim 18, further comprising a speech recognition engine that recognizes words and phrases contained in the received user utterance using information in one or more dictionary and phrase tables, wherein the parser examines the recognized words and phrases to identify the one or more keywords.

27. (**Currently Amended**) A [[The]] system ~~according to claim 1~~ responsive to a user generated natural language speech utterance, ~~further~~ comprising:

an agent architecture that includes a plurality of domain agents, each of the plurality of domain agents being an autonomous executable configured to receive, process, and respond to requests associated with a respective context;

a parser configured to determine a context for one or more keywords contained in the utterance and to determine a meaning of the utterance based on the determined context, wherein the parser selects at least one of the plurality of domain agents based on the determined meaning, wherein the selected domain agent is configured to receive, process, and respond to requests associated with the determined context;

an event manager configured to coordinate interaction between the parser and the agent architecture; and

an update manager that enables the user to purchase one or more domain agents from a third party on a one-time or subscription basis.

28. (**Previously Presented**) The system according to claim 27, wherein the update manager downloads updates for one or more domain agents and uninstalls one or more unused domain agents pursuant to a license with the third party.

29. (**Previously Presented**) The system according to claim 28, wherein the agent architecture further includes an agent manager that verifies compliance with terms and conditions of the license.

30. (**Previously Presented**) The system according to claim 29, wherein the agent manager uses a network interface to locate a suitable domain agent for a request that requires a domain agent not currently loaded on the system, the agent manager causing the update manager to load the located domain agent pursuant to the terms and conditions of the license.

31. (**Previously Presented**) The system according to claim 27, wherein the parser formulates at least one request in accordance with a grammar that the selected domain agent uses to process requests associated with the context for the one or more keywords contained in the utterance.

32. (**Previously Presented**) The system according to claim 27, further comprising a speech recognition engine that recognizes words and phrases contained in the received user utterance using information in one or more dictionary and phrase tables, wherein the parser examines the recognized words and phrases to identify the one or more keywords.

33. (**Currently Amended**) The system according to claim [[1]] 27, further comprising an extension and modification facility that allows users and content developers to configure behavior of the agent architecture.

34. (**Previously Presented**) The system according to claim 33, wherein the extension and modification facility can be used to extend or modify behavior of the plurality of domain agents.

35. (**Previously Presented**) The system according to claim 34, wherein the users and content developers can add one or more of new commands, keywords, information, or

information sources to the agent architecture to extend or modify the behavior of the plurality of domain agents.

36. (**Previously Presented**) The system according to claim 33, wherein the extension and modification facility provides a generic agent that can be used to create a new domain agent.

37. (**Previously Presented**) The system according to claim 33, wherein the users and content developers can configure the behavior of the agent architecture using one or more of a scripting language, a graphical user interface, or natural language utterances.

38. (**Previously Presented**) The system according to claim 33, wherein the users and content developers can create one or more of special reports, packages of queries, alerts, or output formats using the extension and modification facility.

39. (**Previously Presented**) The system according to claim 33, wherein the parser formulates at least one request in accordance with a grammar that the selected domain agent uses to process requests associated with the context for the one or more keywords contained in the utterance.

40. (**Previously Presented**) The system according to claim 33, further comprising a speech recognition engine that recognizes words and phrases contained in the received user utterance using information in one or more dictionary and phrase tables, wherein the parser examines the recognized words and phrases to identify the one or more keywords.

# REMARKS

Upon entry of the foregoing Amendment, claims 2-40 are pending in the application. Claims 2, 4-5, 7, 9-12, 14, 16, 18, 22, 27, and 33 have been amended. Claim 1 has been cancelled. No claims have been newly added. Applicants believe that this Amendment does not add new matter. In view of the foregoing Amendment and the following Remarks, allowance of all the pending claims is requested.

## SPECIFICATION OBJECTIONS

The Examiner has objected to the disclosure because of alleged informalities. In particular, the Examiner points out that the amendment to the Specification filed on June 18, 2008 "appears to have erroneously amended ¶[0048] as ¶[0061]."

Applicants note that the misnumbering of paragraph **[48]** as **[61]** was a typographical error, and as such, Applicants have further amended the specification as indicated above to correct the typographical error identified by the Examiner.

Accordingly, for at least the reason that the foregoing amendment to the Specification fully addresses the Examiner's objection to the disclosure, Applicants respectfully request withdrawal of this objection.

## ALLOWABLE SUBJECT MATTER

Applicants thank the Examiner for indicating that claims 27-32 would be allowable if rewritten in independent form including the subject matter of any intervening claims. Applicants note that claim 27 has been amended to be rewritten in independent form, whereby independent claim 27, as amended, recites subject matter that the Examiner has identified as allowable.

Applicants also note that the claims have been further amended to have claims 2-26 and 28-40 each depend from and add features to independent claim 27. Thus, claims 2-26 and 28-40 each recite allowable subject matter for at least the reason that they depend from and add features to independent claim 27, which recites subject matter that the Examiner has identified as allowable.

Accordingly, for at least the reason that all of the pending claims recite subject matter that the Examiner has identified as allowable, or alternatively depend from a claim that recites subject matter that the Examiner has identified as allowable, allowance of all of the pending claims is respectfully requested.

## REJECTION UNDER 35 U.S.C. § 103

The Examiner has rejected claims 1-5, 7, 10-12, 16-26, and 33-40 under 35 U.S.C. § 103 as allegedly being unpatentable over U.S. Patent No. 6,523,061 to Halverson et al. ("Halverson") in view of U.S. Patent No. 6,513,006 to Howard et al. ("Howard"), claims 6, 8, and 14-15 under 35 U.S.C. § 103 as allegedly being unpatentable over Halverson in view of Howard, and further in view of U.S. Patent No. 6,195,651 to Handel et al. ("Handel"), and claims 9 and 13 under 35 U.S.C. § 103 as allegedly being unpatentable over Halverson in view of Howard, and further in view of U.S. Patent No. 7,062,488 to Reisman ("Reisman").

Solely for purposes of expediting prosecution of this application, and without acknowledging the propriety of the alleged basis for the rejection, Applicants note that previously pending claim 1 has been cancelled, claim 27 has been amended to recite subject matter that the Examiner has identified as allowable in an independent form, and claims 2-26 and 28-40 each depend from and add features to amended independent claim 27.

As such, Applicants request withdrawal of the foregoing rejections for at least the reason that all currently pending claims depend from and add features to independent claim 27, as amended, which was not alleged to be unpatentable over the references relied upon.

## CONCLUSION

Having addressed each of the foregoing rejections, it is respectfully submitted that a full and complete response has been made to the outstanding Office Action. As such, the application is in condition for allowance. Notice to that effect is respectfully requested.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Date: **December 9, 2008**

Respectfully submitted,

By: _____

Syed Jafar Ali
Registration No. 58,780

PILLSBURY WINTHROP SHAW PITTMAN LLP
P.O. Box 10500
McLean, Virginia 22102
Main: 703-770-7900
Direct: 703-770-7540
Fax: 703-770-7901

| INFORMATION DISCLOSURE CITATION IN AN APPLICATION | Docket Number | Application Number |
|---|---|---|
| | 090611-0361350 | 11/747,547 |
| | Applicant(s) | |
| | Robert A. KENNEWICK *et al.* | |
| | Filing Date | Group Art Unit |
| Form PTO-1449 | May 11, 2007 | 2626 |

## U.S. PATENT DOCUMENTS

| *EXAMINER INITIAL | REF | DOCUMENT NO. | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
|---|---|---|---|---|---|---|---|
| | A | 5,274,560 | 12/28/1993 | LaRue | 364 | 444 | |
| | B | 5,377,350 | 12/27/1994 | Skinner | 395 | 600 | |
| | C | 5,902,347 | 05/11/1999 | Backman *et al.* | 701 | 200 | |
| | D | 6,195,634 | 02/27/2001 | Dudemaine *et al.* | 704 | 231 | |
| | E | 6,574,597 | 06/03/2003 | Mohri *et al.* | 704 | 251 | |
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| | G | 6,944,594 | 09/13/2005 | Busayapongchai *et al.* | 704 | 275 | |
| | H | 7,376,645 | 05/20/2008 | Bernard | 707 | 3 | |
| | I | 7,398,209 | 07/08/2008 | Kennewick *et al.* | 704 | 255 | |
| | J | 7,424,431 | 09/09/2008 | Greene *et al.* | 704 | 270 | |
| | K | 2002/0049805 | 04/25/2002 | Yamada *et al.* | 709 | 202 | |
| | L | 2002/0120609 | 08/29/2002 | Lang *et al.* | 707 | 1 | |
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| | P | 2004/0166832 | 08/26/2004 | Portman *et al.* | 455 | 412.1 | |
| | Q | 2004/0199375 | 10/07/2004 | Ehsani *et al.* | 704 | 4 | |
| | R | 2005/0021334 | 01/27/2005 | Iwahashi | 704 | 240 | |
| | S | 2007/0050191 | 03/01/2007 | Weider *et al.* | 704 | 275 | |

## FOREIGN PATENT DOCUMENTS

| | REF | DOCUMENT NO. | DATE | COUNTRY | CLASS | SUBCLASS | Translations YES | Translations NO |
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| | | | | | | | | |
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## OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

| | | |
|---|---|---|
| | T | MAO, Mark Z., "Automatic Training Set Segmentation for Multi-Pass Speech Recognition", Department of Electrical Engineering, Stanford University, CA, copyright 2005, IEEE, pages I-685 to I-688. |
| | U | VANHOUCKE, Vincent, "Confidence Scoring and Rejection Using Multi-Pass Speech Recognition", Nuance Communications, Menlo Park, CA, [no date], 4 pages. |
| | V | WENG, Fuliang, *et al.*, "Efficient Lattice Representation and Generation", Speech Technology and Research Laboratory, SRI International, Menlo Park, CA, [no date], 4 pages. |
| | W | EL MELIANI *et al.*, "A Syllabic-Filler-Based Continuous Speech Recognizer for Unlimited Vocabulary", Canadian Conference on Electrical and Computer Engineering, Volume 2, September 5-8, 1995, pages 1007-1010. |

| EXAMINER | DATE CONSIDERED |
|---|---|
| | |

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

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 11747547 |
| **Filing Date:** | 11-May-2007 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| **First Named Inventor/Applicant Name:** | ROBERT A. KENNEWICK |
| **Filer:** | Syed Jafar Ali/Kathy Oliver |
| **Attorney Docket Number:** | 090611-0361350 |

Filed as Small Entity

## Utility under 35 USC 111(a) Filing Fees

| 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($) |
|---|---|---|---|---|
| **Miscellaneous:** | | | | |
| Request for continued examination | 2801 | 1 | 405 | 405 |
| | | **Total in USD ($)** | | **405** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 4422989 |
| **Application Number:** | 11747547 |
| **International Application Number:** | |
| **Confirmation Number:** | 4708 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| **First Named Inventor/Applicant Name:** | ROBERT A. KENNEWICK |
| **Customer Number:** | 00909 |
| **Filer:** | Syed Jafar Ali/Kathy Oliver |
| **Filer Authorized By:** | Syed Jafar Ali |
| **Attorney Docket Number:** | 090611-0361350 |
| **Receipt Date:** | 09-DEC-2008 |
| **Filing Date:** | 11-MAY-2007 |
| **Time Stamp:** | 16:33:28 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | $405 |
| RAM confirmation Number | 1786 |
| Deposit Account | 033975 |
| Authorized User | |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 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 | | 0361350Rsp.pdf | 882621<br>05508ca096976663047eed300640c2486ff9ebcc | yes | 23 |

**Multipart Description/PDF files in .zip description**

| Document Description | Start | End |
|---|---|---|
| Request for Continued Examination (RCE) | 1 | 1 |
| Amendment Submitted/Entered with Filing of CPA/RCE | 2 | 2 |
| Specification | 3 | 3 |
| Claims | 4 | 10 |
| Applicant Arguments/Remarks Made in an Amendment | 11 | 13 |
| Information Disclosure Statement Letter | 14 | 22 |
| Information Disclosure Statement (IDS) Filed (SB/08) | 23 | 23 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 2 | NPL Documents | MAO.pdf | 87562<br>1b3ffe999a30b15eea176ac4951c57362d0c3bbb | no | 4 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 3 | NPL Documents | VANHOUCKE.pdf | 258100<br>095933ea064f85a3705750030dec1a9690d3ae6d | no | 4 |

**Warnings:**

**Information:**

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|---|---|---|---|---|---|
| 4 | NPL Documents | WENG.pdf | 345795<br>ab3fae98c6cdea032dd636d4c37094120b0def8c | no | 4 |

**Warnings:**

**Information:**

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|---|---|---|---|---|---|
| 5 | NPL Documents | EL_MELIANI.pdf | 294901<br>b1c4510f36ba51ee85f20457fdd383145f4e918a | no | 4 |

**Warnings:**

| Information: | | | | | |
|---|---|---|---|---|---|
| 6 | Fee Worksheet (PTO-06) | fee-info.pdf | 30604<br>a221768355242fc0548d1539e1f02ee0b14bad3d | no | 2 |
| Warnings: | | | | | |
| Information: | | | | | |
| | | | Total Files Size (in bytes): | 1899583 | |

**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.**

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

| | | | |
|---|---|---|---|
| APPLICANTS : | Robert A. KENNEWICK *et al.* | CONFIRMATION NO.: | 4708 |
| SERIAL NUMBER : | 11/747,547 | EXAMINER: | Martin Lerner |
| FILING DATE : | May 11, 2007 | ART UNIT: | 2626 |
| FOR : | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | | |

**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, Applicants hereby make of record in the above-identified application the documents listed on the attached Form PTO-1449.

Applicants have listed publication dates on the attached PTO-1449 based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the date indicated. Where the publication date of a listed document does not provide a month of publication, the year of publication of the listed document is sufficiently earlier than the effective U.S. filing date and any foreign priority date so that the month of publication is not an issue.

Applicants reserve the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered.

This Supplemental Information Disclosure Statement is being filed within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. §1.53(d), or within three months of the date of entry of the national stage as set forth in 37 C.F.R. §1.491 in an international application, or before the mailing date of a first Office Action on the merits, or before the mailing date of a first Office Action after the filing of a request for continued examination under 37 C.F.R. §1.114. No certification or fee is required. 37 C.F.R. §1.97(b).

Documents A-C, F, H, and O-S were cited in search reports by a foreign patent office in counterpart foreign applications. Submission of an English language version of each search report that indicates the degree of relevance found by the foreign office is provided.

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

By _____
Syed Jafar Ali
Registration No.: 58,780

Customer No.
00909

P. O. Box 10500
McLean, Virginia 22102
Telephone: (703) 770-7900
Telefax: (703) 770-7901

Dated: December 9, 2008

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. 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

Substitute for Form PTO-875

| Application or Docket Number | Filing Date | ☐ To be Mailed |
|---|---|---|
| 11/747,547 | 05/11/2007 | |

## 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 | | | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | | | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | | | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | | OR | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | | | 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 $250 ($125 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 | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

AMENDMENT **12/09/2008**

| | (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)) | * 39 | Minus | ** 20 | = 19 | X $26 = | 494 | OR | X $ = | |
| Independent (37 CFR 1.16(h)) | * 1 | Minus | ***3 | = 0 | X $110 = | 0 | 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 | **494** | OR | TOTAL ADD'L FEE | |

AMENDMENT

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) | OR | 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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/KIMBERLY PANNELL/

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

# NOTICE OF ALLOWANCE AND FEE(S) DUE

909 7590 12/15/2008

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

| EXAMINER | |
|---|---|
| LERNER, MARTIN | |
| ART UNIT | PAPER NUMBER |
| 2626 | |

DATE MAILED: 12/15/2008

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 | 4708 |

TITLE OF INVENTION: SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | YES | $755 | $300 | $0 | $1055 | 03/16/2009 |

**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 SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**



PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

Google Exhibit 1021
Page 00289

# 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)

909 7590 12/15/2008

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

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. |
|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 | 4708 |

TITLE OF INVENTION: SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | YES | $755 | $300 | $0 | $1055 | 03/16/2009 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|---|---|---|
| LERNER, MARTIN | 2626 | 704-257000 |

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 credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information 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.



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www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 | 4708 |

909 7590 12/15/2008

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

| EXAMINER | |
|---|---|
| LERNER, MARTIN | |
| ART UNIT | PAPER NUMBER |
| 2626 | |

DATE MAILED: 12/15/2008

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

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 Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

| Notice of Allowability | Application No. | Applicant(s) | |
|---|---|---|---|
| | 11/747,547 | KENNEWICK ET AL. | |
| | Examiner | Art Unit | |
| | MARTIN LERNER | 2626 | |

***-- 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 *Amendment filed 09 December 2008*.

2. ☒ The allowed claim(s) is/are *2 to 40*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   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**.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ 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. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 12/09/2008
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

## EXAMINER'S STATEMENT OF REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:

The prior art of record does not disclose or reasonably suggest the limitation of an update manager that enables a user to purchase one or more domain agents from a third party on a one-time or subscription basis, in combination with an agent architecture including a plurality of domain agents, and a parser configured to determine a context for one more keywords. Generally, it is known in the prior art of interactive voice response (IVR) and distributed speech recognition to update functionalities by downloading a plug-in. However, the prior art of record does not disclose or reasonably suggest purchasing domain agents from a third party on a one-time or subscription basis. Specifically, while it is known to purchase software for downloading over the Internet, the prior art of record does not disclose or reasonably suggest purchasing a domain agent through an update manager, in combination with an agent architecture including a plurality of domain agents, and a parser configured to determine a context for one or more keywords. Applicants' Specification, ¶[0010] - ¶[0011], discloses that agents are modules of functionality that can be updated remotely over a network as new behavior becomes available.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARTIN LERNER whose telephone number is (571)272-7608. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. 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.

/Martin Lerner/
Primary Examiner
Art Unit 2626
December 11, 2008

| Notice of References Cited | Application/Control No. 11/747,547 | Applicant(s)/Patent Under Reexamination KENNEWICK ET AL. | |
|---|---|---|---|
| | Examiner MARTIN LERNER | Art Unit 2626 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|---|---|---|---|
| * | A | US-4,430,669 | 02-1984 | Cheung, William S. H. | 380/241 |
| * | B | US-2004/0193420 | 09-2004 | Kennewick et al. | 704/257 |
| * | C | US-2008/0091406 | 04-2008 | Baldwin et al. | 704/4 |
| * | D | US-2007/0038436 | 02-2007 | Cristo et al. | 704/009 |
| * | E | US-2007/0033005 | 02-2007 | Cristo et al. | 704/009 |
| * | F | US-2005/0114116 | 05-2005 | Fiedler, Mark Geoffrey | 704/201 |
| * | G | US-2002/0065568 | 05-2002 | Silfvast et al. | 700/94 |
| * | H | US-2002/0082911 | 06-2002 | Dunn et al. | 705/14 |
| * | I | US-2002/0124050 | 09-2002 | Middeljans, Jakobus | 709/203 |
| | J | US- | | | |
| | K | US- | | | |
| | L | US- | | | |
| | M | US- | | | |

**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|---|---|---|---|---|---|
| | N | | | | | |
| | O | | | | | |
| | P | | | | | |
| | Q | | | | | |
| | R | | | | | |
| | S | | | | | |
| | T | | | | | |

**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | 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.

# Issue Classification

| Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|
| 11747547 | KENNEWICK ET AL. |
| **Examiner** | **Art Unit** |
| MARTIN LERNER | 2626 |

## ORIGINAL

| CLASS | SUBCLASS |
|---|---|
| 704 | 257 |

### CROSS REFERENCE(S)

| CLASS | SUBCLASS (ONE SUBCLASS PER BLOCK) | | | | |
|---|---|---|---|---|---|
| 704 | 270 | 275 | | | |

## INTERNATIONAL CLASSIFICATION

| CLAIMED | NON-CLAIMED |
|---|---|
| G 1 0 L 15 / 18 (2006.01.01) | |
| G 1 0 L 15 / 22 (2006.01.01) | |

☐ 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 | 17 | 17 | 32 | 33 | | | | | | | | | | |
| 2 | 2 | 18 | 18 | 33 | 34 | | | | | | | | | | |
| 3 | 3 | 19 | 19 | 34 | 35 | | | | | | | | | | |
| 4 | 4 | 20 | 20 | 35 | 36 | | | | | | | | | | |
| 5 | 5 | 21 | 21 | 36 | 37 | | | | | | | | | | |
| 6 | 6 | 22 | 22 | 37 | 38 | | | | | | | | | | |
| 7 | 7 | 23 | 23 | 38 | 39 | | | | | | | | | | |
| 8 | 8 | 24 | 24 | 39 | 40 | | | | | | | | | | |
| 9 | 9 | 25 | 25 | | | | | | | | | | | | |
| 10 | 10 | 26 | 26 | | | | | | | | | | | | |
| 11 | 11 | 1 | 27 | | | | | | | | | | | | |
| 12 | 12 | 27 | 28 | | | | | | | | | | | | |
| 13 | 13 | 28 | 29 | | | | | | | | | | | | |
| 14 | 14 | 29 | 30 | | | | | | | | | | | | |
| 15 | 15 | 30 | 31 | | | | | | | | | | | | |
| 16 | 16 | 31 | 32 | | | | | | | | | | | | |

NONE

(Assistant Examiner) (Date)

**Total Claims Allowed:** 39

/MARTIN LERNER/
Primary Examiner.Art Unit 2626 12/11/2008

(Primary Examiner) (Date)

| O.G. Print Claim(s) | O.G. Print Figure |
|---|---|
| 1 | 1 |



Google Exhibit 1021
Page 00296

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 11747547 | KENNEWICK ET AL. |
| | Examiner | Art Unit |
| | MARTIN LERNER | 2626 |

| SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| 704 | 251, 257, 270, 270.1, 275 | 3/10/2008 | ML |
| 707 | 3, 4, 5 | 3/10/2008 | ML |
| ALL | UPDATED | 9/5/2008 | ML |
| ALL | UPDATED | 12/11/2008 | ML |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Parent Application Checked | 3/10/2008 | ML |
| EAST Search Attached | 3/10/2008 | ML |
| EAST Search Attached | 9/5/2008 | ML |
| EAST Search Attached | 12/11/2008 | ML |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| 704 | 257, 270, 275 | 12/11/2008 | ML |

| | |
|---|---|
| | |


Google Exhibit 1021
Page 00297

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Alexandria, Virginia 22313-1450
www.uspto.gov

# BIB DATA SHEET

**CONFIRMATION NO. 4708**

| SERIAL NUMBER | FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 11/747,547 | 05/11/2007<br>RULE | 704 | 2626 | 090611-0361350 |

**APPLICANTS**

ROBERT A. KENNEWICK, Seattle, WA;
David Locke, Redmond, WA;
Michael R. Kennewick SR., Bellevue, WA;
Michael R Kennewick JR., Bellevue, WA;
Richard Kennewick, Woodinville, WA;
Tom Freeman, Mercer Island, WA;

**** CONTINUING DATA ***************************

This application is a DIV of 10/452,147 06/03/2003 PAT 7,398,209
which claims benefit of 60/384,388 06/03/2002

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
05/31/2007

| Foreign Priority claimed | 35 USC 119(a-d) conditions met | Verified and Acknowledged | Met after Allowance | STATE OR COUNTRY | SHEETS DRAWINGS | TOTAL CLAIMS | INDEPENDENT CLAIMS |
|---|---|---|---|---|---|---|---|
| ☐ Yes ☑ No | ☐ Yes ☑ No | /MARTIN LERNER/ Examiner's Signature | ☐ Initials | WA | 7 | 15 | 1 |

**ADDRESS**

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102
UNITED STATES

**TITLE**

SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

| FILING FEE RECEIVED | FEES: Authority has been given in Paper | |
|---|---|---|
| 925 | 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

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| L1 | 19 | ("20020049805" \| "20020120609" \| "20020198714" \| "20030014261" \| "20040025115" \| "20040166832" \| "20040199375" \| "20050021334" \| "20070050191" \| "5274560" \| "5377350" \| "5902347" \| "6195634" \| "6574597" \| "6598018" \| "6944594" \| "7376645" \| "7398209" \| "7424431").PN. | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:22 |
| L2 | 3 | 1 and subscription | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:27 |
| L3 | 53 | white.in. and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:36 |
| L4 | 13 | parser.clm. and agent.clm. and context.clm. | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:39 |
| L5 | 0 | parser.clm. and agent.clm. and context.clm. and subscription.clm. | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:41 |
| L6 | 0 | parser.clm. and agent.clm. and context.clm. and one-time.clm. | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:42 |
| L7 | 5 | voicebox.as. | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:42 |
| L8 | 1978 | one-time and subscription | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:46 |
| L9 | 24 | one-time and subscription and "704"/$.ccls. | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:46 |
| L10 | 1450 | one-time and subscription and purchas$ | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:50 |

| | | | | | | |
|---|---|---|---|---|---|---|
| L11 | 100 | one-time same subscription same purchas $ | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:50 |
| L12 | 13 | one-time same subscription same purchas $ and @ad<"20020603" | US-PGPUB; USPAT | OR | OFF | 2008/12/10 10:50 |

12/10/08 10:53:26 AM
C:\Documents and Settings\MLerner\My Documents\EAST\workspaces\Default EAST Workspace 1600x1200.wsp

OIPE IAP97
JUL 31 2007
PATENT & TRADEMARK OFFICE

APPROVED: /M.L./
12/11/2008

REPLACEMENT SHEET

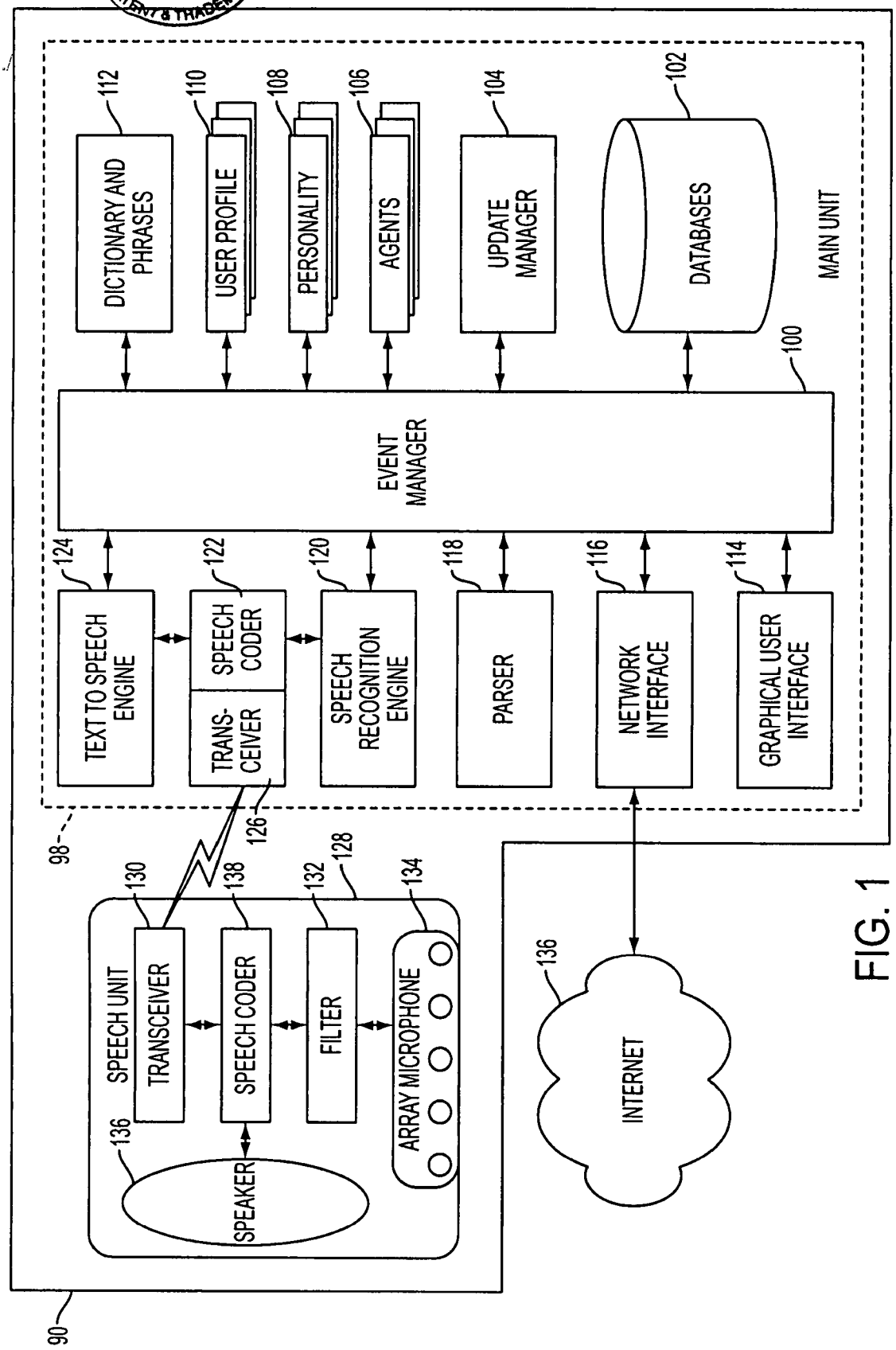



FIG. 1

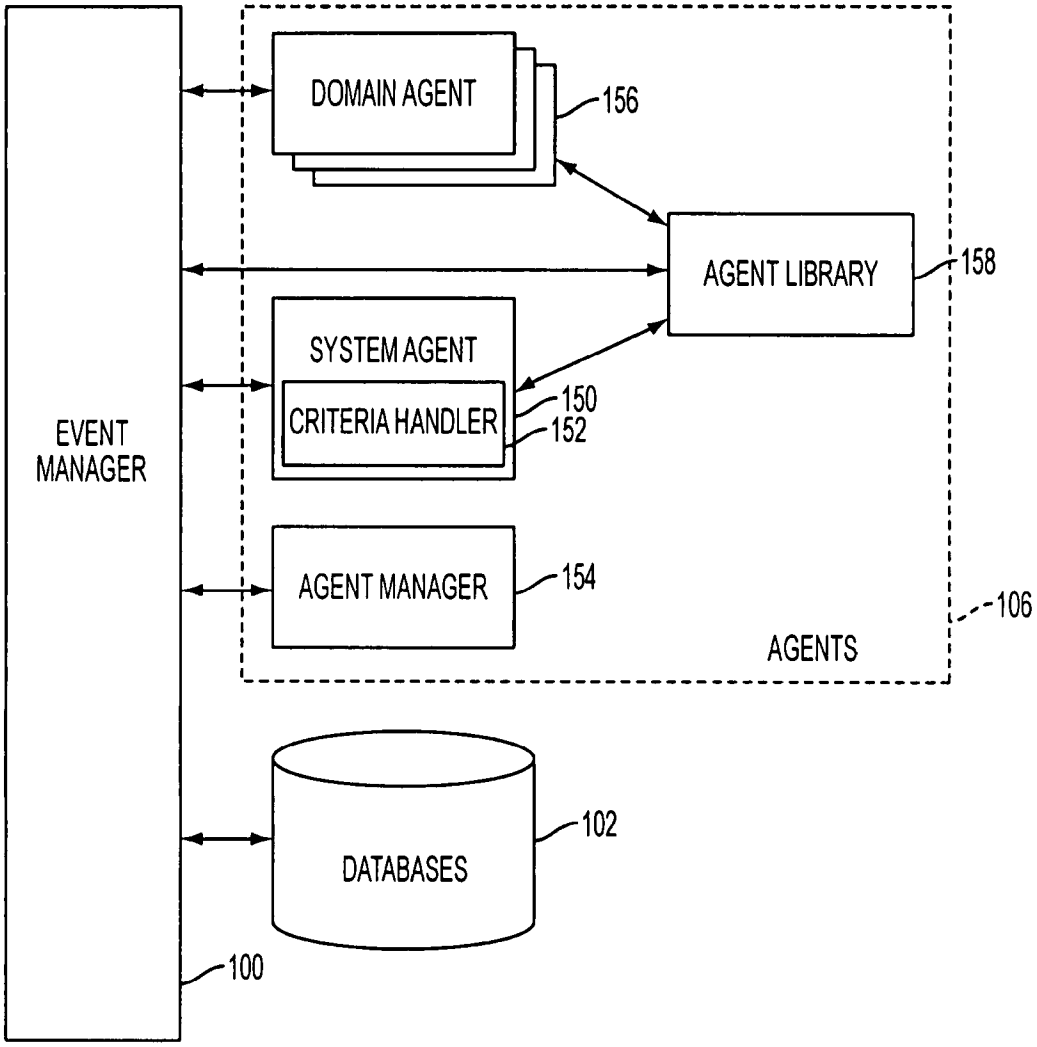

DOMAIN AGENT
156
AGENT LIBRARY
158
SYSTEM AGENT
CRITERIA HANDLER
150
152
EVENT MANAGER
AGENT MANAGER
154
106
AGENTS
DATABASES
102
100

FIG. 2

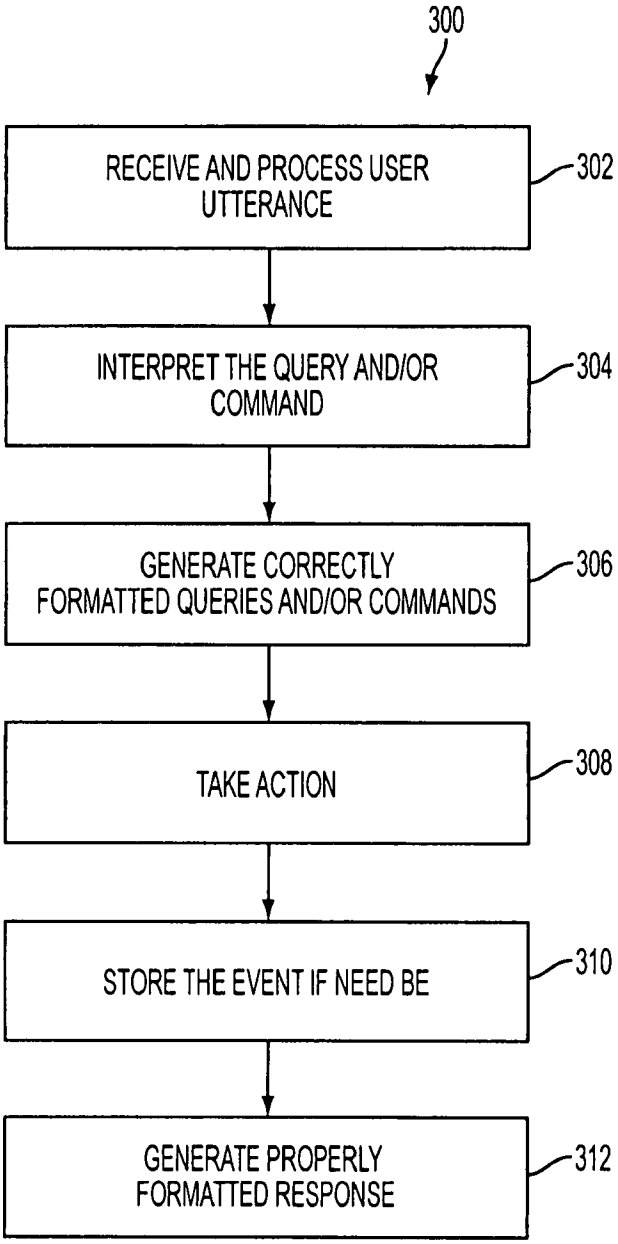

300
RECEIVE AND PROCESS USER UTTERANCE
302
INTERPRET THE QUERY AND/OR COMMAND
304
GENERATE CORRECTLY FORMATTED QUERIES AND/OR COMMANDS
306
TAKE ACTION
308
STORE THE EVENT IF NEED BE
310
GENERATE PROPERLY FORMATTED RESPONSE
312

FIG. 3

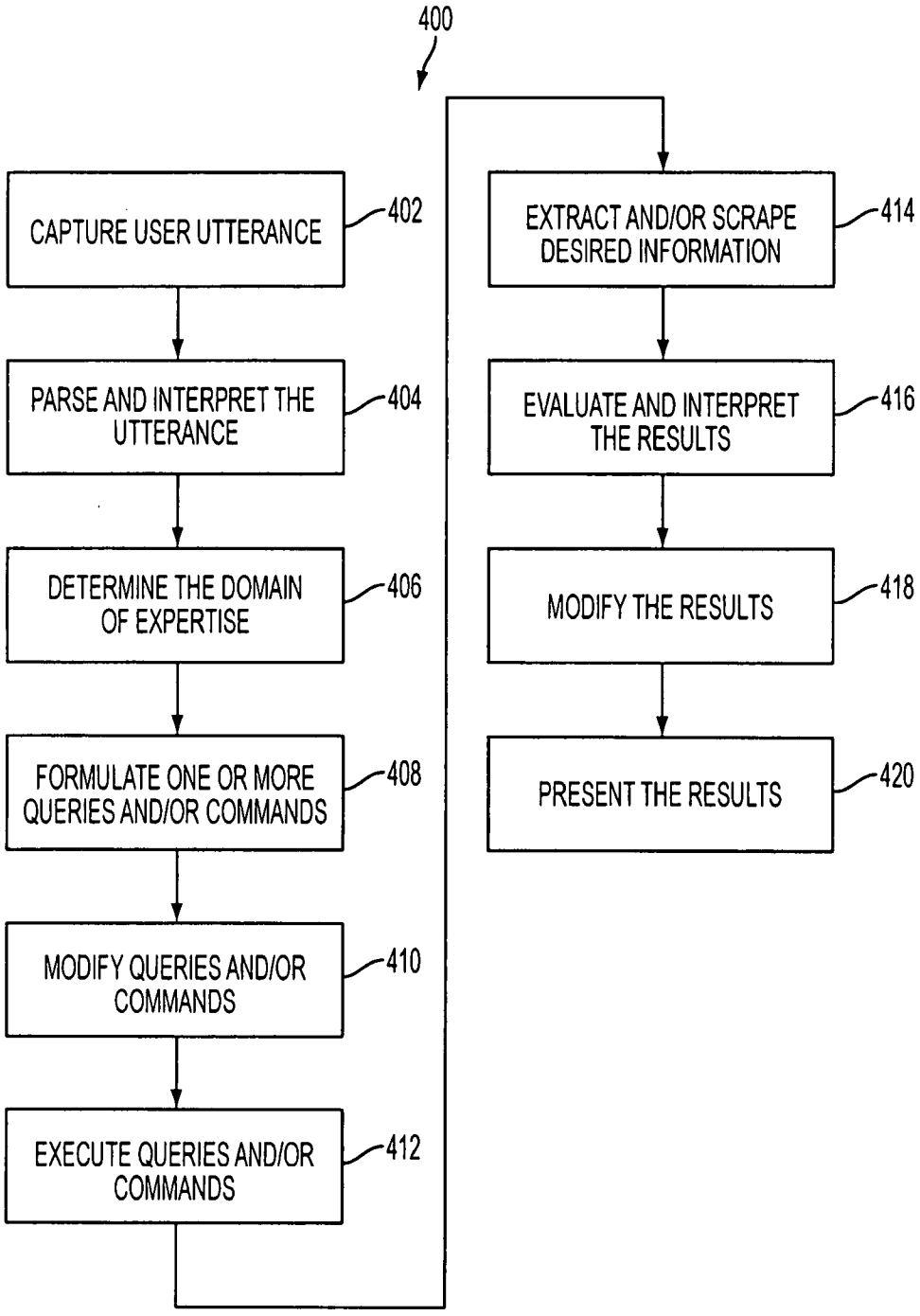

400
CAPTURE USER UTTERANCE
402
PARSE AND INTERPRET THE UTTERANCE
404
DETERMINE THE DOMAIN OF EXPERTISE
406
FORMULATE ONE OR MORE QUERIES AND/OR COMMANDS
408
MODIFY QUERIES AND/OR COMMANDS
410
EXECUTE QUERIES AND/OR COMMANDS
412
EXTRACT AND/OR SCRAPE DESIRED INFORMATION
414
EVALUATE AND INTERPRET THE RESULTS
416
MODIFY THE RESULTS
418
PRESENT THE RESULTS
420

FIG. 4A

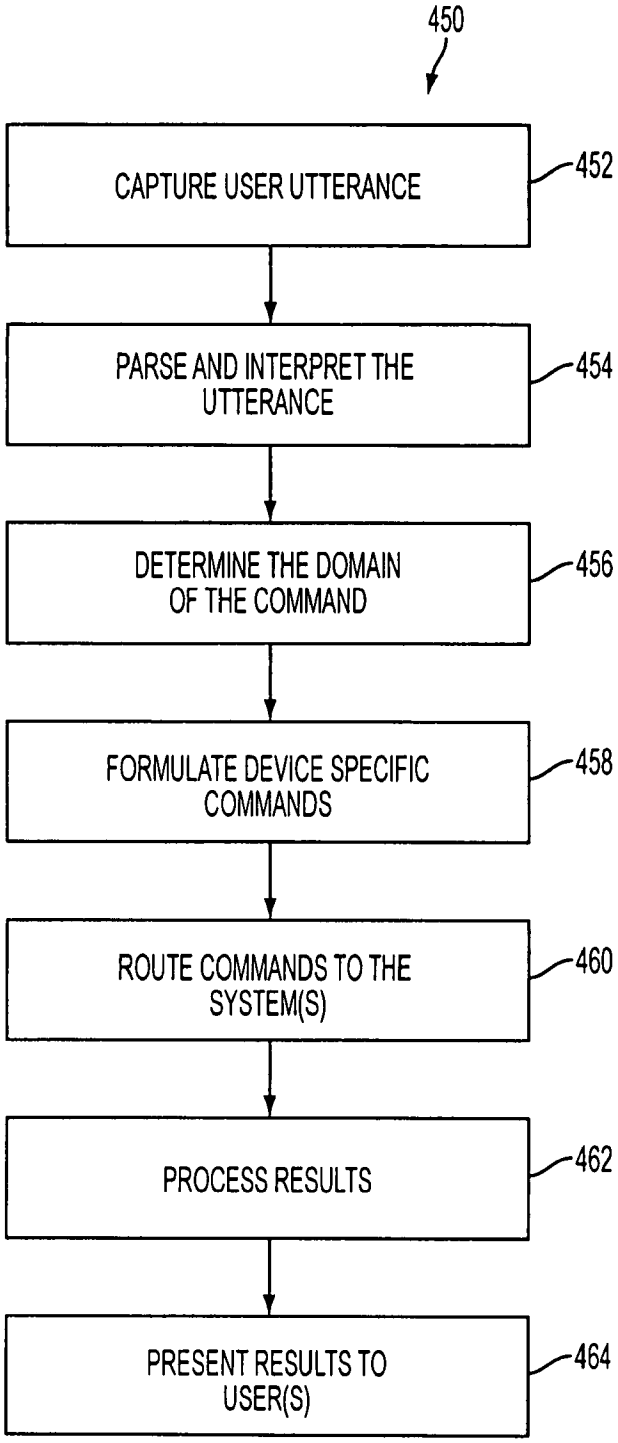

450
CAPTURE USER UTTERANCE
452
PARSE AND INTERPRET THE UTTERANCE
454
DETERMINE THE DOMAIN OF THE COMMAND
456
FORMULATE DEVICE SPECIFIC COMMANDS
458
ROUTE COMMANDS TO THE SYSTEM(S)
460
PROCESS RESULTS
462
PRESENT RESULTS TO USER(S)
464

FIG. 4B

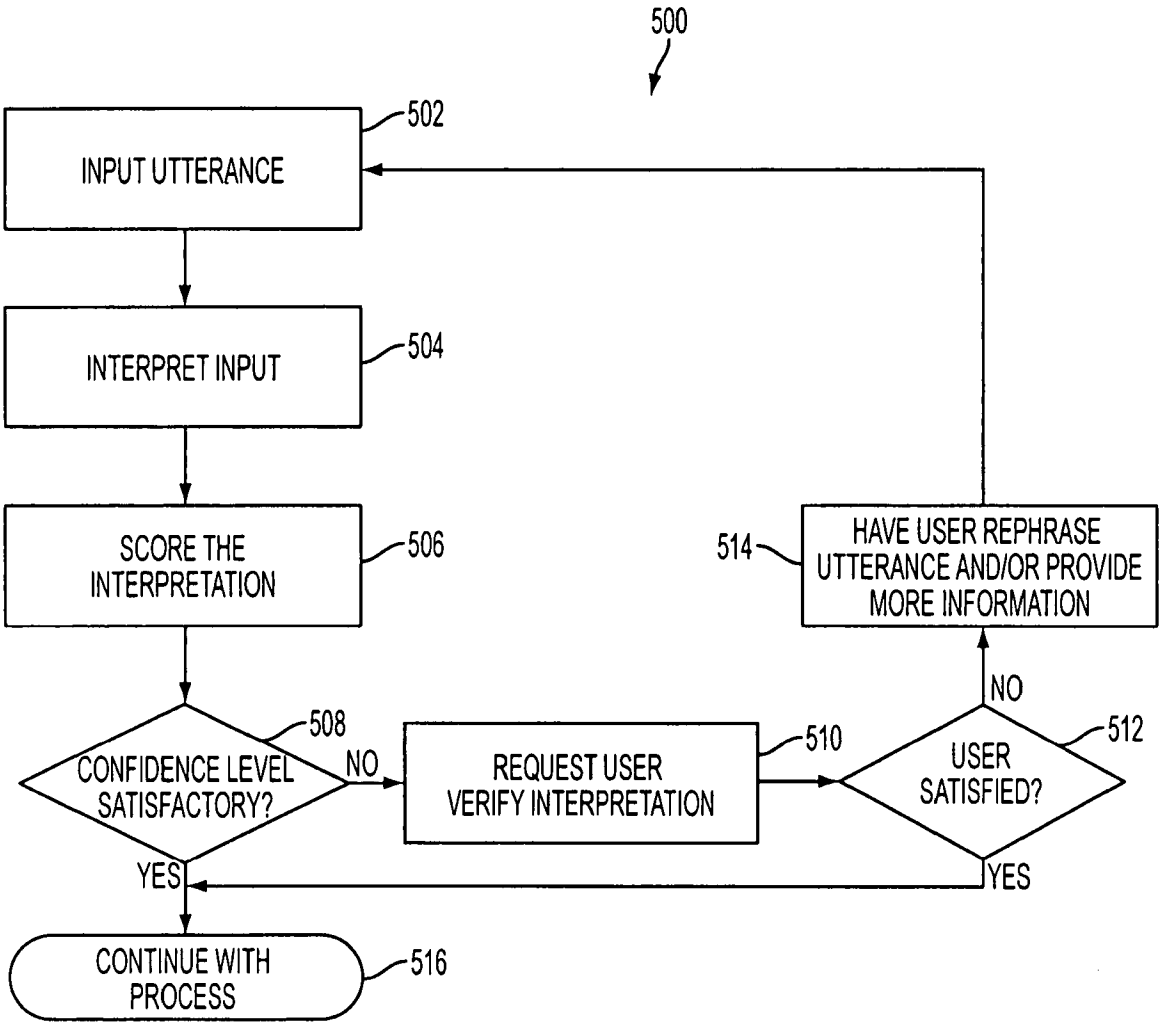

500
INPUT UTTERANCE
502
INTERPRET INPUT
504
SCORE THE INTERPRETATION
506
CONFIDENCE LEVEL SATISFACTORY?
508
NO
YES
REQUEST USER VERIFY INTERPRETATION
510
USER SATISFIED?
512
NO
YES
HAVE USER REPHRASE UTTERANCE AND/OR PROVIDE MORE INFORMATION
514
CONTINUE WITH PROCESS
516

FIG. 5

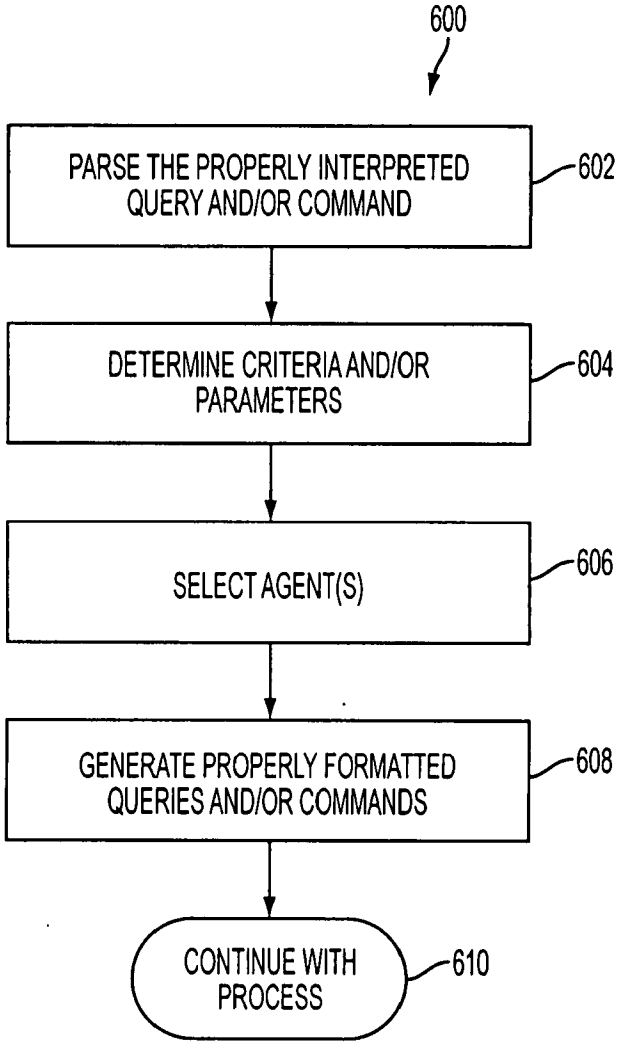

600
PARSE THE PROPERLY INTERPRETED QUERY AND/OR COMMAND
602
DETERMINE CRITERIA AND/OR PARAMETERS
604
SELECT AGENT(S)
606
GENERATE PROPERLY FORMATTED QUERIES AND/OR COMMANDS
608
CONTINUE WITH PROCESS
610

FIG. 6

| INFORMATION DISCLOSURE CITATION IN AN APPLICATION | Docket Number | Application Number |
|---|---|---|
| | 090611-0361350 | 11/747,547 |
| | Applicant(s) | |
| | Robert A. KENNEWICK *et al.* | |
| | Filing Date | Group Art Unit |
| Form PTO-1449 | May 11, 2007 | 2626 |

## U.S. PATENT DOCUMENTS

| *EXAMINER INITIAL | REF | DOCUMENT NO. | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
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| | C | 5,902,347 | 05/11/1999 | Backman *et al.* | 701 | 200 | |
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| | F | 6,598,018 | 07/22/2003 | Junqua | 704 | 251 | |
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| | Q | 2004/0199375 | 10/07/2004 | Ehsani *et al.* | 704 | 4 | |
| | R | 2005/0021334 | 01/27/2005 | Iwahashi | 704 | 240 | |
| | S | 2007/0050191 | 03/01/2007 | Weider *et al.* | 704 | 275 | |

## FOREIGN PATENT DOCUMENTS

| | REF | DOCUMENT NO. | DATE | COUNTRY | CLASS | SUBCLASS | Translations YES | Translations NO |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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| | | |
|---|---|---|
| | T | MAO, Mark Z., "Automatic Training Set Segmentation for Multi-Pass Speech Recognition", Department of Electrical Engineering, Stanford University, CA, copyright 2005, IEEE, pages I-685 to I-688. |
| | U | VANHOUCKE, Vincent, "Confidence Scoring and Rejection Using Multi-Pass Speech Recognition", Nuance Communications, Menlo Park, CA, [no date], 4 pages. |
| | V | WENG, Fuliang, *et al.*, "Efficient Lattice Representation and Generation", Speech Technology and Research Laboratory, SRI International, Menlo Park, CA, [no date], 4 pages. |
| | W | EL MELIANI *et al.*, "A Syllabic-Filler-Based Continuous Speech Recognizer for Unlimited Vocabulary", Canadian Conference on Electrical and Computer Engineering, Volume 2, September 5-8, 1995, pages 1007-1010. |

| EXAMINER | DATE CONSIDERED |
|---|---|
| /Martin Lerner/ | 12/10/2008 |

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



ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.L./

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Page 00308

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Bib Data Sheet

**CONFIRMATION NO. 4708**

| SERIAL NUMBER | FILING OR 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 11/747,547 | 05/11/2007<br>RULE | 704 | 2626 | 090611-0361350 |

**APPLICANTS**

ROBERT A. KENNEWICK, Seattle, WA;
David Locke, Redmond, WA;
Michael R. Kennewick SR., Bellevue, WA;
Michael R Kennewick JR., Bellevue, WA;
Richard Kennewick, Woodinville, WA;
Tom Freeman, Mercer Island, WA;

MR 1-8-9

** CONTINUING DATA **********

** FOREIGN APPLICATIONS **********

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 05/31/2007

| | | STATE OR COUNTRY | SHEETS DRAWING | TOTAL CLAIMS | INDEPENDENT CLAIMS |
|---|---|---|---|---|---|
| Foreign Priority claimed | ☐ yes ☐ no | WA | 7 | 15 | 1 |
| 35 USC 119 (a-d) conditions met | ☐ yes ☐ no ☐ Met after Allowance | | | | |
| Verified and Acknowledged | Examiner's Signature Initials | | | | |

**ADDRESS**
909

**TITLE**
SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

| FILING FEE RECEIVED | FEES: Authority has been given in Paper | |
|---|---|---|
| 925 | 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 |

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| (Depositor's name) |
|---|
| (Signature) |
| (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 | 4708 |

TITLE OF INVENTION: SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | YES | $755 | $300 | $0 | $1055 | 03/16/2009 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|---|---|---|
| LERNER, MARTIN | 2626 | 704-257000 |

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,

(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.

1 PILLSBURY WINTHROP SHAW
2 PITTMAN LLP
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: VoiceBox Technologies, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Bellevue, Washington

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.
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5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date January 30, 2009

Typed or printed name Syed Jafar Ali Registration No. 58780

This collection of information 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.

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

| | | | |
|---|---|---|---|
| APPLICANTS : | Robert A. KENNEWICK et al. | CONFIRMATION NO.: | 4708 |
| SERIAL NUMBER : | 11/747,547 | EXAMINER: | Martin Lerner |
| FILING DATE : | May 11, 2007 | ART UNIT: | 2626 |
| FOR : | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | | |

# COMMENTS ON STATEMENT OF REASONS FOR ALLOWANCE

**Mail Stop Issue Fee**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

A Statement of Reasons for Allowance was attached to the Notice of Allowance mailed December 15, 2008, for the above-identified application.

Applicants appreciate the Notice of Allowability for all claims of the present application, but note that the independent claim and each of the dependent claims are separately patentably distinguishable over the references relied upon by the Examiner, as such references do not anticipate or render obvious the respective combinations of elements recited in the independent and respective dependent claims.

For example, the references relied upon by the Examiner, either alone or in combination with one another, do not disclose, teach, or suggest a system responsive to a user generated natural language speech utterance, as recited in independent claim 27, for example, which includes:

> an agent architecture that includes a plurality of domain agents, each of the plurality of domain agents being an autonomous executable configured to receive, process, and respond to requests associated with a respective context;



401093316v1

a parser configured to determine a context for one or more keywords contained in the utterance and to determine a meaning of the utterance based on the determined context, wherein the parser selects at least one of the plurality of domain agents based on the determined meaning, wherein the selected domain agent is configured to receive, process, and respond to requests associated with the determined context;

an event manager configured to coordinate interaction between the parser and the agent architecture; and

an update manager that enables the user to purchase one or more domain agents from a third party on a one-time or subscription basis.

These comments, in response to the Examiner's Statement of Reasons for Allowance, are timely submitted.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975 (**Ref. No. 090611-0361350**). The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Date: **January 30, 2009**

Respectfully submitted,

By: _____

Syed Jafar Ali
Registration No. 58780

**CUSTOMER NO. 00909**

PILLSBURY WINTHROP SHAW PITTMAN LLP
P.O. Box 10500
McLean, Virginia 22102
Main: 703-770-7900
Fax: 703-770-7901

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 11747547 |
| **Filing Date:** | 11-May-2007 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| **First Named Inventor/Applicant Name:** | ROBERT A. KENNEWICK |
| **Filer:** | Syed Jafar Ali/Kathy Oliver |
| **Attorney Docket Number:** | 090611-0361350 |

Filed as Small Entity

## Utility under 35 USC 111(a) Filing Fees

| 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:** | | | | |
| Utility Appl issue fee | 2501 | 1 | 755 | 755 |
| Publ. Fee- early, voluntary, or normal | 1504 | 1 | 300 | 300 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | | **Total in USD ($)** | **1055** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 4706840 |
| **Application Number:** | 11747547 |
| **International Application Number:** | |
| **Confirmation Number:** | 4708 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| **First Named Inventor/Applicant Name:** | ROBERT A. KENNEWICK |
| **Customer Number:** | 00909 |
| **Filer:** | Syed Jafar Ali/Kathy Oliver |
| **Filer Authorized By:** | Syed Jafar Ali |
| **Attorney Docket Number:** | 090611-0361350 |
| **Receipt Date:** | 30-JAN-2009 |
| **Filing Date:** | 11-MAY-2007 |
| **Time Stamp:** | 14:03:37 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Deposit Account |
| Payment was successfully received in RAM | $1055 |
| RAM confirmation Number | 10489 |
| Deposit Account | 033975 |
| Authorized User | |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

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 | | 0361350IF.pdf | 169123<br>25bef9e72ac11673b8749f1e3f9def8ce974e5e9 | yes | 3 |

| Multipart Description/PDF files in .zip description | | |
|---|---|---|
| **Document Description** | **Start** | **End** |
| Issue Fee Payment (PTO-85B) | 1 | 1 |
| Post Allowance Communication - Incoming | 2 | 3 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 2 | Fee Worksheet (PTO-06) | fee-info.pdf | 31855<br>a84be8de9f26d48f373979c14837c6dab5f3b87c | no | 2 |

**Warnings:**

**Information:**

| Total Files Size (in bytes): | 200978 |
|---|---|

**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

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 11/747,547 | 03/10/2009 | 7502738 | 090611-0361350 | 4708 |

909 7590 02/18/2009

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

# 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 Customer Service Center of the Office of Patent Publication at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

ROBERT A. KENNEWICK, Seattle, WA;
David Locke, Redmond, WA;
Michael R. Kennewick SR., Bellevue, WA;
Michael R Kennewick JR., Bellevue, WA;
Richard Kennewick, Woodinville, WA;
Tom Freeman, Mercer Island, WA;

C of C






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

| | | | |
|---|---|---|---|
| APPLICANTS : | Robert A. KENNEWICK *et al.* | CONFIRMATION NO.: | 4708 |
| PATENT NUMBER : | 7,502,738 B2 | SERIAL NO.: | 11/747,547 |
| ISSUE DATE : | March 10, 2009 | FILING DATE: | May 11, 2007 |
| FOR : | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | | |

## PETITION FOR CERTIFICATE OF CORRECTION




Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

The assignee of the above-identified patent, through its attorneys, hereby requests issuance of a Certificate of Correction. A certificate is required to correct the error as set forth below.

The error is considered to be the fault of the United States Patent and Trademark Office ("PTO"). Therefore, no fee is required. However, in the event that it is determined that fees are due, the Commissioner is hereby authorized to charge the undersigned's Deposit Account No. 03-3975 (Reference No. 090611-0361350).

**Correction of Related U.S. Application Data**

The present application is a divisional of application Serial No. 10/452,147, which claims priority to U.S. provisional application Serial No. 60/384,388. However, the title page of the

MAR 27 2009

patent that issued on this application does not list these applications. Item (62) should state "Division of application No. 10/452,147, filed on Jun. 3, 2003, now Pat. No. 7,398,209" and Item (60) should state "Provisional application No. 60/384,388, filed on Jun. 3, 2002." The undersigned has provided, as an attached EXHIBIT A, a copy of the Updated Filing Receipt mailed August 9, 2007, which correcting lists the priority claim, thus supporting the contention that PTO error resulted in the incorrect listing of the related U.S. application data on the title page of the patent.

**CONCLUSION**

It is respectfully requested that a Certificate of Correction be issued to correct this error. Form PTO/SB/44 is attached for this purpose.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

By _____
James G. Gatto
Registration No.: 32,694

Customer No.
00909

P. O. Box 10500
McLean, Virginia 22102
Telephone: (703) 770-7900
Telefax: (703) 770-7901

Dated: March 25, 2009



MAR 2 7 2009

Google Exhibit 1021
Page 00319

# EXHIBIT A

MAR 2 7 2009

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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www.uspto.gov

| APPL NO. | FILING OR 371(c) DATE | ART UNIT | FIL FEE REC'D | ATTY.DOCKET NO. | TOT CLMS | IND CLMS |
|---|---|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | 2626 | 425 | 090611-0361350 | 15 | 1 |

**CONFIRMATION NO. 4708**

909
PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

**UPDATED FILING RECEIPT**

*OC000000025290385*

Date Mailed: 08/09/2007

Receipt is acknowledged of this nonprovisional 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 write to the Office of Initial Patent Examination's Filing Receipt Corrections. 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 (if appropriate).**

**Applicant(s)**

ROBERT A. KENNEWICK, Seattle, WA;
David Locke, Redmond, WA;
Michael R. Kennewick SR., Bellevue, WA;
Michael R Kennewick JR., Bellevue, WA;
Richard Kennewick, Woodinville, WA;
Tom Freeman, Mercer Island, WA;

**Power of Attorney:** The patent practitioners associated with Customer Number **29315**.

**Domestic Priority data as claimed by applicant**

This application is a DIV of 10/452,147 06/03/2003
which claims benefit of 60/384,388 06/03/2002

**Foreign Applications**

**If Required, Foreign Filing License Granted:** 05/31/2007

**The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US11/747,547**

**Projected Publication Date:** 11/15/2007

**Non-Publication Request:** No

RECEIVED
PILLSBURY WINTHROP SHAW PITTMAN
MAR 27 2008

AUG 13 2007

CL 0964 MT# 0361350
ATTY(S) JGG/JA
DUE: 10
DKT BY(1)

**Early Publication Request:** No

**** SMALL ENTITY ****

**Title**

SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

**Preliminary Class**

704

## 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 (1-866-999-4158).

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## LICENSE FOR FOREIGN FILING UNDER
## Title 35, United States Code, Section 184
## Title 37, Code of Federal Regulations, 5.11 & 5.15

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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

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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 Assets Control, 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).

MAR 2 7 2009

PTO/SB/44 (09-07)
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(Also Form PTO-1050)

# UNITED STATES PATENT AND TRADEMARK OFFICE
## CERTIFICATE OF CORRECTION



PATENT NO. : 7,502,738 B2

APPLICATION NO.: 11/747,547

ISSUE DATE : March 10, 2009

INVENTOR(S) : Robert A. KENNEWICK et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Related U.S. Application Data

(62) Division of application No. 10/452,147, filed on Jun. 3, 2003, now Pat. No. 7,398,209.

(60) Provisional application No. 60/384,388, filed on Jun. 3, 2002.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

PILLSBURY WINTHROP SHAW PITTMAN LLP
P. O. Box 10500
McLean, VA 22102

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 hour 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: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

MAR 2 7 2009

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

UNITED STATES PATENT AND TRADEMARK OFFICE

# CERTIFICATE OF CORRECTION



PATENT NO. : 7,502,738 B2
APPLICATION NO. : 11/747547
DATED : March 10, 2009
INVENTOR(S) : Robert A. Kennewick et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page

Related U.S. Application Data should read

Item (62) Division of application No. 10/452,147, filed on Jun. 3, 2003, now Pat. No. 7,398,209.

Item (60) Provisional application No. 60/384,388, filed on Jun. 3, 2002.

Signed and Sealed this

Twenty-eighth Day of April, 2009



JOHN DOLL
*Acting Director of the United States Patent and Trademark Office*

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# PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378 (c))

Docket Number (Optional)
090611-0361350

Mail to: Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Fax: (571) 273-8300

05/17/2013 DALLEN 00000018 033975 7502738
01 FC:1599 1620.00 DA

NOTE: If information or assistance is needed in completing this form, please contact Petitions Information at (571) 272-3282.

Patent No. 7,502,738 Application Number 11/747,547

Issue Date March 10, 2009 Filing Date May 11, 2007

CAUTION: Maintenance fee (and surcharge, if any) payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

**Also complete the following information, if applicable**

The above – identified patent

☐ is a reissue of original Patent No. _____ original issue date _____

original application number _____

original filing date _____

☐ resulted from the entry into the U.S. under 35 U.S.C. 371 of international application _____

filed on _____

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DIVISION

CERTIFICATE OF MAILING (37 CFR 1.89(a))

I hereby certify that this paper (*along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Date Signature

Typed or Printed Name of Person Signing Certificate



This collection of information is required by 37 CFR 1.378(c). 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 1 hour 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: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450**

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Page 00326

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1. SMALL ENTITY

☑ Patentee claims, or has previously claimed, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

☐ Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g)

3. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

| NOT Small Entity | | | Small Entity | | |
|---|---|---|---|---|---|
| Amount | Fee | (Code) | Amount | Fee | (Code) |
| ☐ $ _____ | 3 ½ yr fee | (1551) | ☑ $ 800.00 | 3 ½ yr fee | (2551) |
| ☐ $ _____ | 7 ½ yr fee | (1552) | ☐ $ _____ | 7 ½ yr fee | (2552) |
| ☐ $ _____ | 11 ½ yr fee | (1553) | ☐ $ _____ | 11 ½ yr fee | (2553) |

MAINTENANCE FEE BEING SUBMITTED $ 800.00

4. SURCHARGE

The surcharge required by 37 CFR 1.20(i)(2) of $ 820.00 (Fee Code 1558) must be paid as a condition of accepting unintentionally delayed payment of a maintenance fee.

SURCHARGE FEE BEING SUBMITTED $ 820.00

5. MANNER OF PAYMENT

☐ Enclosed is a check for the sum of $ _____

☑ Please charge Deposit Account No. 03-3975 the sum of $ 1,620.00

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

6. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

☑ The Director is hereby authorized to charge any maintenance fee, surcharge or petition deficiency to Deposit Account No. 03-3975

2013 MAY 15 PM 4:44
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DIVISION



PAGE 2/3 * RCVD AT 5/15/2013 10:49:21 AM [Eastern Daylight Time] * SVR:W-PTOFAX-001/21 * DNIS:2738300 * CSID:17039645785 * DURATION (mm-ss):00-51
Google Exhibit 1021
Page 00327

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7. OVERPAYMENT

As to any overpayment made please

OR

☑ Credit to Deposit Account No. 03-3975

☐ Send refund check

**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.

8. STATEMENT

The delay in payment of the maintenance fee to this patent was unintentional.

9. PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED

Signature(s) of Petitioner(s) — May 15, 2013 (Date)

Bradford C. Blaise — Typed or printed name(s) — 47,429 (Registration Number, if applicable)

703.770.7741 — Telephone Number

c/o Pillsbury Winthrop Shaw Pittman LLP — Address

P. O. Box 10500, McLean, Virginia 22102 — Address

2013 MAY 15 PM 4:44
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37 CFR 1.378(d) states: "Any petition under this section must be signed by an attorney or agent registered to practice before the Patent and Trademark Office, or by the patentee, the assignee, or other party in interest."

ENCLOSURES

☑ Maintenance Fee Payment

☑ Surcharge under 37 CFR 1.20(i)(2) (fee for filing the maintenance fee petition)

☐ _____

_____

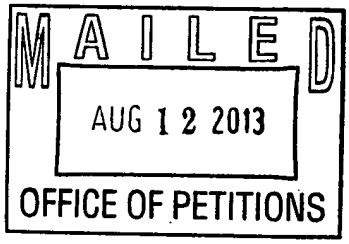


PAGE 3/3 * RCVD AT 5/15/2013 10:49:21 AM [Eastern Daylight Time] * SVR:W-PTOFAX-001/21 * DNIS:2738300 * CSID:17039645785 * DURATION (mm-ss):00-51

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Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Pillsbury Winthrop Shaw
Pittman, LLP (NV)
PO Box 10500
McLean VA 22102




In re Patent No. 7,502,738 :
Kennewick et al. :
Issue Date: March 10, 2009 :
Application No. 11/747,547 : DECISION ON PETITION
Filed: October 6, 2006 :
Attorney Docket No. R0019/7000:

This is a decision on the PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(c)) filed May 15, 2013.

The petition is **GRANTED**.

The patent issued March 10, 2009. The window for paying the 3-½ year maintenance fee provided in 37 CFR 1.362(e) expired at midnight on March 10, 2013, with no payment received.

This petition was timely filed within twenty-four months after the expiration of the six-month grace period. As required, petitioner submitted with the petition the required maintenance fee, the surcharge for accepting an unintentionally delayed maintenance fee after expiration, and a statement that the delay in payment of the maintenance fee was unintentional. These fees were accepted at the reduced small entity rate, as the fees were accompanied by petitioner's assertion of having made a determination of continued entitlement to pay small entity fees, pursuant to 37 CFR 1.27(g)(1), effective September 8, 2000.

Accordingly, the maintenance fee in this case is hereby accepted and the above-identified patent is hereby reinstated as of the mail date of this decision.

Telephone inquiries related to this decision may be directed to the undersigned at (571) 272-3219.

/Nancy Johnson/

Nancy Johnson
Senior Petitions Attorney
Office of Petitions

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MAY 15 2013

PTO/SB/68 (03-09)
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# PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378 (c))

Docket Number (Optional)
090611-0361350

Mail to: Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Fax: (571) 273-8300

05/17/2013 DALLEN 00000018 033975 7502738
01 FC:1599 1620.00 DA

NOTE: If information or assistance is needed in completing this form, please contact Petitions Information at (571) 272-3282.

Patent No. 7,502,738 Application Number 11/747,547

Issue Date March 10, 2009 Filing Date May 11, 2007

CAUTION: Maintenance fee (and surcharge, if any) payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

**Also complete the following information, if applicable**

The above – identified patent

☐ is a reissue of original Patent No. _____ original issue date _____
original application number _____
original filing date _____

☐ resulted from the entry into the U.S. under 35 U.S.C. 371 of international application _____
filed on _____

2013 MAY 15 PM 4:44
USPTO
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DIVISION

CERTIFICATE OF MAILING (37 CFR 1.8(a))

I hereby certify that this paper (*along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

_____ Date

_____ Signature

_____ Typed or Printed Name of Person Signing Certificate



This collection of information is required by 37 CFR 1.378(c). 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 1 hour 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: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450

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

Adjustment Date: 08/12/2013 CKHLOK
05/17/2013 DALLEN 00000018 033975 7502738
01 FC:1599 1620.00 CR

08/12/2013 CKHLOK 00000012 033975 7502738

01 FC:2551 800.00 DA

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PTO/SB/66 (03-09)
Approved for use through 03/31/2012. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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1. SMALL ENTITY

☑ Patentee claims, or has previously claimed, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

☐ Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g)

3. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

| NOT Small Entity | | | Small Entity | | |
|---|---|---|---|---|---|
| Amount | Fee | (Code) | Amount | Fee | (Code) |
| ☐ $ _____ | 3 ½ yr fee | (1551) | ☑ $ 800.00 | 3 ½ yr fee | (2551) |
| ☐ $ _____ | 7 ½ yr fee | (1552) | ☐ $ _____ | 7 ½ yr fee | (2552) |
| ☐ $ _____ | 11 ½ yr fee | (1553) | ☐ $ _____ | 11 ½ yr fee | (2553) |

MAINTENANCE FEE BEING SUBMITTED $ 800.00

4. SURCHARGE

The surcharge required by 37 CFR 1.20(i)(2) of $ 820.00 (Fee Code 1558) must be paid as a condition of accepting unintentionally delayed payment of a maintenance fee.

SURCHARGE FEE BEING SUBMITTED $ 820.00

5. MANNER OF PAYMENT

☐ Enclosed is a check for the sum of $ _____

☑ Please charge Deposit Account No. 03-3975 the sum of $ 1,620.00

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

6. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

☑ The Director is hereby authorized to charge any maintenance fee, surcharge or petition deficiency to Deposit Account No. 03-3975

2013 MAY 15 PM 4:44
USPTO
RECEIPTS ACCOUNTING
DIVISION



PAGE 2/3 * RCVD AT 5/15/2013 10:49:21 AM [Eastern Daylight Time] * SVR:W-PTOFAX-001/21 * DNIS:2738300 * CSID:17039545785 * DURATION (mm-ss):00-61

RECEIVED
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MAY 15 2013

PTO/SB/66 (03-09)
Approved for use through 03/31/2012. OMB 0651-0016
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

7. OVERPAYMENT

As to any overpayment made please

OR

☑ Credit to Deposit Account No. 03-3975

☐ Send refund check

**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.

8. STATEMENT

The delay in payment of the maintenance fee to this patent was unintentional.

9. PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED

| | |
|---|---|
| Signature(s) of Petitioner(s) | May 15, 2013<br>Date |
| Bradford C. Blaise<br>Typed or printed name(s) | 47,429<br>Registration Number, if applicable |
| 703.770.7741<br>Telephone Number | |

c/o Pillsbury Winthrop Shaw Pittman LLP
Address

P. O. Box 10500, McLean, Virginia 22102
Address

2013 MAY 15 PM 4:44
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DIVISION

37 CFR 1.378(d) states: "Any petition under this section must be signed by an attorney or agent registered to practice before the Patent and Trademark Office, or by the patentee, the assignee, or other party in interest."

ENCLOSURES

☑ Maintenance Fee Payment

☑ Surcharge under 37 CFR 1.20(i)(2) (fee for filing the maintenance fee petition)

☐ _____

[Page 3 of 3]

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

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Current Date: October 2nd, 2018

Application No.: 11/747547
Filed: 11.05.2007

Patent No.: 7502738
Issued: 10.03.2009

**CHANGE OF ENTITY STATUS PURSUANT TO 37 C. F. R. § 1.27 (g)(2)**

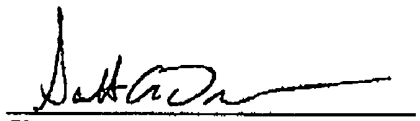
Commissioner for Patents
Mail Stop M Correspondence
P.O. Box 1450
Alexandria, VA 22313-1450

By Fax: 001-571-273-6500

Sir:

This communication hereby notifies the United States Patent and Trademark Office that **small entity status is no longer applicable** for the above-identified patent.

Respectfully submitted,



Signature
Printed Name: Scott Ouellette
TITLE: Attorney of Record Reg #38,573



Google Exhibit 1021
Page 00334

Docket No.: N0484.71158US02
(PATENT)

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

| | |
|---|---|
| Applicant: | David Locke, et al. |
| Patent No.: | 7,502,738 |
| Issued: | March 10, 2009 |
| Serial No.: | 11/747,547 |
| For: | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| Maintenance Fee: | 8th Year – September 12, 2016 |

CERTIFICATE OF FACSIMILE TRANSMISSION UNDER 37 CFR § 1.8(a)

The undersigned hereby certifies that this document is being sent via facsimile to 571-273-6500, ATTN: Receipts Accounting Div./Office of Finance, United States Patent & Trademark Office, on the 10 day of March, 2020.

Mariah M. Smith-Jones

**VIA FACSIMILE (571-273-6500)**
Receipts Accounting Division
Office of Finance
U.S. Patent and Trademark Office

**CORRECTION OF ERROR IN SMALL ENTITY STATUS PURSUANT TO 37 C.F.R. § 1.28(c)**

Sir/Madam:

In the above-identified case, through error and without deceptive intent, the Patent Office was not timely notified of a loss to entitlement to Small Entity Status for the present application that occurred prior to payment of the 8th year Maintenance Fee, and through error and without deceptive intent the 8th year Maintenance Fee was incorrectly paid under the Small Entity status. Pursuant to 37 C.F.R. §1.28(c)(1)(2), Patentee respectfully requests acceptance of the enclosed the deficiency payment.

Patentee submits herewith the deficiency in payment of $1,800.00 for the 8th year Maintenance Fee payment. Pursuant to 37 C.F.R. §§ 1.28(c)(1), 1.28(c)(2)(i), and 1.28(c)(2)(ii), the itemization of the deficiency payment is as follows:

| Type of fee erroneously paid as small entity | Current fee amount for non-small entity | Small entity fee actually paid and date paid | Deficiency Owed Amount |
|---|---|---|---|
| 8th Year Maintenance Fee | $3,600.00 | $1,800.00 September 07, 2016 | $1,800.00 |
| **Total Deficiency Owed** | | | **$1,800.00** |

In view of compliance with 37 C.F.R. §§ 1.28(c)(1), 1.28(c)(2)(i), and 1.28(c)(2)(ii), Patentee respectfully requests that the error in Small Entity status be excused. Additionally, pursuant to 37 C.F.R. § 1.28(d), it is requested that the submission of the deficiency payment be treated under 37 C.F.R. § 1.27(g)(2) as a notification of a loss of entitlement to Small Entity status.

Please charge the deficiency of $1,800.00 to Deposit Account Number 23/2825, under our Docket Number N0484.71158US02, in order that the 8th Year Maintenance Fee payment reflects Large Entity status.

If there is an additional fee that is not covered, please charge any deficiency to Deposit Account No. 23/2825 under Docket No. N0484.71158US02.

Respectfully submitted,

Date: March 10, 2020

By: /Andrew J. Tibbetts/
Andrew J. Tibbetts
Registration Number: 65,139
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, Massachusetts 02210-2206
Telephone: (617) 646-8000



Google Exhibit 1021

# FAX COVER SHEET

| | |
|---|---|
| TO | |
| COMPANY | |
| FAX NUMBER | 15712736500 |
| FROM | Wolf Greenfield |
| DATE | 2020-03-10 21:54:31 GMT |
| RE | FW: AccuRoute Scan |

COVER MESSAGE



Google Exhibit 1021
Page 00237

PAGE 1/4 * RCVD AT 3/10/2020 5:55:13 PM [Eastern Daylight Time]* SVR:W-PTOFAX-002/24 * DNIS:2736500 * CSID:16176468646 * ANI:9712751300 * DURATION (mm-ss):03-23

Wolf Greenfield
SPECIALISTS IN INTELLECTUAL PROPERTY LAW

# FAX COVER

**********OFFICIAL FAX**********

**Date:** March 10, 2020 **Number of pages** (including cover): 3

**To:** Attn: Maintenance Fee, Receipts Accounting Division, Office of Finance
U.S. Patent and Trademark Office

**Fax No.:** (571) 273-6500

**Patent No.:** 7,502,738

**Title:** SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE

**From:** Mariah M. Smith-Jones

**Direct dial:** 617.646.8470

**Our File #:** N0484.71158US02

**CERTIFICATE OF FACSIMILE TRANSMISSION 37 C.F.R. §1.8(a)**

The undersigned hereby certifies that this document is being transmitted via facsimile to the attention of the Receipts Accounting Division, Office of Finance, FAX number (571) 273-6500, at the United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450, in accordance with 37 C.F.R. §1.6(d), on the _10th_ day of March, 2020.



Mariah M. Smith-Jones

**ORIGINAL DOCUMENTS WILL NOT BE MAILED.**

**MESSAGE:** Transmitted herewith is a Correction of Error In Small Entity Status Pursuant to 37 C.F.R. § 1.28(c) and fee deficiency payment. Please note the 8th year maintenance fee was paid on September 07, 2016. Thank you.

This transmission contains confidential information intended for use only by the above-named recipient. Reading, discussing, distributing, or copying this message by anyone other than the named recipient, or his or her employees or agents, is strictly prohibited. If you have received this fax in error, please notify us immediately by telephone (collect), and return the original message to us at the address below via the U.S. Postal Service.

**IF YOU DID NOT RECEIVE ALL OF THE PAGES OF THIS TRANSMISSION, OR IF ANY OF THE PAGES ARE ILLEGIBLE, PLEASE CALL 617.646.8000 IMMEDIATELY.**

**Wolf Greenfield Fax Number: 617.646.8646**

Wolf, Greenfield & Sacks, P.C. | 600 Atlantic Avenue | Boston, Massachusetts 02210-2206
617.646.8000 | fax 617.646.8646 | www.wolfgreenfield.com

**PATENTS TRADEMARKS COPYRIGHTS TECHNOLOGY TRANSFERS LITIGATION**

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. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 | 4708 |

909 7590 07/02/2020

Pillsbury Winthrop Shaw Pittman, LLP
PO Box 10500
McLean, VA 22102

| EXAMINER | |
|---|---|
| LERNER, MARTIN | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2626 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 07/02/2020 | 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):

docket_ip@pillsburylaw.com

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

In re Patent No. 7,502,738
Issue Date: March 10, 2009
Application No. 11/747,547
Filing or 371(c) Date: May 11, 2007
Attorney Docket No. 090611-0361350

DECISION ON PETITION

This is a notice regarding your request filed March 10, 2020, for acceptance of a fee deficiency submission under 37 CFR 1.28(c).

The file does not indicate a change of address has been submitted, although the address given on the petition differs from the address of record. If appropriate, a change of address should be filed in accordance with MPEP 601.03. A courtesy copy of this decision is being mailed to the address given on the petition; however, the Office will mail all future correspondence solely to the address of record.

The Office no longer investigates or rejects original or reissue applications under 37 CFR 1.56. **1098 Off. Gaz. Pat. Office 502 (January 3, 1989)**. Therefore, nothing in this Notice is intended to imply that an investigation was done.

The fee deficiency submission under 37 CFR 1.28(c) is hereby **ACCEPTED**.

Accordingly, status as a small entity has been removed and any future fee(s) submitted must be paid at the undiscounted rate.

Inquiries related to this communication should be directed to the undersigned at (571) 272-1058.

*/Angela Walker/*
Angela Walker
Paralegal Specialist
Office of Petitions

cc: Andrew J. Tibbetts
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, MA 02210-2206

| Transmittal Communication on Petition | Application/Control No. 11/747,547 | Applicant(s)/Patent Under Reexamination KENNEWICK et al. | |
|---|---|---|---|
| | Deciding Official LERNER, MARTIN | Office of Petitions OPET | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --*

(ADDITIONAL PARTY'S CORRESPONDENCE ADDRESS)

Andrew J. Tibbetts
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, MA 02210-2206

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified Application/Patent.

# PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6700444

| | |
|---|---|
| **SUBMISSION TYPE:** | NEW ASSIGNMENT |
| **NATURE OF CONVEYANCE:** | ASSIGNMENT |

**CONVEYING PARTY DATA**

| Name | Execution Date |
|---|---|
| NUANCE COMMUNICATIONS, INC. | 01/01/2021 |

**RECEIVING PARTY DATA**

| | |
|---|---|
| **Name:** | VOICE INVENTIONS, LLC |
| **Street Address:** | 2 EXECUTIVE DRIVE |
| **Internal Address:** | STE. 270 |
| **City:** | FORT LEE |
| **State/Country:** | NEW JERSEY |
| **Postal Code:** | 07024 |

**PROPERTY NUMBERS Total: 29**

| Property Type | Number |
|---|---|
| **Patent Number:** | 7398209 |
| **Patent Number:** | 7502738 |
| **Patent Number:** | 7809570 |
| **Patent Number:** | 8015006 |
| **Patent Number:** | 8112275 |
| **Patent Number:** | 8140327 |
| **Patent Number:** | 8155962 |
| **Patent Number:** | 8731929 |
| **Patent Number:** | 9734825 |
| **Patent Number:** | 7693720 |
| **Patent Number:** | 9031845 |
| **Patent Number:** | 7640160 |
| **Patent Number:** | 7917367 |
| **Patent Number:** | 8326634 |
| **Patent Number:** | 8849670 |
| **Patent Number:** | 9263039 |
| **Patent Number:** | 7620549 |
| **Patent Number:** | 8332224 |
| **Patent Number:** | 8620659 |

| Property Type | Number |
|---|---|
| **Patent Number:** | 9626959 |
| **Patent Number:** | 7949529 |
| **Patent Number:** | 8195468 |
| **Patent Number:** | 8447607 |
| **Patent Number:** | 8849652 |
| **Patent Number:** | 9495957 |
| **Patent Number:** | 7634409 |
| **Patent Number:** | 7983917 |
| **Patent Number:** | 8069046 |
| **Patent Number:** | 8150694 |

**CORRESPONDENCE DATA**

**Fax Number:**

***Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.***

**Email:** eddie.weiss@voiceinventions.com
**Correspondent Name:** EDWARD WEISS
**Address Line 1:** 2 EXECUTIVE DRIVE
**Address Line 2:** STE. 270
**Address Line 4:** FORT LEE, NEW JERSEY 07024

| | |
|---|---|
| **NAME OF SUBMITTER:** | EDWARD WEISS |
| **SIGNATURE:** | /Edward Weiss/ |
| **DATE SIGNED:** | 05/10/2021 |
| | This document serves as an Oath/Declaration (37 CFR 1.63). |

**Total Attachments: 4**
source=2020-12-24 - Assignment Nuance to Voice Inventions#page1.tif
source=2020-12-24 - Assignment Nuance to Voice Inventions#page2.tif
source=2020-12-24 - Assignment Nuance to Voice Inventions#page3.tif
source=2020-12-24 - Assignment Nuance to Voice Inventions#page4.tif

# PATENT ASSIGNMENT AGREEMENT

This PATENT ASSIGNMENT AGREEMENT (the "Assignment Agreement") between Nuance Communications, Inc., a Delaware corporation, with an address at One Wayside Road, Burlington, MA 01803 ("Assignor"), and Voice Inventions, LLC, a Texas Limited Liability Company, with an address at 2 Executive Drive, Suite 270, Fort Lee, NJ 07024 ("Assignee").

## RECITALS

WHEREAS the parties have entered into a certain Patent Purchase and Licensing Agreement (the "Purchase Agreement"), with an effective date of January 1, 2021;

WHEREAS Assignor possesses all legal rights, title, and interests in and to the patents listed in Exhibit A (the "Assigned Patent Portfolio") to this Assignment Agreement;

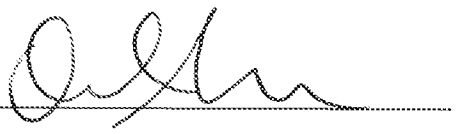
WHEREAS the parties desire to effectuate the assignment and transfer of the Assigned Patent Portfolio to Assignee such that Assignee shall acquire, and thus hereby acquires, all of Assignor's worldwide rights, title, and interests in and to the Assigned Patent Portfolio; and

WHEREAS the parties further desire that the assignment of the Assigned Patent Portfolio be undertaken in a such a manner as to allow Assignee to make such assignment a matter of record in the appropriate domestic and international patent offices;

NOW THEREFORE, for good and valuable consideration, the receipt of which by Assignor is hereby acknowledged, Assignor hereby sells, assigns, and transfers to Assignee, and Assignee hereby purchases and accepts from Assignor, all of Assignor's worldwide rights, title and interest, in and to the Assigned Patent Portfolio, including any and all of Assignor's rights to sue for past damages, subject to the terms and conditions of the Purchase Agreement.

IN WITNESS WHEREOF, intending to be legally bound, Assignor has caused this Assignment Agreement to by executed by its duly authorized representative and made effective, as of January 1, 2021.

**Nuance Communications, Inc.**
**Assignor**

By 

Name: David Greenbaum
Title: VP, Litigation & IP

## Exhibit A

### Assigned Patent Portfolio

| | COUNTRY | TITLE | APPLICATION NUMBER | DATE FILED | PATENT NUMBER |
|---|---|---|---|---|---|
| 1 | US | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 10/452,147 | Jun 3, 2003 | 7,398,209 |
| 2 | US | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 11/747,547 | May 11, 2007 | 7,502,738 |
| 3 | US | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 12/168,554 | Jul 7, 2008 | 7,809,570 |
| 4 | US | SYSTEMS AND METHODS FOR PROCESSING NATURAL LANGUAGE SPEECH UTTERANCES WITH CONTEXT-SPECIFIC DOMAIN AGENTS | 12/130,397 | May 30, 2008 | 8,015,006 |
| 5 | US | SYSTEM AND METHOD FOR USER-SPECIFIC SPEECH RECOGNITION | 12/765,733 | Apr 22, 2010 | 8,112,275 |
| 6 | US | SYSTEM AND METHOD FOR FILTERING AND ELIMINATING NOISE FROM NATURAL LANGUAGE UTTERANCES TO IMPROVE SPEECH RECOGNITION AND PARSING | 12/765,753 | Apr 22, 2010 | 8,140,327 |
| 7 | US | METHOD AND SYSTEM FOR ASYNCHRONOUSLY PROCESSING NATURAL LANGUAGE UTTERANCES | 12/838,982 | Jul 19, 2010 | 8,155,962 |
| 8 | US | AGENT ARCHITECTURE FOR DETERMINING MEANINGS OF NATURAL LANGUAGE UTTERANCES | 12/365,516 | Feb 4, 2009 | 8,731,929 |
| 9 | US | SYSTEM AND METHOD FOR PROCESSING NATURAL LANGUAGE UTTERANCES | 14/278,627 | May 15, 2014 | 9,734,825 |
| 10 | US | MOBILE SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCES | 10/618,633 | Jul 15, 2003 | 7,693,720 |
| 11 | US | MOBILE SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 12/705,311 | Feb 12, 2010 | 9,031,845 |



Google Exhibit 1021
Page 00345

| | | | | | |
|---|---|---|---|---|---|
| 12 | US | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 11/197,504 | Aug 5, 2005 | 7,640,160 |
| 13 | US | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 12/617,506 | Nov 12, 2009 | 7,917,367 |
| 14 | US | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 13/019,834 | Feb 2, 2011 | 8,326,634 |
| 15 | US | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 13/690,895 | Nov 30, 2012 | 8,849,670 |
| 16 | US | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 14/500,723 | Sep 29, 2014 | 9,263,039 |

| | | | | | |
|---|---|---|---|---|---|
| 17 | US | SYSTEM AND METHOD OF SUPPORTING ADAPTIVE MISRECOGNITION IN CONVERSATIONAL SPEECH | 11/200,164 | Aug 10, 2005 | 7,620,549 |
| 18 | US | SYSTEM AND METHOD OF SUPPORTING ADAPTIVE MISRECOGNITION IN CONVERSATIONAL SPEECH | 12/571,795 | Oct 1, 2009 | 8,332,224 |
| 19 | US | SYSTEM AND METHOD OF SUPPORTING ADAPTIVE MISRECOGNITION IN CONVERSATIONAL SPEECH | 13/022,370 | Feb 7, 2011 | 8,620,659 |
| 20 | US | SYSTEM AND METHOD OF SUPPORTING ADAPTIVE MISRECOGNITION IN CONVERSATIONAL SPEECH | 14/143,903 | Dec 30, 2013 | 9,626,959 |

| | | | | | |
|---|---|---|---|---|---|
| 21 | US | MOBILE SYSTEMS AND METHODS OF SUPPORTING NATURAL LANGUAGE HUMAN-MACHINE INTERACTIONS | 11/212,693 | Aug 29, 2005 | 7,949,529 |
| 22 | US | MOBILE SYSTEMS AND METHODS OF SUPPORTING NATURAL LANGUAGE HUMAN-MACHINE INTERACTIONS | 13/084,197 | Apr 11, 2011 | 8,195,468 |
| 23 | US | MOBILE SYSTEMS AND METHODS OF SUPPORTING NATURAL LANGUAGE HUMAN-MACHINE INTERACTIONS | 13/488,299 | Jun 4, 2012 | 8,447,607 |
| 24 | US | MOBILE SYSTEMS AND METHODS OF SUPPORTING NATURAL LANGUAGE HUMAN-MACHINE INTERACTIONS | 13/898,045 | May 20, 2013 | 8,849,652 |

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| 25 | US | MOBILE SYSTEMS AND METHODS OF SUPPORTING NATURAL LANGUAGE HUMAN-MACHINE INTERACTIONS | 14/467,641 | Aug 25, 2014 | 9,495,957 |

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| 26 | US | DYNAMIC SPEECH SHARPENING | 11/513,269 | Aug 31, 2006 | 7,634,409 |
| 27 | US | DYNAMIC SPEECH SHARPENING | 12/608,544 | Oct 29, 2009 | 7,983,917 |
| 28 | US | DYNAMIC SPEECH SHARPENING | 12/608,572 | Oct 29, 2009 | 8,069,046 |
| 29 | US | SYSTEM AND METHOD FOR PROVIDING AN ACOUSTIC GRAMMAR TO DYNAMICALLY SHARPEN SPEECH INTERPRETATION | 13/150,977 | Jun 1, 2011 | 8,150,694 |

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| 30 | CN | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 2006800362006 | Aug 4, 2006 | ZL200680036200.6 |
| 31 | CN | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE | 2015102059396 | Aug 4, 2006 | ZL201510205939.6 |
| 32 | CN | MOBILE SYSTEMS AND METHODS OF SUPPORTING NATURAL LANGUAGE HUMAN-MACHINE INTERACTIONS | 200680038560 | Aug 29, 2006 | 200680038560 |

PTO/AIA/81A (02-15)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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# PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

| | |
|---|---|
| Patent Number | 7502738 |
| Issue Date | 03/10/09 |
| First Named Inventor | Kennewick, Robert A |
| Title | Systems and methods for responding to natural language speech utterance |
| Attorney Docket No. | 9032-0003 |

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 174889

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

| Practitioner(s) Name | Registration Number |
|---|---|
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Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-identified Customer Number.

OR

☐ The address associated with the Customer Number identified in the box at right:

OR

| | | | | | |
|---|---|---|---|---|---|
| ☐ Firm or Individual Name | | | | | |
| Address | | | | | |
| City | | State | | Zip | |
| Country | | | | | |
| Telephone | | Email | | | |

I am the:

☐ Applicant.

OR

☒ Patent owner.

*Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on* _____.

**SIGNATURE of Applicant or Patent Owner**

| | | | |
|---|---|---|---|
| Signature | /Jeff Ronaldi/ | Date | 02/27/2023 |
| Name | Jeff Ronaldi | Telephone | (571) 334-1112 |
| Title and Company | Manager, Dialect, LLC | | |

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted.

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 update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 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.*

# 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.

PTO/AIA/96 (08-12)
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# STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Dialect, LLC

Application No./Patent No.: 7502738 Filed/Issue Date: 03/10/09

Titled: Systems and methods for responding to natural language speech utterance

Dialect, 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: Kennewick, Robert A et al. To: VoiceBox Technologies, Inc.

   The document was recorded in the United States Patent and Trademark Office at
   Reel 019771, Frame 0079, or for which a copy thereof is attached.

2. From: VoiceBox Technologies, Inc. To: VoiceBox Technologies Corporation

   The document was recorded in the United States Patent and Trademark Office at
   Reel 032620, Frame 0956, 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.**

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

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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## STATEMENT UNDER 37 CFR 3.73(c)

3. From: VoiceBox Technologies Corporation To: Nuance Communications, Inc.

The document was recorded in the United States Patent and Trademark Office at
Reel 034703, Frame 0429, or for which a copy thereof is attached.

4. From: Nuance Communications, Inc. To: Voice Inventions, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 056185, Frame 0742, or for which a copy thereof is attached.

5. From: Voice Inventions, LLC To: Dialect, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 060820, Frame 0857, 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.

| | |
|---|---|
| /Jeff Ronaldi/ | 02/27/2023 |
| Signature | Date |
| Jeff Ronaldi | Manager, Dialect, LLC |
| Printed or Typed Name | Title or Registration Number |

# Privacy Act Statement

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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).
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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.
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:** | 47604739 |
| **Application Number:** | 11747547 |
| **International Application Number:** | |
| **Confirmation Number:** | 4708 |
| **Title of Invention:** | SYSTEMS AND METHODS FOR RESPONDING TO NATURAL LANGUAGE SPEECH UTTERANCE |
| **First Named Inventor/Applicant Name:** | ROBERT A. KENNEWICK |
| **Customer Number:** | 909 |
| **Filer:** | David Alexander Gerasimow |
| **Filer Authorized By:** | |
| **Attorney Docket Number:** | 090611-0361350 |
| **Receipt Date:** | 28-FEB-2023 |
| **Filing Date:** | 11-MAY-2007 |
| **Time Stamp:** | 14:31:31 |
| **Application Type:** | Utility under 35 USC 111(a) |

## 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 | 7502738.pdf | 206849<br>412e1dfe68d21bac9149734eb369c3c2f76259e3 | no | 2 |

**Warnings:**

| Information: | | | | | |
|---|---|---|---|---|---|
| 2 | Assignee showing of ownership per 37 CFR 3.73 | 7502738-aia0096.pdf | 196985<br>e7cb6e4729a0492c478a1226af02b2dc59507be5 | no | 3 |
| Warnings: | | | | | |
| Information: | | | | | |
| | | Total Files Size (in bytes): | 403834 | | |

**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 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 |
|---|---|---|---|
| 11/747,547 | 05/11/2007 | ROBERT A. KENNEWICK | 090611-0361350 |

**CONFIRMATION NO. 4708**

**IMPROPER CPOA LETTER**

909
Pillsbury Winthrop Shaw Pittman, LLP
PO Box 10500
McLean, VA 22102

*OC000000137523284*

Date Mailed: 03/07/2023

## NOTICE REGARDING POWER OF ATTORNEY

This is in response to the power of attorney filed 02/28/2023. The power of attorney in this application is not accepted for the reason(s) listed below:

- The person(s) appointed in the power of attorney is/are not registered to practice before the U.S. Patent and Trademark Office.

/sltorres/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

174889
Carbon Research, Inc (aka Research Carbon, Inc)
43 Luke St
Prospect, CT 06712
UNITED STATES



Google Exhibit 1021
Page 00355