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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/954,604	11/24/2010	Jonathan S. Steuer	10004-2000115	5737

51417 7590 07/11/2013

Mauriel Kapouytian & Treffert LLP
27 W. 24th Street
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New York, NY 10010

EXAMINER	
SMITH, CHENEA	
ART UNIT	PAPER NUMBER
2421	
MAIL DATE	DELIVERY MODE
07/11/2013	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.

Notice of Abandonment	Application No. 12/954,604	Applicant(s) STEUER ET AL.
	Examiner CHENEA SMITH	Art Unit 2421

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1. ☒ Applicant's failure to timely file a proper reply to the Office letter mailed on *12 December 2012*.
   (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
   (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 (a) to the final rejection.
   (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
   (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
   (d) ☒ No reply has been received.

2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
   (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
   (b) ☐ The submitted fee of $_____ is insufficient. A balance of $_____ is due.
   The issue fee required by 37 CFR 1.18 is $_____. The publication fee, if required by 37 CFR 1.18(d), is $_____.
   (c) ☐ The issue fee and publication fee, if applicable, has not been received.

3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
   (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
   (b) ☐ No corrected drawings have been received.

4. ☐ The letter of express abandonment which is signed by the attorney or agent of record, the assignee of the entire interest, or all of the applicants.

5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.

6. ☐ The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. ☒ The reason(s) below:

No reply has been received.

/CHENEA SMITH/
Primary Examiner, Art Unit 2421

Petitions to revive under 37 CFR 1.137(a) or (b), or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

PTO/AIA/22 (03-13)
Approved for use through 3/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): 10004-2000115

Application Number: 12/954,604

Filed: November 24, 2010

For: MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD

Art Unit: 2421

Examiner: Smith, Chenea

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	Micro Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$200	$100	$50	$
☐	Two months (37 CFR 1.17(a)(2))	$600	$300	$150	$
☑	Three months (37 CFR 1.17(a)(3))	$1,400	$700	$350	$ 700
☐	Four months (37 CFR 1.17(a)(4))	$2,200	$1,100	$550	$
☐	Five months (37 CFR 1.17(a)(5))	$3,000	$1,500	$750	$

☑ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

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

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 504242.

☑ Payment made via EFS-Web.

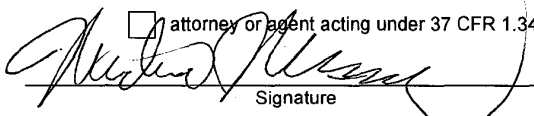
WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 44,226.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.



Signature

May 20, 2013
Date

Michael Mauriel; Reg. No. 44,226
Typed or printed name

212-529-5131
Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 6 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 PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	12954604
Filing Date:	24-Nov-2010
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Filer:	Michael John Mauriel/Jasmine Habbas
Attorney Docket Number:	10004-2000115

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:				
Extension - 3 months with $0 paid	2253	1	700	700

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**700**

Electronic Acknowledgement Receipt	
EFS ID:	15819731
Application Number:	12954604
International Application Number:	
Confirmation Number:	5737
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Customer Number:	51417
Filer:	Michael John Mauriel/Jasmine Habbas
Filer Authorized By:	Michael John Mauriel
Attorney Docket Number:	10004-2000115
Receipt Date:	20-MAY-2013
Filing Date:	24-NOV-2010
Time Stamp:	15:42:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$700
RAM confirmation Number	2541
Deposit Account	
Authorized User	

File Listing:

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

1	Extension of Time	100042000115_ExtofTime.pdf	129629 5c3875fbb6208af3d320da175e0ae63b76b76cd4	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	29806 25d6895a187fbc43416aec37119ea88127cf0161	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	159435		

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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/954,604	11/24/2010	Jonathan S. Steuer	10004-2000115	5737

51417 7590 12/12/2012

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EXAMINER	
SMITH, CHENEA	
ART UNIT	PAPER NUMBER
2421	
MAIL DATE	DELIVERY MODE
12/12/2012	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)	
	12/954,604	STEUER ET AL.	
	Examiner	Art Unit	
	CHENEA SMITH	2421	

-- 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 *24 November 2010*.

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

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-25* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-25* is/are rejected.

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

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

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *24 November 2010* 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).

12)☐ 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

13)☐ 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

Priority

1. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 119(e) as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original non-provisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed applications, Application No. 60/574836 and Application No. 11/139330, fail to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application.

For example, claim 1 recites the limitation "*wherein the correlator server correlates the detected location with a location of at least one geographically identifiable sponsor of a reference media item*". While the Applicants' original disclosure at [0024] of 11/139330 recites that *"For example, filtered search module 122 might use audience data from audience data processing module 123 to form parameters and then pass those parameters to content*

recognition system 124 which then uses the parameters to conduct a filtered search of its content. Alternatively, module 122 might be adapted to utilize an instance of content recognition system 124 that includes content pre-selected based upon relevant audience data. Some examples of relevant audience data that may be used either to form search parameters or to construct targeted content include: location of the audience member (alone and/or relative to other audience members)", this appears to be the only teaching of a user location, and therefore does not support the limitation as claimed. Also, the claim recited "a server", "at least one stream collection server", "a stream store, coupled to the server and to the at least one stream collection server" and "a location tracking server". While the Applicants' original disclosure of 11/139330 teach a media measurement system 100, comprised of modules, i.e., 121-123, 129, Fig. 1), these are not servers, and do not support the limitations as claimed. This analysis and rejection, includes then, in addition to claim 1, claim 3-4 and claim 12.

Claims 2 and 18 recite the limitation "*wherein the location tracking server detects the location via at least one selected from the group consisting of: GPS tracking; RFID tracking; Bluetooth tracking*". While the Applicants' original disclosure at [0024] of 11/139330 recites that *"For example, filtered search module 122 might use audience data from audience data processing module 123 to form parameters and then pass those parameters to content recognition system 124 which then uses the parameters to conduct a filtered search of its content. Alternatively, module 122 might be adapted to utilize an instance of content recognition system 124 that includes content pre-selected based upon relevant audience data. Some examples of relevant audience data that may be used either to form search parameters or to construct targeted content include: location of the audience member (alone and/or relative to*

other audience members)", this appears to be the only teaching of a user location, and therefore does not support the limitation as claimed.

Claims 4 and 5 recite the limitations "*a purchasing tracking server, for receiving consumer purchasing information; wherein the output device generates a report correlating user purchasing information with user exposure to the identified reference media item*", and "*wherein the purchasing tracking server receives at least one indication of user use of a credit card*", respectively. While the Applicant's original disclosure at [0024] of 11/139330 recites that "*For example, filtered search module 122 might use audience data from audience data processing module 123 to form parameters and then pass those parameters to content recognition system 124 which then uses the parameters to conduct a filtered search of its content. Alternatively, module 122 might be adapted to utilize an instance of content recognition system 124 that includes content pre-selected based upon relevant audience data. Some examples of relevant audience data that may be used either to form search parameters or to construct targeted content include: media consumption patterns of the audience member based on questionnaire input or based on past content identifications associated with that audience member* and *media consumption patterns of other audience members who have consumed other media content that has also previously been consumed by the audience member using the corresponding monitoring device*", this appears to be the only teaching of using user information, and therefore does not support the limitation as claimed.

Claims 6-7 recite the limitation "*for selecting, based on at least one of load and geographic proximity to the client device, one of the plurality of data signature stream collection server*s". While the Applicants' original disclosure at [0024] of 11/139330 recites that *"For*

example, filtered search module 122 might use audience data from audience data processing module 123 to form parameters and then pass those parameters to content recognition system 124 which then uses the parameters to conduct a filtered search of its content. Alternatively, module 122 might be adapted to utilize an instance of content recognition system 124 that includes content pre-selected based upon relevant audience data. Some examples of relevant audience data that may be used either to form search parameters or to construct targeted content include: location of the audience member (alone and/or relative to other audience members)", this appears to be the only teaching of a user location, and therefore does not support the limitation as claimed.

Claims 7, 12 and 21 recite the limitation "*receiving, from the client device: ... an indication as to whether the client device is in the physical possession of a person at the time of exposure to the target media item*". While the Applicants' original disclosure at [0017], line 3 of 11/139330 recites, "*A monitored audience member wears the monitor 101a during a monitoring period*", this does not support the limitation as claimed.

Furthermore, the limitation "*responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item, ignoring the representation of the at least one target media item from the client device*", as recited in claims 8-9 and 13-14, is not supported by the Applicant's original disclosure of 11/139330, as there is no teaching of any received indications of physical possession, or alternative situations "when the client device is not in the physical possession of a person at the time of exposure to the target media item". Therefore, there appears to be no support for the limitations as claimed.

Claims 11, 16 and 23 recite the limitation "*wherein the at least one sensor detects at least one selected from the group consisting of: vibration of the client device; key presses on the client device; temperature of the client device; and movement of the client device*". The Applicants' specification at [0017] of 11/139330 recites "*As illustrated, monitoring device 101a includes a microphone 105, a media player port 102, a headphone port 103, and a data upload port 104. A monitored audience member wears monitor 101a during a monitoring period. When the audience member is consuming media from media player 170a without the use of headphones 160a (i.e. if media player 170a has a speaker), monitor 101 captures audio energy acoustically through microphone 105. However, when the audience member desires to use headphones 160a to receive media content from media player 170a (e.g. an MP3 player, iPod, CD player, DVD player, television, radio, computer, or other media player) he or she can plug headphones 160a into headphone port 103 and plug media player 170a into media player port 102. In that case, monitor 101 a captures audio energy through media player port 102. Microphone 105 includes a microphone and associated microphone port. However, in alternatives, a monitor may simply have a microphone port into which a microphone may be plugged or linked via wireless connection. Thus the term "microphone port" will herein refer to any electronics capable of receiving energy captured through a microphone, whether or not a microphone is built into the monitoring device itself*". This does not support the limitations as claimed.

Claims 17 and 20 recite the limitations "*wherein the audience data processor relates the detected location to retail traffic of an advertiser associated with the known media content*", and "*a retail traffic data system; wherein the report generator generates a report matching retail traffic and audience member exposure to known media content*", respectively. While the

Applicant's original disclosure at [0024] of 11/139330 recites that "*For example, filtered search module 122 might use audience data from audience data processing module 123 to form parameters and then pass those parameters to content recognition system 124 which then uses the parameters to conduct a filtered search of its content. Alternatively, module 122 might be adapted to utilize an instance of content recognition system 124 that includes content pre-selected based upon relevant audience data. Some examples of relevant audience data that may be used either to form search parameters or to construct targeted content include: media consumption patterns of the audience member based on questionnaire input or based on past content identifications associated with that audience member* and *media consumption patterns of other audience members who have consumed other media content that has also previously been consumed by the audience member using the corresponding monitoring device*", this appears to be the only teaching of using user information, and therefore does not support the limitations as claimed.

Claim 19 recites the limitation "*wherein the representation of the monitored media indicates audience member exposure at a time other than the time of broadcast*". While the Applicant's original disclosure at [0024] of 11/139330 recites that "*For example, filtered search module 122 might use audience data from audience data processing module 123 to form parameters and then pass those parameters to content recognition system 124 which then uses the parameters to conduct a filtered search of its content. Alternatively, module 122 might be adapted to utilize an instance of content recognition system 124 that includes content pre-selected based upon relevant audience data. Some examples of relevant audience data that may be used either to form search parameters or to construct targeted content include: media*

consumption patterns of the audience member based on questionnaire input or based on past content identifications associated with that audience member and *media consumption patterns of other audience members who have consumed other media content that has also previously been consumed by the audience member using the corresponding monitoring device*", this appears to be the only teaching of using user information, and therefore does not support the limitation as claimed.

Accordingly, claims 1-23 are not entitled to the benefit of the prior application, and in the interest of compact prosecution, two rejections will be given (please see rejections below).

The Applicants should please note that this application does repeat a substantial portion of prior Application No. 11/139330, filed 05/27/2004, but adds and claims additional disclosure not presented in the prior application. Since this application names an inventor/inventors also named in the prior application, it may constitute a **continuation-in-part** of the prior application. Should the Applicants desire to obtain the benefit of the filing date of the prior application, attention is directed to 35 U.S.C. 120 and 37 CFR 1.78.

a. The Applicants may cancel the claim limitations were not disclosed in the parent applications.

or

b. Should the Applicants not cancel the claim limitations, then the Applicants should convert the application to a **continuation-in-part**, and the new limitations will receive the current application's filing date of 11/24/2010.

i. The applicant would be required to file a new oath and declaration.

ii. The claim limitations would be required to be added to the specification without adding any other new matter.

Claim *Rejections - 35 USC § 102*

2. 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.

3. Claims 1-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Zito et al. (US20060059277, hereinafter Zito).

Regarding claim 1, Zito discloses a system for detecting user exposure to media items (see Zito, Fig. 1), comprising:

a server (server 112A, see Zito, Figs. 1 and 3), for receiving a plurality of reference media items from at least one media receiver (media receivers 111, see Zito, see Figs. 1 and 3 and [0047]);

at least one stream collection server (servers 107, see Zito, Figs. 1 and 3), for receiving a representation of at least one target media item from at least one client device (see Zito, Figs. 1 and 3 and [0039]);

a stream store (stream store 114, see Zito, Figs. 1 and 3), coupled to the server and to the at least one stream collection server, (see Zito, Figs. 1 and 3) for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item (see Zito, [0043] and [0045]);

a correlator server (servers 115, see Zito, Fig. 1), coupled to the stream store (see Zito, Fig. 1), for identifying one of the reference media items as corresponding to the target media item (see Zito, [0043] and [0054]);

an output device (see Zito, Figs. 1 and 3), coupled to the correlator server (see Zito, Figs. 1 and 3), for generating output signaling user exposure to the identified reference media item (see Zito, Figs. 1 and 3 and [0055]); and

a location tracking server (server 109, see Zito, Figs. 1 and 3) for detecting a location for the client device (see Zito, Figs. 1 and 3 and [0026], [0051] and [0056]);

wherein the correlator server correlates the detected location with a location of at least one geographically identifiable sponsor of a reference media (see Zito, [0056]).

Regarding claim 2, Zito discloses wherein the location tracking server detects the location via at least one selected from the group consisting of: GPS tracking; RFID tracking; Bluetooth tracking (see Zito, [0065]).

Regarding claim 3, Zito discloses a system for detecting user exposure to media items (see Zito, Fig. 1), comprising:

a server (server 112A, see Zito, Figs. 1 and 3), for receiving a plurality of reference media items from at least one media receiver (media receivers 111, see Zito, see Figs. 1 and 3 and [0047]);

at least one stream collection server (servers 107, see Zito, Figs. 1 and 3), for receiving a representation of at least one target media item from at least one client device (see Zito, Figs. 1 and 3 and [0039]);

a stream store (stream store 114, see Zito, Figs. 1 and 3), coupled to the server and to the at least one stream collection server, (see Zito, Figs. 1 and 3) for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item (see Zito, [0043] and [0045]);

a correlator server (servers 115, see Zito, Fig. 1), coupled to the stream store (see Zito, Fig. 1), for identifying one of the reference media items as corresponding to the target media item (see Zito, [0043] and [0054]);

an output device (see Zito, Figs. 1 and 3), coupled to the correlator server (see Zito, Figs. 1 and 3), for generating output signaling user exposure to the identified reference media item (see Zito, Figs. 1 and 3 and [0055]);

wherein the plurality of reference media items comprises at least one broadcast (see Zito, [0026] and [0044]) and

wherein the representation of at least one target media item indicates user exposure at a time other than the time of broadcast (see Zito, claim 59).

Regarding claim 4, Zito discloses a system for detecting user exposure to media items (see Zito, Fig. 1), comprising:

a server (server 112A, see Zito, Figs. 1 and 3), for receiving a plurality of reference media items from at least one media receiver (media receivers 111, see Zito, see Figs. 1 and 3 and [0047]);

at least one stream collection server (servers 107, see Zito, Figs. 1 and 3), for receiving a representation of at least one target media item from at least one client device (see Zito, Figs. 1 and 3 and [0039]);

a stream store (stream store 114, see Zito, Figs. 1 and 3), coupled to the server and to the at least one stream collection server, (see Zito, Figs. 1 and 3) for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item (see Zito, [0043] and [0045]);

a correlator server (servers 115, see Zito, Fig. 1), coupled to the stream store (see Zito, Fig. 1), for identifying one of the reference media items as corresponding to the target media item (see Zito, [0043] and [0054]);

an output device (see Zito, Figs. 1 and 3), coupled to the correlator server (see Zito, Figs. 1 and 3), for generating output signaling user exposure to the identified reference media item (see Zito, Figs. 1 and 3 and [0055]); and

a purchase tracking server, for receiving consumer purchase information (see Zito, Figs. 1 and 3);

wherein the output device generates a report correlating user purchasing information with user exposure to the identified reference media item (see Zito, Figs. 1 and 3 and claim 61)

Regarding claim 5, Zito discloses wherein the purchasing tracking server receives at least one indication of user use of a credit card (see Zito, claim 62).

Regarding claim 6, Zito discloses a system for detecting user exposure to media items (see Zito, Fig. 1), comprising:

a server (server 112A, see Zito, Figs. 1 and 3), for receiving a plurality of reference media items from at least one media receiver (media receivers 111, see Zito, see Figs. 1 and 3 and [0047]);

at least one stream collection server (servers 107, see Zito, Figs. 1 and 3), for receiving a representation of at least one target media item from at least one client device (see Zito, Figs. 1 and 3 and [0039]);

a stream store (stream store 114, see Zito, Figs. 1 and 3), coupled to the server and to the at least one stream collection server, (see Zito, Figs. 1 and 3) for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item (see Zito, [0043] and [0045]);

a correlator server (servers 115, see Zito, Fig. 1), coupled to the stream store (see Zito, Fig. 1), for identifying one of the reference media items as corresponding to the target media item (see Zito, [0043] and [0054]);

an output device (see Zito, Figs. 1 and 3), coupled to the correlator server (see Zito, Figs. 1 and 3), for generating output signaling user exposure to the identified reference media item (see Zito, Figs. 1 and 3 and [0055]);

and a stream collection server selector, for selecting, based on at least one of load and geographic proximity to the client device, one of the plurality of data signature stream collection servers to receive the representation of at least one target media item (see Zito, claim 63).

Regarding claim 7, Zito discloses a method for detecting user exposure to media items (see Zito, Figs. 3 and 4), comprising:

receiving a plurality of reference media items from at least one media source (see Zito, [0026]-[0027] and Figs. 3 and 4);

for at least one client device (see Zito, Figs. 1 and 3):

selecting, based on at least one of load and geographic proximity to the client device (see Zito, [0042]),

one of a plurality of data signature stream collection servers (see Zito, [0042]); and

at the selected data signature stream collection server, receiving, from the client device (see Zito, [0043]):

a representation of at least one target media item (see Zito, [0043]); and

an indication as to whether the client device is in the physical possession of a person at a time of exposure to the target media item (see Zito, [0105]); and

responsive to an indication that the client device is in the physical possession of a person at the time of exposure to the target media item: identifying one of the reference media items as corresponding to the target media item ([0014] and [0026]-[0027]); and

generating output signaling user exposure to the identified reference media item (see Zito, Figs. 1 and 3 and [0055]).

Regarding claim 8, Zito discloses responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item, ignoring the representation of the at least one target media item from the client device (see Zito, [0105]).

Regarding claim 9, Zito discloses responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item: identifying one of the reference media items as corresponding to the target media item; and

generating output signaling user exposure to the identified reference media item, wherein the output is flagged as having reduced reliability (see Zito, [0105]).

Regarding claims 10 and 22, Zito discloses wherein the indication as to whether the client device is in the physical possession of a person is provided based on output of at least one sensor associated with the client device (see Zito, [0105]).

Regarding claims 11 and 23, Zito discloses wherein the at least one sensor detects at least one selected from the group consisting of: vibration of the client device; key presses on the client device; temperature of the client device; and movement of the client device (see Zito, [0105]).

Regarding claim 12, Zito discloses a system for detecting user exposure to media items (see Zito, Figs. 1 and 3), comprising:

a server (server 112A, see Zito, Figs. 1 and 3), for receiving a plurality of reference media items from at least one media receiver (media receivers 111, see Zito, see Figs. 1 and 3 and [0047]);

at least one stream collection server (servers 107, see Zito, Figs. 1 and 3), for receiving from at least one client device:

a representation of at least one target media item from at least one client device (see Zito, Figs. 1 and 3 and [0039]);

an indication as to whether the client device is in the physical possession of a person at a time of exposure to the target media item (see Zito, [0105]); and

a stream store (stream store 114, see Zito, Figs. 1 and 3), coupled to the server and to the at least one stream collection server, (see Zito, Figs. 1 and 3) for:

storing a representation of at least a subset of the received reference media items (see Zito, [0043] and [0045]); and

responsive to an indication that the client device is in the physical possession of a person at the time of exposure to the target media item (see Zito, [0105]), storing a representation of the target media item (see Zito, Figs. 1 and 3);

a correlator server (see Zito, Fig, 3), coupled to the stream store (see Zito, Fig, 3), for, for each stored representation of a target media item, identifying one of the reference media items as corresponding to the target media item (see Zito, [0043] and [0054]); and

an output device (see Zito, Figs. 1 and 3), coupled to the correlator server (see Zito, Figs. 1 and 3), for, for each identified reference media item, generating output signaling user exposure to the identified reference media item (see Zito, [0043] and [0054]).

Regarding claim 13, Zito discloses wherein the stream store: responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item, ignores the representation of the target media item (see Zito, [0105]).

Regarding claim 14, Zito discloses wherein, responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item:

the stream store stores a representation of the target media item and an indication of reduced reliability of the stored representation (see Zito, [0105]); the correlator server identifies one of the reference media items as corresponding to the target media item (see Zito, [0043] and [0054]); and the output device, generates output signaling user exposure to the identified

reference media item and indicates reduced reliability of the indication of user exposure (see Zito, [0043] and [0054] and [0105]).

Regarding claim 15, Zito discloses wherein the indication as to whether the client device is in the physical possession of a person is provided based on output of at least one sensor associated with the client device (see Zito, [0105]).

Regarding claim 16, Zito discloses wherein the at least one sensor detects at least one selected from the group consisting of: vibration of the client device; key presses on the client device; temperature of the client device; and movement of the client device (see Zito, [0105]).

Regarding claim 17, Zito discloses a system for measuring audience member exposure to media content (see Zito, Figs. 1 and 3) comprising:

an interface for receiving a plurality of known media content from at least one media broadcast (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a content recognition system, coupled to the interface and to the sample control processor, for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media (see Zito, Figs. 1 and 3 and [0026] and [0044]);

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media (see Zito, [0033] and [0043]);

a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content (see Zito, Figs. 1 and 3); and

an audience data processor for detecting a location of the audience member monitoring device (see Zito, [0026] and [0065]); wherein the audience data processor relates the detected location to retail traffic of an advertiser associated with the known media content (see Zito, [0026] and [0056]).

Regarding claim 18, Zito discloses wherein the audience data processor detects the location via GPS tracking (see Zito, [0026]).

Regarding claim 19, Zito discloses a system for measuring audience member exposure to media content (see Zito, Figs. 1 and 3) comprising:

an interface for receiving a plurality of known media content from at least one media broadcast (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a content recognition system, coupled to the interface and to the sample control processor, for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media (see Zito, Figs. 1 and 3 and [0026] and [0044]);

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media (see Zito, [0033] and [0043]);

a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content (see Zito, Figs. 1 and 3); and

wherein the plurality of known media content comprises at least one broadcast (see Zito, [0026] and [0044]); and wherein the representation of the monitored media indicates audience member exposure at a time other than the time of the broadcast (see Zito, claim 59).

Regarding claim 20, Zito discloses a system for measuring audience member exposure to media content (see Zito, Figs. 1 and 3) comprising:

an interface for receiving a plurality of known media content from at least one media broadcast (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a content recognition system, coupled to the interface and to the sample control processor, for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media (see Zito, Figs. 1 and 3 and [0026] and [0044]);

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media (see Zito, [0033] and [0043]);

a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content (see Zito, Figs. 1 and 3); and

and a retail traffic data system; wherein the report generator generates a report matching retail traffic and audience member exposure to known media content (see Zito, Figs. 1 and 3 and [0026] and [0056]).

Regarding claim 21, Zito discloses a system for measuring audience member exposure to media content (see Zito, Figs. 1 and 3) comprising:

an interface for receiving a plurality of known media content from at least one media broadcast (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a content recognition system, coupled to the interface and to the sample control processor, for

storing a representation of at least a subset of the known media content and for storing a representation of the monitored media (see Zito, Figs. 1 and 3 and [0026] and [0044]);

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media (see Zito, [0033] and [0043]); and

a report generator, coupled to the content recognition system, for, for each identified known media content, generating output signaling audience member exposure to the identified known media content (see Zito, claim 28).

Regarding claims 24-25, Zito discloses a system for measuring audience member exposure to media content (see Zito, Figs. 1 and 3) comprising:

an interface for receiving a plurality of known media content from at least one media broadcast (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device (see Zito, Figs. 1 and 3 and [0026] and [0044]);

a content recognition system, coupled to the interface and to the sample control processor, for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media (see Zito, Figs. 1 and 3 and [0026] and [0044]);

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media (see Zito, [0033] and [0043]);

a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content (see Zito, Figs. 1 and 3);

and an audience data processor for detecting a location of the audience member monitoring device and relating the detected location to content meta data associated with the known media content (see Zito, Figs. 1 and 3 and [0026], [0051] and [0056]).

Claim Rejections - 35 USC § 103

4. 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.

5. Claims 1-3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US7444353, hereinafter Chen) in view Bisdikian et al. (US7779415, hereinafter Bisdikian).

Regarding claim 1, Chen discloses a system for detecting user exposure to media items (see Chen, Fig. 1), comprising:

a server (local servers 104/110, see Chen, Fig. 1 and col 5, lines 24-29), for receiving a plurality of reference media items from at least one media receiver (see Chen, col 6, lines 11-15 and col 14, lines 55-63);

receiving a representation of at least one target media item from at least one client device (see Chen, col 6, lines 11-15);

a stream store (database of local servers 104/110, see Chen, Fig. 1 and col 5, lines 24-29), coupled to the server (see Chen, Fig. 1), for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item (see Chen, col 6, lines 11-15 and col 16, lines 5-13);

identifying one of the reference media items as corresponding to the target media item (see Chen, col 16, lines 42-52 and col 17, lines 4-6);

an output device (see Chen, Fig. 1), for generating output signaling user exposure to the identified reference media item (see Chen, col 16, lines 42-52 and col 17, lines 4-6); and

a location tracking device (location identification unit 120, see Chen, col 8, line 45 – col 9, line2) for detecting a location for the client device (see Chen, col 8, lines 46-48);

wherein the detected location is correlated with a location of at least one geographically identifiable sponsor of a reference media item (see Chen, col 8, lines 55-57 and col 9, lines 3-8).

And while Chen does disclose that those of skill in the art will understand that any number of such communication devices may be included within the system 100 of the invention (see Chen, col 5, lines 24-29), he does not specifically disclose separate servers to perform steps of the disclosed method.

In an analogous art relating to a system for distributed computing wherein a group of computing devices cooperate to provide a specific service, Bisdikian discloses a distributed computing system wherein each server is responsible for some portion of the overall workload space (see Bisdikian, col 1, lines 42-43 and col 3, lines 6-12), thereby allowing the computational burden to be shared across multiple servers and reducing catastrophic single-point failures.

Therefore, it would have been obvious for a person having ordinary skill in the art to modify Chen's system to include the limitations as taught by Bisdikian for the advantage of allowing the computational burden to be shared, thereby reducing catastrophic single-point failures.

Regarding claim 2, Chen in view of Bisdikian discloses wherein the location tracking server detects the location via at least one selected from the group consisting of: GPS tracking (see Chen, col 8, lines 58-60).

Regarding claim 3, Chen discloses a system for detecting user exposure to media items (see Chen, Fig. 1), comprising:

a server (local servers 104/110, see Chen, Fig. 1 and col 5, lines 24-29), for receiving a plurality of reference media items from at least one media receiver (see Chen, col 6, lines 11-15 and col 14, lines 55-63);

receiving a representation of at least one target media item from at least one client device (see Chen, col 6, lines 11-15);

a stream store (database of local servers 104/110, see Chen, Fig. 1 and col 5, lines 24-29), coupled to the server (see Chen, Fig. 1), for storing a representation of at least a subset of the

received reference media items and for storing a representation of the at least one target media item (see Chen, col 6, lines 11-15 and col 16, lines 5-13);

identifying one of the reference media items as corresponding to the target media item (see Chen, col 16, lines 42-52 and col 17, lines 4-6);

an output device (see Chen, Fig. 1), for generating output signaling user exposure to the identified reference media item (see Chen, col 16, lines 42-52 and col 17, lines 4-6);

wherein the plurality of reference media items comprises at least one broadcast (see Chen, col 2, lines 12-20), and

wherein the representation of at least one target media item indicates user exposure at a time other than the time of the broadcast (Chen's submission of the sample itself indicates user exposure, see Chen, col 6, lines 11-15).

And while Chen does disclose that those of skill in the art will understand that any number of such communication devices may be included within the system 100 of the invention (see Chen, col 5, lines 24-29), he does not specifically disclose separate servers to perform steps of the disclosed method.

In an analogous art relating to a system for distributed computing wherein a group of computing devices cooperate to provide a specific service, Bisdikian discloses a distributed computing system wherein each server is responsible for some portion of the overall workload space (see Bisdikian, col 1, lines 42-43 and col 3, lines 6-12), thereby allowing the computational burden to be shared across multiple servers and reducing catastrophic single-point failures.

Therefore, it would have been obvious for a person having ordinary skill in the art to modify Chen's system to include the limitations as taught by Bisdikian for the advantage of allowing the computational burden to be shared, thereby reducing catastrophic single-point failures.

Regarding claim 6, Chen discloses a system for detecting user exposure to media items (see Chen, Fig. 1), comprising:

a server (local servers 104/110, see Chen, Fig. 1 and col 5, lines 24-29), for receiving a plurality of reference media items from at least one media receiver (see Chen, col 6, lines 11-15 and col 14, lines 55-63);

receiving a representation of at least one target media item from at least one client device (see Chen, col 6, lines 11-15);

a stream store (database of local servers 104/110, see Chen, Fig. 1 and col 5, lines 24-29), coupled to the server (see Chen, Fig. 1), for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item (see Chen, col 6, lines 11-15 and col 16, lines 5-13);

identifying one of the reference media items as corresponding to the target media item (see Chen, col 16, lines 42-52 and col 17, lines 4-6);

an output device (see Chen, Fig. 1), for generating output signaling user exposure to the identified reference media item (see Chen, col 16, lines 42-52 and col 17, lines 4-6); and

selecting, based on at least one of load and geographic proximity to the client device, one of the plurality of data signature stream collection servers to receive the representation of at least one target media item (see Chen, col 8, line 58 - col 9, line 2).

And while Chen does disclose that those of skill in the art will understand that any number of such communication devices may be included within the system 100 of the invention (see Chen, col 5, lines 24-29), he does not specifically disclose separate servers to perform steps of the disclosed method.

In an analogous art relating to a system for distributed computing wherein a group of computing devices cooperate to provide a specific service, Bisdikian discloses a distributed computing system wherein each server is responsible for some portion of the overall workload space (see Bisdikian, col 1, lines 42-43 and col 3, lines 6-12), thereby allowing the computational burden to be shared across multiple servers and reducing catastrophic single-point failures.

Therefore, it would have been obvious for a person having ordinary skill in the art to modify Chen's system to include the limitations as taught by Bisdikian for the advantage of allowing the computational burden to be shared, thereby reducing catastrophic single-point failures.

6. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (previously cited) in view of Bisdikian (previously cited) and Barton et al. (US20020072982, hereinafter Barton).

Regarding claim 4, Chen discloses a system for detecting user exposure to media items (see Chen, Fig. 1), comprising:

a server (local servers 104/110, see Chen, Fig. 1 and col 5, lines 24-29), for receiving a plurality of reference media items from at least one media receiver (see Chen, col 6, lines 11-15 and col 14, lines 55-63);

receiving a representation of at least one target media item from at least one client device (see Chen, col 6, lines 11-15);

a stream store (database of local servers 104/110, see Chen, Fig. 1 and col 5, lines 24-29), coupled to the server (see Chen, Fig. 1), for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item (see Chen, col 6, lines 11-15 and col 16, lines 5-13);

identifying one of the reference media items as corresponding to the target media item (see Chen, col 16, lines 42-52 and col 17, lines 4-6); and

an output device (see Chen, Fig. 1), for generating output signaling user exposure to the identified reference media item (see Chen, col 16, lines 42-52 and col 17, lines 4-6).

Chen does not specifically disclose a purchase tracking server, for receiving consumer purchasing information;

wherein the output device generates a report correlating user purchasing information with user exposure to the identified reference media item.

And while Chen does disclose that those of skill in the art will understand that any number of such communication devices may be included within the system 100 of the invention (see Chen, col 5, lines 24-29), he does not specifically disclose separate servers to perform steps of the disclosed method.

In an analogous art relating to a system for distributed computing wherein a group of computing devices cooperate to provide a specific service, Bisdikian discloses a distributed computing system wherein each server is responsible for some portion of the overall workload space (see Bisdikian, col 1, lines 42-43 and col 3, lines 6-12), thereby allowing the computational burden to be shared across multiple servers and reducing catastrophic single-point failures.

Therefore, it would have been obvious for a person having ordinary skill in the art to modify Chen's system to include the limitations as taught by Bisdikian for the advantage of allowing the computational burden to be shared, thereby reducing catastrophic single-point failures.

Chen in view of Bisdikian does not specifically disclose a purchase tracking server, for receiving consumer purchasing information;

wherein the output device generates a report correlating user purchasing information with user exposure to the identified reference media item.

In an analogous art, Barton discloses a purchase tracking server (see Barton, [0051], lines 14-17), for receiving consumer purchasing information (see Barton, [0046], lines 1-5 and [0051], lines 14-17);

wherein an output device generates a report correlating user purchasing information with user exposure to the identified reference media item (see Barton, [0051], lines 22-30 and [0052], lines 1-5).

It would have been obvious for a person having ordinary skill in the art at the time of the invention to modify the system of Chen in view of Bisdikian to include the limitations as taught

by Barton for the advantage of providing an improved, more efficient and more versatile method of content recognition.

Regarding claim 5, Chen in view of Bisdikian and Barton discloses wherein the purchase tracking server receives at least one indication of user use of a credit card (see Barton, [0043], lines 4-7).

7. Claims 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Percy et al. (US7038619, hereinafter Percy) in view of Chen (previously cited).

Regarding claim 7, Percy discloses a method for detecting user exposure to media items (see Percy, col 2, line 46 – col 3, line 10), comprising:

receiving a plurality of reference media items from at least one media source (the user/respondent receives the media items visually/audibly, etc., from the media displays 150, see Percy, col 7, lines 59-64);

for at least one client device (monitoring device 200, see Percy, col 7, lines 54-64):

selecting one of a plurality of data signature stream collection servers (download server 300/post-processing server 400, see Percy, col 7, lines 40-41); and

at the selected data signature stream collection server, receiving, from the client device:

a representation of at least one target media item (identifiers of the specific media displays, see Percy, col 17, lines 40-44);

an indication as to whether the client device is in the physical possession of a person at the time of exposure to the target media item (see Percy, col 12, line 50 – col 13, line 2, col 13, lines 14-27, col 15, lines 1-16 and col 16, lines 10-25); and

responsive to an indication that the client device is in the physical possession of a person at the time of exposure to the target media item (see Percy, col 18, lines 33-35, col 20, line 64 - col 21, line 11 and col 22, lines 43-49):

identifying one of the reference media items as corresponding to the target media item (see Percy, col 8, lines 7-12, col 18, lines 33-35 and col 20, line 64 - col 21, line 11); and

and generating output signaling user exposure to the identified reference media item (see Percy, Fig. 14 #1800-2100 and Figs. 18-21).

Percy does not specifically disclose selecting, based on at least one of load and geographic proximity to the client device, one of the servers.

In an analogous art relating to a system for presenting media and information to a user, Chen discloses selecting, based on at least one of load and geographic proximity to the client device, one of the servers (see Chen, col 8, line 64 – col 9, line 2).

It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the system of Percy to include the limitations as taught by Chen for the advantage of providing an improved system for measuring media exposure such that music and information may be delivered to a user, while accurate measurements of the user exposure to the media presentations may be obtained in a manner that reduces processing time.

Regarding claim 8, Percy in view of Chen discloses that responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target

media item, ignoring the representation of the at least one target media item from the client device (see Percy, col 22, lines 43-48 and col 23, lines 2-19).

Regarding claim 9, Percy in view of Chen discloses responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item: identifying one of the reference media items as corresponding to the target media item; and generating output signaling user exposure to the identified reference media item, wherein the output is flagged as having reduced reliability (Percy discloses that the information flagged as having a reduced reliability is saved for possible future use, but does not specifically disclose that it is output. However, outputting various collected data and information to a user is very common and well known in the art for the advantage of providing the user more complete and accurate results of a study. Therefore, the Examiner takes Official Notice that it would have been obvious to a person having ordinary skill in the art at the time of the invention to output the compiled data, with an indication of reduced reliability in order to provide the user with more accurate and complete results of the conducted study, see Percy, col 23, lines 15-20 and col 24, lines 64-67).

Regarding claim 10, Percy in view of Chen discloses wherein the indication as to whether the client device is in the physical possession of a person is provided based on output of at least one sensor associated with the client device (see Percy, col 12, line 50 – col 13, line 2, col 13, lines 14-27, col 15, lines 1-16 and col 16, lines 10-25).

Regarding claim 11, Percy in view of Chen discloses wherein the at least one sensor detects movement of the client device (see Percy, col 12, line 50 – col 13, line 2, col 13, lines 14-27, col 15, lines 1-16 and col 16, lines 10-25).

8. Claims 12-16 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Percy (previously cited) in view of Chen (previously cited) and Bisdikian (previously cited).

Regarding claims 12 and 21, Percy discloses system for detecting user exposure to media items (see Percy, col 2, line 46 – col 3, line 10), comprising:

at least one stream collection server servers (download server 300/post-processing server 400, see Percy, col 7, lines 40-41), for, receiving, from at least one client device: a representation of at least one target media item from at least one client device (identifiers of the specific media displays, see Percy, col 17, lines 40-44);

an indication as to whether the client device is in the physical possession of a person at a time of exposure to the target media item (see Percy, col 12, line 50 – col 13, line 2, col 13, lines 14-27, col 15, lines 1-16 and col 16, lines 10-25); and

a stream store (database of download server 300/post-processing server 400, see col 8, lines 7-12), coupled to the at least one stream collection server (database of download server 300/post-processing server 400, see col 8, lines 7-12), for:

storing a representation of at least a subset of the received reference media items (see Percy, col 8, lines 7-12); and

responsive to an indication that the client device is in the physical possession of a person

at the time of exposure to the target media item, storing a representation of the target media item (see Percy, col 18, lines 33-35, col 20, line 64 - col 21, line 11 and col 22, lines 43-49);

for each stored representation of a target media item, identifying one of the reference media items as corresponding to the target media item (see Percy, col 8, lines 7-12, col 18, lines 33-35 and col 20, line 64 - col 21, line 11); and

an output device, for, for each identified reference media item, generating output signaling user exposure to the identified reference media item (see Percy, Fig. 14 #1800-2100 and Figs. 18-21).

Percy does not specifically disclose a server, for receiving a plurality of reference media items from at least one media receiver; or separate servers to perform steps of the disclosed method.

In an analogous art, Chen discloses a server (local servers 104/110, see Chen, Fig. 1 and col 5, lines 24-29), for receiving a plurality of reference media items from at least one media receiver (see Chen, col 6, lines 11-15 and col 14, lines 55-63).

It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the system of Percy to include the limitations as taught by Chen for the advantage of providing an improved system for measuring media exposure such that music and information may be delivered to a user, while accurate measurements of the user exposure to the media presentations may be obtained in a manner that reduces processing time.

And while both Percy and Chen does disclose that those of skill in the art will understand that any number of such communication devices may be included within the system 100 of the invention (see Percy, col 7, lines 35-40 and Chen, col 5, lines 24-29), neither specifically discloses separate servers to perform steps of the disclosed method.

In an analogous art, Bisdikian discloses a distributed computing system wherein each server is responsible for some portion of the overall workload space (see Bisdikian, col 1, lines 42-43 and col 3, lines 6-12), thereby allowing the computational burden to be shared across multiple servers and reducing catastrophic single-point failures.

Therefore, it would have been obvious for a person having ordinary skill in the art to modify the system of Percy in view of Chen to include the limitations as taught by Bisdikian for the advantage of allowing the computational burden to be shared, thereby reducing catastrophic single-point failures.

Regarding claim 13, Percy in view of Chen and Bisdikian discloses wherein the stream store: responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item, ignores the representation of the target media item (see Percy, col 22, lines 43-48 and col 23, lines 2-19).

Regarding claim 14, wherein, Percy in view of Chen and Bisdikian discloses responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item: the stream store stores a representation of the target media item and an indication of reduced reliability of the stored representation; the correlator server identifies one of the reference media items as corresponding to the target media item; and the output device, generates output signaling user exposure to the identified reference media item and indicates reduced reliability of the indication of user exposure (Percy discloses that the information flagged as having a reduced reliability is saved for possible future use, but does not specifically disclose that it is output. However, outputting various collected data and information to a user is very common and well known in the art for the advantage of providing the user more

complete and accurate results of a study. Therefore, the Examiner takes Official Notice that it would have been obvious to a person having ordinary skill in the art at the time of the invention to output the compiled data, with an indication of reduced reliability in order to provide the user with more accurate and complete results of the conducted study, see Percy, col 23, lines 15-20 and col 24, lines 64-67).

Regarding claims 15 and 22, Percy in view of Chen and Bisdikian discloses wherein the indication as to whether the client device is in the physical possession of a person is provided based on output of at least one sensor associated with the client device (see Percy, col 12, line 50 – col 13, line 2, col 13, lines 14-27, col 15, lines 1-16 and col 16, lines 10-25).

Regarding claims 16 and 23, Percy in view of Chen and Bisdikian discloses wherein the at least one sensor detects movement of the client device (see Percy, col 12, line 50 – col 13, line 2, col 13, lines 14-27, col 15, lines 1-16 and col 16, lines 10-25).

9. Claims 17-18, 20 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (previously cited) in view of Barton (previously cited).

Regarding claims 17, 20 and 24-25, Chen discloses a system for measuring audience member exposure to media content (see Chen, Fig. 1), comprising:

an interface (see Chen, Fig. 1) for receiving a plurality of known media content (see Chen, col 6, lines 11-15 and col 14, lines 55-63) from at least one media broadcast (see Chen, col 2, lines 12-20);

a sample control processor (see Chen, Fig. 1 and col 5, lines 24-29) for receiving a representation of monitored media from at least one audience member monitoring device (see Chen, col 6, lines 11-15);

a content recognition system, coupled to the interface and to the sample control processor (see Chen, Fig. 1), for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media (see Chen, col 6, lines 11-15 and col 16, lines 5-13);

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media (see Chen, col 16, lines 42-52 and col 17, lines 4-6); and

an audience data processor for detecting a location of the audience member monitoring device (see Chen, col 8, lines 44-63);

wherein the audience data processor relates the detected location to retail traffic of an advertiser associated with the known media content (see Chen, col 9, lines 3-8).

Chen does not specifically disclose a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content.

In an analogous art, Barton discloses a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content (see Barton, [0138], lines 1-6).

It would have been obvious for a person having ordinary skill in the art at the time of the invention to modify Chen's system to include the limitations as taught by Barton for the

advantage of providing an improved, more efficient and more versatile method of content recognition

Regarding claim 18, Chen in view of Barton discloses wherein the audience data processor detects the location via GPS tracking (see Chen, col 8, lines 58-61).

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (previously cited) in view of Barton (previously cited) and Burges et al. (US20050086682, hereinafter Burges).

Regarding claim 19, Chen discloses a system for measuring audience member exposure to media content (see Chen, Fig. 1), comprising:

an interface (see Chen, Fig. 1) for receiving a plurality of known media content (see Chen, col 6, lines 11-15 and col 14, lines 55-63) from at least one media broadcast (see Chen, col 2, lines 12-20);

a sample control processor (see Chen, Fig. 1 and col 5, lines 24-29) for receiving a representation of monitored media from at least one audience member monitoring device (see Chen, col 6, lines 11-15); and

a content recognition system, coupled to the interface and to the sample control processor (see Chen, Fig. 1), for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media (see Chen, col 6, lines 11-15 and col 16, lines 5-13);

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media (see Chen, col 16, lines 42-52 and col 17, lines 4-6);

wherein the plurality of known media content comprises at least one broadcast (see Chen, col 2, lines 12-20).

Chen does not specifically disclose a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content,

wherein the representation of the monitored media indicates audience member exposure at a time other than the time of the broadcast.

In an analogous art, Barton discloses a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content (see Barton, [0138], lines 1-6).

It would have been obvious for a person having ordinary skill in the art at the time of the invention to modify Chen's system to include the limitations as taught by Barton for the advantage of providing an improved, more efficient and more versatile method of content recognition.

Chen in view of Barton does not specifically disclose wherein the representation of the monitored media indicates audience member exposure at a time other than the time of the broadcast.

In an analogous art, Burges discloses wherein the representation of the monitored media indicates audience member exposure at a time other than the time of the broadcast (Burges discloses that his media objects are stored with extra identification information, such as time

stamps indicating the date and time the object occurred in a media stream {see Burges, [0052], lines 10-16}. Therefore, the submitted sample of Chen in view of the Barton and Burges would include time stamp information, which would indicate when/if the user has been exposed to the media. Therefore, the limitations as claimed are met.

It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the system of Chen in view of Barton to include the limitations as taught by Burges for the advantage of providing an improved system for recognizing content and inferring extensive and comprehensive information about the content such that a user has more options for managing the content.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHENEA SMITH whose telephone number is (571)272-9524. The examiner can normally be reached on 8:00 am - 4:00 pm, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kristine Kincaid can be reached on 571-272-4063. 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.

/CHENEA SMITH/
Examiner, Art Unit 2421

/Seema S Rao/

Director, Technology Center 2400

Notice of References Cited	Application/Control No. 12/954,604	Applicant(s)/Patent Under Reexamination STEUER ET AL.	
	Examiner CHENEA SMITH	Art Unit 2421	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,444,353	10-2008	Chen et al.	1/1
*	B	US-7,779,415	08-2010	Bisdikian et al.	718/105
*	C	US-2002/0072982	06-2002	Barton et al.	705/26
*	D	US-7,038,619	05-2006	Percy et al.	342/357.52
*	E	US-2005/0086682	04-2005	Burges et al.	725/019
*	F	US-2006/0059277	03-2006	Zito et al.	710/015
	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					
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	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12954604	STEUER ET AL.
	Examiner	**Art Unit**
	CHENEA SMITH	2421

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/28/2012								
	1	✓								
	2	✓								
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	25	✓								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	31961	"725".clas.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 17:17
L2	7	((JONATHAN) near2 (STEUER)).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/28 17:18
L3	16	((CHRISTOPHER) near2 (OTTO)).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/28 17:18
L4	16	2 3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 17:18
L5	4534801	(collection near serv$3) (stream$1 near stor$3) ((gps rfid bluetooth) with track$3) ((consumer$1 customer$1 subscriber$1 user$1 viewer$1) with (purchas$3)) (user with expos$4) (track$3 near server$1) (expos$3 ad ads advertis$6)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 17:19
L6	8	4 and 5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 17:19
L7	14861	1 and 5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 17:21
L8	28691550	@ad<"20040527"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 17:21

L9	5880	7 and 8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 17:21
S1	1	12/954604.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 11:08
S2	1	S1 and (correlator with server$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 11:08
S3	51	("20020038456" | "20020059577" | "20020083060" | "4677466" | "7444353" | "20020161741" | "3919479" | "7483975" | "20040001161" | "20080154401" | "8131389" | "6990453" | "20020072982" | "4697209" | "5095382" | "6513161" | "5594934" | "5945988" | "5436653" | "20020010919" | "5437050" | "5512933" | "5758257" | "7038619").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:01
S4	20	correlator near server$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:01
S5	7	(correlat$4 correspond$3) with location$1 with sponsor$1 with (media video$1 audio$1 content$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:04
S6	1	S1 and ((collection near serv$3) (stream$1 near stor$3) ((gps rfid bluetooth) with track$3) ((consumer$1 customer$1 subscriber$1 user$1 viewer$1) with (purchas$3)) (user with expos$4) (track$3 near server$1) (expos$3 ad ads advertis$6))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:08
S7	1	S1 and (relat$3 with traffic$1 with retail$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:09

S8	133	(relat$3 with traffic$1 with retail$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:10
S9	4534801	((collection near serv$3) (stream$1 near stor$3) ((gps rfid bluetooth) with track$3) ((consumer$1 customer$1 subscriber$1 user$1 viewer$1) with (purchas$3)) (user with expos$4) (track$3 near server$1) (expos$3 ad ads advertis$6))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:10
S10	107	S8 and S9	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:10
S11	646	(relat$3 same traffic$1 same retail$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:12
S12	521	S9 and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:12
S13	4	S12 and zito.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:12
S14	2	"7623823".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:13
S15	2	11/216543.app.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:26
S16	1	12/954604.app.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2012/09/28 12:34

			EPO; JPO; DERWENT			
S17	2	"20020083060".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 12:38
S18	2	"20060059277".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 13:26
S19	0	S18 and (other with time)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 13:59
S20	0	S18 and (other same broadcast$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 14:00
S21	1	S18 and (indicat$4 with expos$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2012/09/28 14:15

EAST Search History (Interference)

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2423
Examiner Name	Koenig, Andrew Y.
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
	1	WO 2005/006768 A1	01-20-2005	Lee et al.		
	2	WO 2005/036877 A1	04-21-2005	Deng, Kevin		

Examiner Signature	/Chenea Smith/	Date Considered	09/28/2012

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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CONFIRMATION NO. 5737

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/954,604	11/24/2010	725	2421	10004-2000115

APPLICANTS

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Christopher W. Otto, Fremont, CA;

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

This application is a DIV of 11/139,330 05/26/2005 ABN
which claims benefit of 60/574,836 05/27/2004

**** FOREIGN APPLICATIONS ***************************

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12/14/2010

Foreign Priority claimed ❑ Yes ☑ No 35 USC 119(a-d) conditions met ❑ Yes ❑ No Verified and Acknowledged /CHENEA SMITH/ Examiner's Signature	❑ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		NY	7	25	12

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UNITED STATES

TITLE

Media Usage Monitoring and Measurement System and Method

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12954604	STEUER ET AL.
	Examiner	Art Unit
	CHENEA SMITH	2421

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
EAST search results included	9/28/2012 5:38:17 PM	CS
Inventor search included - see search results printout	9/28/2012 5:38:18 PM	CS
class search: 735.clas. - text search only, see search results printout	9/28/2012 5:38:20 PM	CS

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 3

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2447
Examiner Name	Not Yet Assigned
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	US- 3,919,479	11-11-1975	Moon et al.	
	2	US- 4,677,466	06-30-1987	Lert et al.	
	3	US- 4,697,209	09-29-1987	Kiewit et al.	
	4	US- 5,095,382	03-10-1992	Abe, Kesasku	
	5	US- 5,437,050	07-25-1995	Lamb et al.	
	6	US- 5,512,933	04-30-1996	Wheatley et al.	
	7	US- 5,594,934	01-14-1997	Lu et al.	
	8	US- 5,758,257	05-26-1998	Herz et al.	
	9	US- 5,945,988	08-31-1999	Williams et al.	
	10	US- 6,513,161 B2	01-28-2003	Wheeler et al.	
	11	US- 6,990,453 B2	06-27-2002	Wang	
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	14	US- 2002/0010919 A1	01-24-2002	Lu et al.	
	15	US- 2002/0038456	03-28-2002	Hansen et al.	
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	17	US- 2002/0072982 A1	06-13-2002	Barton et al.	
	18	US- 2002/0083060	06-27-2002	Wang et al.	
	19	US- 2002/0161741 A1	10-31-2002	Wang et al.	

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	20	WO 2002/27600 A2	04-04-2002	Shazam Entertainment, LTD	All	
	21	WO 2003/091990 A1	11-06-2003	Shazam Entertainment, LTD	All	
	22	WO 2004/040475 A2	05-13-2004	Koninklijke Philips N.V.	All	

Examiner Signature	/Chenea Smith/	Date Considered	09/28/2012

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 2 of 3

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2447
Examiner Name	Not Yet Assigned
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	23	US- 2003/0009469	01-09-2003	Platt et al.	
	24	US- 2004/0001161	01-01-2004	Herley, Cormac	
	25	US- 2004/0122679 A1	06-24-2004	Neuhauser et al.	
	26	US- 2004/0224638	11-11-2004	Fadell et al.	
	27	US- 2005/0086682	04-21-2005	Burges et al.	
	28	US- 2006/0059277 A1	03-16-2006	Zito et al.	
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FOREIGN PATENT DOCUMENTS

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

Examiner Signature	/Chenea Smith/	Date Considered	09/28/2012

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 3 of 3

	Complete if Known
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2447
Examiner Name	Not Yet Assigned
Attorney Docket Number	10004-2000115

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	29	Arbitron, "The Portable People Meter System," www.arbitron.com/protable_people_meters/ppm_system.htm, downloaded on April 25, 2005.	
	30	HEDGES, M. "New measurement devices raise new questions. Will we ever know who's listening?" www.followthemedia.com/number/devices01082004.htm, August 1, 2004.	
	31	Gertner, J. "Watching What You Watch," New York Times Magazine, April 10, 2005.	
	32	GFK AG, "Gfk unveils its multi-talented new MediaWatch," press release, June 14, 2004.	
	33	Nielsen Media Research, "Active/Passive Metering begins July 2004," August 6, 2003.	
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	35	Philips Research, "Audio Fingerprinting for automatic music recognition," brochure, www.content.identification.philips.com, downloaded March 9, 2005.	
	36	PINTO, A. "Mediawatch meters a complex mix of media, passively," www.Indiantelevision.com/headlines/y2k5/feb/feb177.htm, February 19, 2005.	

Examiner Signature	/Chenea Smith/	Date Considered	09/28/2012

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 1

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2426
Examiner Name	KAY, MARY ANNE
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	US- 8,131,389 B1	03-06-2012	Hardwick et al.	
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FOREIGN PATENT DOCUMENTS

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Examiner Signature	/Chenea Smith/	Date Considered	09/28/2012

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Sheet 1 of 1

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2423
Examiner Name	Koenig, Andrew Y.
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	US- 7,038,619 B2	05-02-2006	Percy et al.	
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Art Unit	2423
Examiner Name	Koenig, Andrew Y.
Attorney Docket Number	10004-2000115

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	1	US- 5,436,653	07-1995	Ellis et al.	
	2	US- 2004/0001161	01-2004	Herley, Cormac	
	3	US- 2002/0072982	06-2002	Barton et al.	
	4	US- 2008/0154401 A1	06-2008	Wang, Avery Li-Chun	
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	5	WO 2005036877 A1	04-2005	Deng, Kevin		
	6	WO 2005006768 A1	01-2005	Lee et al.		

Examiner Signature	/Chenea Smith/	Date Considered	09/28/2012

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Sheet 1 of 1

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Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2421
Examiner Name	Smith, Chenea
Attorney Docket Number	10004-2000115

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	1	US- 2007/0143777 A1	06-21-2007	Wang	
	2	US- 2004/0055445 A1	03-25-2004	Iyoku et al.	
	3	US- 2003/0177488 A1	09-18-2003	Smith et al.	
	4	US- 7,634,787 B1	12-15-2009	Gebhardt et al.	
	5	US- 5,404,161	04-04-1995	Douglass et al.	
	6	US- 5,844,938	12-01-1998	Hupp et al.	
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Electronic Acknowledgement Receipt	
EFS ID:	14325391
Application Number:	12954604
International Application Number:	
Confirmation Number:	5737
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Customer Number:	51417
Filer:	Michael John Mauriel/Jasmine Habbas
Filer Authorized By:	Michael John Mauriel
Attorney Docket Number:	10004-2000115
Receipt Date:	28-NOV-2012
Filing Date:	24-NOV-2010
Time Stamp:	12:40:27
Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		100042000115_IDS.pdf	176691 1460e7a34f9175103766ffdc4676843a2f9b2b24	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	4
	Information Disclosure Statement (IDS) Form (SB08)	5	5
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PATENT
Docket No. 10004-2000115

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:	Examiner: Smith, Chenea
Jonathan S. Steuer et al.	Group Art Unit: 2421
Serial No.: 12/954,604	
Filing Date: November 24, 2010	
For: MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD	

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97 & § 1.98

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

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- ☐ The fee set forth in 37 CFR 1.17p is paid herewith.
- ☐ A Certification under 37 C.F.R. § 1.97(e) is provided below; accordingly, no fee is believed to be due.
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  - ☐ no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign

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Dated: November 28, 2012

Respectfully submitted,

By: _____
Michael Mauriel
Reg. No. 44,226

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PTO/SB/08a (07-09)
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(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2426
Examiner Name	KAY, MARY ANNE
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	US- 8,131,389 B1	03-06-2012	Hardwick et al.	
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Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]

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Electronic Acknowledgement Receipt	
EFS ID:	13050934
Application Number:	12954604
International Application Number:	
Confirmation Number:	5737
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Customer Number:	51417
Filer:	Michael John Mauriel/Jasmine Habbas
Filer Authorized By:	Michael John Mauriel
Attorney Docket Number:	10004-2000115
Receipt Date:	19-JUN-2012
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		100042000115_IDS.pdf	170640 f71fa4eaf4b865daeabbea69157aa5bb6b076b24	yes	5

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	Document Description	**Start**	**End**
	Transmittal Letter	1	4
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PATENT
Docket No. 10004-2000115

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:	Examiner: KAY, MARY ANNE
Jonathan S. Steuer et al.	Group Art Unit: 2426
Serial No.: 12/954,604	
Filing Date: November 24, 2010	
For: MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD	

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97 & § 1.98

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Dated: June 19, 2012

Respectfully submitted,

By: _____

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 1

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2423
Examiner Name	Koenig, Andrew Y.
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	US- 5,436,653	07-1995	Ellis et al.	
	2	US- 2004/0001161	01-2004	Herley, Cormac	
	3	US- 2002/0072982	06-2002	Barton et al.	
	4	US- 2008/0154401 A1	06-2008	Wang, Avery Li-Chun	
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
	5	WO 2005036877 A1	04-2005	Deng, Kevin		
	6	WO 2005006768 A1	01-2005	Lee et al.		

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(71) Applicant *(for all designated States except US)*: **NIELSEN MEDIA RESEARCH, INC.** [US/US]; 150 N. Martingale Road, Schaumburg, IL 60173 (US).

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(75) Inventor/Applicant *(for US only)*: **DENG, Kevin** [US/US]; 2106 Gull Lane, Safety Harbor, FL 34695 (US).

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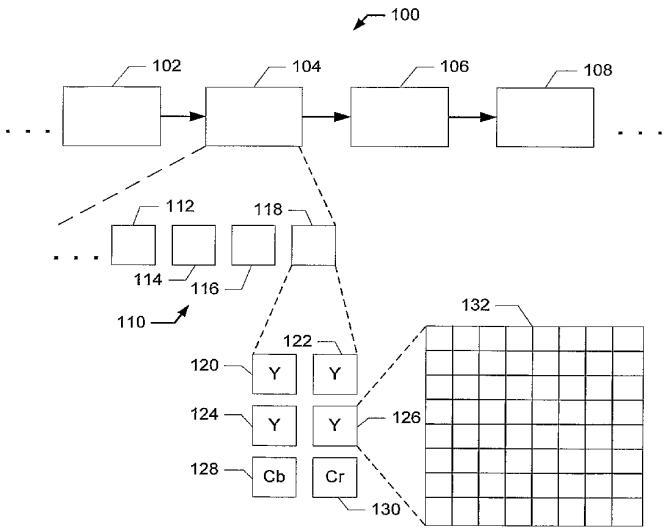
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: DIGITAL VIDEO SIGNATURE APPARATUS AND METHODS FOR USE WITH VIDEO PROGRAM IDENTIFICATION SYSTEMS



(57) Abstract: Digital video signature apparatus and methods for use with video program identification systems are disclosed. The disclosed apparatus and methods identify a video program using a sequence of signatures (100). Each of the signatures includes a set of centroids corresponding to one of a plurality of frames of the video program. The apparatus and methods compare the sequence of signatures to a set of reference sequences of signatures and identify the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures.

WO 2005/036877 A1

DIGITAL VIDEO SIGNATURE APPARATUS AND METHODS FOR USE WITH VIDEO PROGRAM IDENTIFICATION SYSTEMS

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates generally to identifying digital video information and, more specifically, to digital video signature apparatus and methods for use with video program identification systems.

BACKGROUND

[0002] Systems that identify video images and/or sequences of video images (e.g., television commercials or programs) being broadcast and/or viewed on an output device (e.g., a television or video monitor) are often used to verify that certain audio and/or video content or programs (e.g., television programs, advertisements, etc.) have been broadcast in particular geographic regions at particular times. Of course, such video identification system may additionally or alternatively be used to facilitate the analysis of viewing behaviors of selected groups of viewers. Some video identification systems identify programs by extracting audio and/or video information associated with a program currently being broadcast and/or viewed and processing that extracted information to generate audio and/or video signatures. Typically, the audio and/or video signatures are digital sequences or codes that, at a given instant of time, are substantially unique to each portion of audio/video content or program. In this manner, an unidentified video program can be reliably identified by finding a matching signature within a database or library containing the signatures of known available programs. When a matching signature is found, the previously unidentified audio/video content (e.g., television program, advertisement, etc.) is identified as the

one of the known available programs corresponding to the matching database signature.

[0003] Video signatures may be generated for analog and/or digital video programs. Some known video signature generation techniques for use with digital video program information process some or all of the uncompressed image data for one or more video frames to generate one or more signatures for the video program associated with the video frames. However, using uncompressed video data to generate signature information usually requires expensive high-speed signature generation hardware or circuitry, or software/processor-based signature generation techniques that result in relatively slow signature generation rates. For some applications, such as, for example, television audience viewing behavior analysis or other program verification or identification systems that use data acquisition and signature generation devices, high speed hardware-based video signature generation systems are cost prohibitive. In addition, many software-based signature generation systems are too slow and may miss important verification and/or viewing information such as, for example, relatively short television commercials or the like.

[0004] In some software-based systems, the speed at which video signatures are generated may be increased by using less video information (e.g., fewer frames, smaller portions of each frame, etc.) to generate the signature information. However, the use of less information usually results in a signature that is less likely to uniquely represent the associated video content, thereby resulting in an increased false match rate (i.e., incorrectly identifying a video program) and an increased failure to find a match when a match exists (i.e., the failure to identify a known video program).

[0005] Still further, the video signature generation systems used with many video program identification systems are not independent of image format or encoder

operation. For example, changing the display aspect ratio (e.g., from 4:3 to 16:9) for a video program may significantly change the video signature information generated therefrom. As a result, while these known systems may be able to reliably identify a group of known images/frames and, thus, known programs when formatted for a 4:3 aspect ratio display, these same systems may fail to identify any of those known programs when formatted using a different aspect ratio. Similarly, many of these known systems are also sensitive to video program frame rate (e.g., the number of frames per second that compose a video program). For example, while many known systems may be able to reliably identify video programs that are composed of frames or images that are to be displayed at a rate of thirty frames per second, those same systems may be unable to identify those same programs when composed of more or fewer frames or images per second.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Fig. 1 depicts an example sequence of compressed digital video images or frames that may be associated with a digital television program.

[0007] Fig. 2 is a block diagram of an example system that may employ the example digital video signature generation apparatus and methods described herein to identify video programs.

[0008] Fig. 3 is a more detailed block diagram of an example manner in which the data acquisition unit shown in Fig. 2 may be implemented.

[0009] Fig. 4 is an example processor-based system that executes software or instructions stored on a machine readable medium to implement the example data acquisition unit shown in Fig. 2 with the blocks shown in Fig. 3.

[0010] Fig. 5 is flow diagram depicting one manner in which the processor-based system shown in Fig. 4 may be programmed to implement the example data acquisition unit shown in Fig. 3.

[0011] Fig. 6 is an example of an image or frame for which a signature can be generated using a center of mass or centroid calculation.

[0012] Fig. 7 depicts an example image or frame in which image components are distributed in a non-uniform manner.

[0013] Fig. 8 depicts an example image in which a centroid is located within a shape boundary.

[0014] Figs. 9 and 10 depict example images or frames in which centroids are not located within the boundary of the shapes therein.

[0015] Figs. 11 and 12 are example images or frames that contain relatively symmetric distributions of a particular image component.

[0016] Fig. 13 depicts an example frame or image that contains three identical elliptical shapes composed of the same image component.

[0017] Figs. 14 and 15 depict an example method that may be implemented by the system shown in Fig. 2 to identify video programs.

DETAILED DESCRIPTION

[0018] The example video signature methods and apparatus disclosed herein can be used to generate signature information for a sequence of images or frames composed of compressed digital video information. The generated signature information may subsequently be compared to reference signature information to identify a video program from which the sequence of images or frames originated. However, before discussing the example video signature apparatus and methods in

detail, a brief discussion relating to digital video signal compression is provided below.

[0019] The following discussion is based primarily on the Moving Pictures Expert Group (MPEG) video compression standard. The MPEG standard is one particularly well-known digital video compression standard that may be used in conjunction with the example signature generation methods and apparatus described herein. However, MPEG video compression techniques are only one particular manner in which digital video information may be compressed prior to its use with the example signature generation methods and apparatus disclosed herein. Those having ordinary skill in the art will appreciate that the example video signature apparatus and methods disclosed herein may be similarly applied in conjunction with other digital video compression schemes.

[0020] In general, video compression schemes operate based on the assumption that video sequences or programs typically contain a relatively large amount of temporally and/or spatially redundant information. Temporal redundancy occurs between successive frames or images making up a video sequence because there are relatively few changes to the color and brightness of large portions of the successive images or frames making up the video sequence. On the other hand, spatial redundancy occurs within a given video frame or image because adjacent pixels or areas within an image or frame are often of the same or similar color and intensity or brightness. Thus, by eliminating temporally and spatially redundant video information from a video program prior to its transmission, the amount of bandwidth required to transmit the video program can be reduced dramatically.

[0021] The data reduction achieved by a compression scheme is commonly expressed as a compression ratio. Compression ratios are usually calculated by

dividing the amount of video data making up an original sequence of video images by the amount of compressed data used to transmit that video data. Compression ratios of between about 8:1 and about 30:1 are commonly achieved using an MPEG-based video compression scheme.

[0022] Video compression schemes also typically eliminate certain types and amounts of video information that are not necessarily redundant and which may be eliminated without being perceptibly noticeable or offensive to the human eye. For example, the human eye is significantly more sensitive to variations in brightness than variations in color or hue. As a result, as described below, video compression schemes often reduce the amount of digital information pertaining to color or hue without adversely impacting the perceived quality of an image extracted from compressed image information. In addition, the human eye has greater difficulty perceiving rapid variation of brightness and/or color, shade or hue across an image (i.e., the higher frequency components that compose an image). As a result, as described below, video compression schemes can zero-out and/or eliminate the transmission or processing of the higher frequency components of an image without adversely impacting the perceived quality of the image.

[0023] Fig. 1 depicts an example sequence 100 of digital video images or frames 102, 104, 106 and 108 that may be associated with a digital television program or the like. The images or frames 102-108 may make up a group of pictures (GOP) for purposes of MPEG encoding (i.e., compression) to be transmitted, stored or otherwise conveyed for use by an MPEG decoder associated with an output device (e.g., a television, video monitor, computer screen, etc.)

[0024] Initially, each of the images or frames 102-108 is composed of uncompressed digital information representing display pixels arranged in a plurality

of rows and columns to be displayed on an output device in a particular format at a particular rate. For example, each of the frames 102-108 may contain sufficient pixel information to display images or frames on a raster scan-based display having 480 rows or lines of 720 pixels (i.e., columns) at a rate of 30 frames per second. Of course, many other display formats and rates could be used instead.

[0025] The amount of digital data required to represent each pixel within each of the frames or images 102-108 depends on the color model used to create the images 102-108. For example, in the case where the well-known Red, Green, Blue (RGB) color model is used, eight bits are used to represent the amount of each image or color component used for each pixel. Thus, for a digital image generated using the RGB color model, a total of twenty-four bits of data are required to represent each pixel.

[0026] During the MPEG compression processes, each of the images or frames 102-108 is ultimately sub-divided into a sequence of macro blocks, each of which is composed of 16x16 pixels (i.e., sixteen rows of sixteen pixels). The resulting sequences of macro blocks are maintained in a raster scan order. By way of example, the image or frame 104 is sub-divided into a sequence of macro blocks 110 that is composed of at least macro blocks 112, 114, 116 and 118, each of which includes RGB data for 16x16 or 256 pixels.

[0027] The MPEG compression process converts the RGB data (i.e., the twenty-four bits of information) for each pixel within the macro blocks 112-118 into the well-known YUV color model. In general, the YUV color model represents each pixel using a luminance value denoted as Y and two chrominance values denoted as Cr and Cb. However, because the human eye is significantly less sensitive to color changes, the MPEG compression process decimates the chrominance information for each of the macro blocks via a horizontal and vertical (i.e., row and column) sub-sampling

process. In particular, the decimation process averages the chrominance information (i.e., the Cr and Cb values) for groups of four pixels arranged in two rows and two columns, discards the individual chrominance values making up the averages and retains the average values. In this manner, the MPEG compression process compresses the chrominance information required to display an image by a factor of four without adversely affecting the perceptible quality of the image when displayed to a human.

[0028] By way of example, following the color model conversion and chrominance decimation processes, the macro block 118 includes four 8x8 luminance blocks 120, 122, 124 and 126 and two 8x8 chrominance blocks 128 and 130, together representing the color and intensity of the group of 16x16 pixels associated with the macro block 118. Each of the blocks 120-130 is composed of eight rows and eight columns of eight bit values (i.e., bytes). For example, the luminance block 126 is composed of a grid 132 where each of the squares of the grid 132 represents an eight bit luminance value associated with a particular pixel within the macro block 118. Of course, because the chrominance information has been decimated as described above, each of the eight bit values within the 8x8 chrominance blocks 128 and 130 represents the average color information for a group of four pixels associated with the macro block 118.

[0029] After converting the color model and decimating the chrominance information, the MPEG compression scheme processes the images or frames 102-108, which are now represented using the decimated YUV data, to eliminate or reduce temporal redundancy. The MPEG compression scheme uses motion-compensated inter-frame prediction to reduce the amount of data required to regenerate a sequence of video frames. In general, the MPEG compression scheme periodically generates

reference frames (known as Intra-frames or I-frames) that are essentially still video images that can be regenerated (i.e., displayed) without reference to any other frames or images. A series of video frames preceding and/or following a reference frame or I-frame are either Predictive-frames (commonly known as P-frames) or Bidirectionally predictive-frames (commonly known as B-frames). P-frames contain motion vectors and error information relating the P-frame to an I-frame or to a preceding P-frame, while B-frames contain motion vectors and error information relating to preceding and/or subsequent I-frames or P-frames. Because substantial portions (e.g., a background) of a video image typically do not change significantly (or at all) from one frame to the next (i.e., there is a significant amount of temporal redundancy), the amount of information needed to represent each P-frame and B-frame can be significantly less than the amount of information needed to represent an I-frame.

[0030] During an MPEG compression process, each of the frames or images 102-108 making up the video sequence 100 are designated by the MPEG encoder as one of an I-frame, a P-frame or a B-frame. The relatively complex manner in which the MPEG compression process designates frames as I-frames, P-frames and B-frames is well-known in the art and is not described in further detail herein. However, for purposes of understanding the example video signature generation apparatus and methods disclosed herein, it should be recognized that the creation of P-frames and B-frames occurs on a block-by-block basis (i.e., one macro block at a time). As a result, if during the MPEG compression process it is recognized that predicting a particular macro block within a P-frame or a B-frame will not improve compression, that particular macro block will be intra-coded (i.e., not predicted but, rather, fully

described using actual luminance and chrominance data that can be directly converted for display purposes).

[0031] Once the MPEG compression process has reduced or eliminated temporally redundant inter-frame information by converting a sequence of video images into a sequence of I-frames, P-frames and B-frames, the MPEG compression scheme processes these frames to remove spatial redundancy. The MPEG compression scheme recognizes that within a given 16x16 pixel macro block there is typically a repeatable pattern of pixel information and/or the pixel information does not vary significantly (e.g., perceptibly) across the macro block.

[0032] To eliminate the spatially redundant information, the MPEG compression scheme uses a discrete cosine transform (DCT) to convert each of the 8x8 blocks making up the macro blocks of the I-frames, P-frames and B-frames from the spatial domain into the frequency domain. In the spatial domain, each square (i.e., byte) within an 8x8 block corresponds to a physical pixel location, whereas in the frequency domain, each square within the 8x8 block produced by the DCT conversion corresponds to a frequency of a cosine waveform. Because there is typically very little variation in intensity and color across a 16x16 pixel macro block, most macro blocks can be represented in the frequency domain using a direct current (DC) component (i.e., a zero frequency component or offset) and few, if any, low frequency components. As is well known, the DCT of an 8x8 block of spatial pixel information (e.g., an 8x8 block of luminance information where each square within the block represents an eight bit value associated with a physical pixel location) results in an 8x8 block of frequency domain information, where each square contains an amplitude coefficient for a cosine waveform of a particular frequency. The upper left corner of the frequency domain block is a DC value (e.g., the average luminance for the 8x8

spatial domain block), and the horizontal frequency increases moving across rows to the right of the upper left corner and the vertical frequency increases moving down columns. As described in greater detail below, the upper left corner of the frequency domain block (i.e., the DC coefficient value) also represents the value associated with the pixel in the upper left corner of the block in the spatial domain. However, frequency coefficients within the frequency domain block other than the DC coefficient do not correspond identically to pixel values in the spatial domain. Thus, in general, if spatial or pixel value information is needed for a given block, a conversion of the frequency domain block to spatial domain is required.

[0033] In practice, performing a DCT and quantization on each of the 8x8 blocks results in frequency domain blocks having relatively few coefficient values near the upper left corner of the 8x8 frequency domain blocks and a relatively large number of zero value or same value coefficients in the majority of the squares making up the remainders of the blocks. By using a run-length encoding scheme and not individually transmitting the coefficients having the same value (e.g., coefficients having a value of zero), the MPEG compression process can substantially reduce the amount of data needed to reconstitute the compressed image without perceptibly degrading the image quality.

[0034] To illustrate the manner in which spatially redundant information can be eliminated, consider an 8x8 block of pixel luminance information such as, for example, the block 126 of Fig. 1. If the luminance is constant (e.g., a digital value of 128) across the block 126, each of the luminance values associated with the 64 squares making up the grid 132 will contain the value 128. Performing a DCT on such an 8x8 block will result in an 8x8 block in which the upper left corner square contains the DC value 128 and all other squares or frequency domain coefficients are

equal to zero. Thus, in the frequency domain, only a single value needs to be used (and transmitted) to represent the luminance values for all of the pixels associated with the original 8x8 spatial domain block. In other words, 63 eight bit luminance values do not have to be transmitted and processed by an MPEG decoder. Instead, using a run-length encoding scheme, a single value (i.e., 128) may be transmitted and a run length of 63, (indicating 63 zeros), may be transmitted to the MPEG decoder.

[0035] In general, the MPEG compression process achieves relatively high compression ratios by employing techniques such as, for example, frequency coefficient quantization (e.g., reducing the number of bits needed or allocated for each frequency domain coefficient), and zigzag sequence coding in conjunction with run-length encoding to eliminate the individual transmission of coefficients having the same value. However, such techniques are well-known in the art and, thus, are not discussed further herein.

[0036] Fig. 2 is a block diagram of an example system 200 that may employ the example digital video signature generation apparatus and methods described herein to identify video programs. The system 200 includes a demodulator 202 that receives a digital program data stream 204. The digital program data stream 204 may be a multi-program data stream that is broadcast via any desired method. For example, the digital program data stream 204 may be a multi-program digital television data stream that is broadcast using any desired combination of wireless communication links such as, for example, satellite communication links, cellular communication links, or other wireless terrestrial communication links. Alternatively or additionally, the digital program data stream 204 may be transmitted via any desired combination of hardwired communication paths including cables, phone lines, etc.

[0037] For purposes of the following discussion, the example digital program data stream 204 is assumed to include one or more digital video programs that have been compressed and formatted according to the MPEG standard as described by way of example in connection with Fig. 1. The MPEG packets making up the video frame or image information for each of the digital video programs may be encapsulated using any desired transport protocol.

[0038] The demodulator 202 may extract a base band signal containing a multi-program digital data stream and a transport circuit for reconstructing data packets associated with a desired program from the digital program data stream 204. When the demodulator 202 is tuned to a particular channel, it reconstructs the MPEG data packets from the digital program data stream 204 that corresponds to the selected program.

[0039] The system 200 also includes a data acquisition unit 206 that is coupled to the demodulator 202. The data acquisition unit 206 selects compressed digital video information 208 (e.g., MPEG I-frames, P-frames and B-frames) associated with a video program currently output by the demodulator 202. As described in greater detail below, the data acquisition unit 206 selects frames or images from the compressed digital video information 208 that are substantially intra-coded (i.e., frames or images containing a substantial percentage of intra-coded macro blocks) and generates signature information for the video program based on those substantially intra-coded frames or images. More specifically, the data acquisition unit 206 extracts scaled image information (e.g., by extracting the DC coefficient information) from the selected substantially intra-coded frequency domain blocks and uses the scaled image information to calculate center of mass or centroid information for each of the brightness and color components for each of a series of the

substantially intra-coded images or frames. Each of the images or frames may also be recursively sub-divided into a plurality of sub-regions or areas and center of mass information may be similarly generated for each of the sub-regions or areas. In any event, each substantially intra-coded frame or image can be substantially uniquely represented by a signature composed of a plurality of centers of mass or centroid values associated with the components (e.g., colors, brightness, etc.) of the overall image or frame and any defined sub-regions or areas of the image or frame.

[0040] The data acquisition unit 206 is communicatively coupled to a central processing unit 210 via a communication link 212. The communication link 212 may be implemented using any desired combination of hardwired and wireless communication links and any desired combination of communication protocols or schemes. For example, the communication link 212 may be implemented as a local area network, or any other network, and/or may include the use of phone lines, a packet switched network such as, for example, the Internet, or any other types of communication links.

[0041] The central processing unit 210 also includes a non-volatile memory or mass storage device 214. The memory or mass storage device 214 may be implemented using, for example, a disk drive that stores digital information using a magnetic or optical media. Additionally or alternatively, the memory or mass storage device 214 may be implemented using an electrically erasable programmable read only memory (EEPROM) or the like. Although not shown in Fig. 2, additional data acquisition units similar or identical to the data acquisition unit 206 may be communicatively coupled to the central processing unit 210.

[0042] The data acquisition unit 206 sends signatures generated (as generally set forth above) in connection with a sequence of video images or frames associated with

a currently selected video program to the central processing unit 210 via the communication link 212. The central processing unit 210 is configured to compare the sequence of signatures received from the data acquisition unit 206 to a plurality of known or reference signatures that are associated with known video programs and which are stored within a data structure (e.g., a table) within the non-volatile memory 214. In the event that the central processing unit 210 determines that a signature sequence received from the data acquisition unit 206 matches or substantially matches a reference signature sequence associated with a known video program, the central processing unit 210 identifies the video program selected by the demodulator 202.

[0043] The demodulator 202 and the data acquisition unit 206 may be located within a private home or other residence or, alternatively, may be located within a business facility or any other structure. Preferably, the system 200 is located so that the broadcast signals that are to be consumed and/or verified can be easily detected and received. Of course, other such decoders and data acquisition units (none of which are shown) may be similarly located within other locations and communicatively coupled to the central processing unit 210 via the communication link 212 and/or via other communication links (none of which are shown). In this manner, statistically significant viewing behavior and/or program verification information for a designated population of persons or geographic area may be ascertained by the central processing unit 210.

[0044] The system 200 may further include a central facility 216 that communicates with the central processing unit 210 via a communication link 218, which may be implemented using a wide area network including phone lines, wireless communications and/or any other desired communication media and/or protocols. The link 218 may be implemented using a wide area network including phone lines,

wireless communications and/or any other desired communication media and/or protocols. The central facility 216 may process signature information and/or other program-related information received from the central processing unit 210 and/or other processing units (none of which are shown). For example, in the event that the central processing unit 210 fails to identify a program, video clip, etc., using signature information, that signature information and the associated video clip may be conveyed to the central facility 216 via the link 218. At the central facility 216 the signature information may be compared to signatures stored within a library of signatures within (or at least accessible to) the central facility 216. Such a signature library may be complied by receiving signature information from a variety of sources such as, for example, other central processing units (not shown) and/or data acquisition units (not shown). Additionally or alternatively, if the signature information received by the central facility 216 does not match any of the signature information already present in the library accessible to or within the central facility 216, the program, video clip, etc. associated with the signature information is viewed and identified by a human operator. The human operator may then add a signature for that program, video clip, etc. to the signature library.

[0045] While the data acquisition unit 206 is shown in Fig. 2 as a separate structure, the functions of the data acquisition unit 206 may instead be integrated within the demodulator 202 or the central data processing unit 210. Alternatively, the functions of the data acquisition unit 206 could be distributed between the demodulator 202, the central processing unit 210 and/or other similar or identical units within or at least accessible by the system 200.

[0046] Fig. 3 is a more detailed block diagram of an example manner in which the data acquisition unit 206 shown in Fig. 2 may be implemented. As shown in Fig. 3,

the example data acquisition unit 206 includes a frame scanner 300 that receives the compressed digital video information 208, which contains frequency domain image information, and scans the individual images or frames (i.e., I-frames, P-frames, B-frames, etc.) therein to determine, for each image or frame, whether that image or frame contains a sufficient quantity of intra-coded macro blocks for subsequent processing by the remaining functional blocks of the data acquisition unit 206. As described in greater detail in connection with Fig. 4 below, the frame scanner 300 selects frames or images having a relatively high percentage of intra-coded macro blocks to enable the data acquisition unit 206 to generate signature information for those selected images or frames using a relatively small amount of processor time (i.e., processing cost or overhead). As noted above, in contrast to predictive macro blocks (e.g., P-blocks and B-blocks) intra-coded macro blocks may be converted to image information without having to perform complex time consuming calculations involving macro block information from future or subsequent frames or images. Accordingly, by selecting images or frames having a relatively high percentage of intra-coded blocks, the data acquisition unit 206 can generate signatures rapidly and with minimal error for those selected images or frames using only the intra-coded blocks. Ignoring the non-intra-coded blocks does not significantly affect the signature for an image or frame that is composed of a relatively large percentage of intra-coded macro blocks. I-frames are always sufficiently intra-coded and P-frames and B-frames may be sufficiently intra-coded depending on the amount of intra-coded macro blocks that are used to generate these frames.

[0047] Frames having a sufficient percentage of intra-coded macro blocks are passed to an intra-coded block extractor 302. The intra-coded block extractor 302 extracts intra-coded macro blocks from a selected frame or image, which may be an I-

frame or a predictive frame (e.g., P-frame or B-frame) having a relatively high percentage of intra-coded macro blocks.

[0048] A scaled image extractor 304 receives the intra-coded blocks extracted from a selected frame or image and extracts a downscaled image, for example, by extracting DC coefficients (i.e., the upper left corner values) from the intra-coded blocks. As noted above, when conveyed using the MPEG compression process, the macro blocks making up an image or frame are passed through a DCT conversion and quantization that provides spatially compressed frequency domain macro block information. Of course, a downscaled image may be formed using other combinations of frequency coefficients. For example, the DC coefficients and coefficients associated with one or more other frequency components, such as coefficients in the upper left corner of macro blocks, may be extracted. However, in contrast to a case where only DC coefficients are extracted, the scaled image extractor 304 generates the downscaled image by converting the frequency domain blocks to spatial domain pixel information. Thus, in general, the scaled image extractor 304 extracts downscaled images by extracting a subset of the frequency coefficients available in each intra-coded frame provided by the intra-coded block extractor 302, thereby substantially reducing the amount of information that has to be processed to generate signature information, and convert that frequency domain information to spatial domain pixel information. Of course, in the case where only DC coefficients are extracted, the conversion of frequency domain information to spatial domain information is not necessary (and may be eliminated) because the DC coefficients in the frequency domain also correspond to pixel values (i.e., the upper left pixels in blocks) in the spatial domain. In any event, the scaled image extractor 304 extracts the downscaled image information (e.g., the average luminance and chrominance

values in the case where DC coefficients are extracted) from the intra-coded macro blocks and passes those downscaled images to a padding remover 306. The number of frequency coefficients used to form the downscaled image may be based on the resolution of the image being downscaled. In particular, high resolution images may be downscaled using only DC coefficients, whereas, lower resolution images may require the extraction of a plurality of frequency coefficients from each frequency domain block to form the downscaled image. In general, the higher the resolution the image being downscaled, the fewer the number of frequency coefficients that are required to form a downscaled image suitable for signature generation purposes.

[0049] The padding remover 306 removes coefficients that are associated with padded image or frame areas. As is known, digital video images or frames may be padded (i.e., filled with known video information) to completely fill the display area of a video frame or image. In this manner, border areas of a displayed image or frame for which image information may not exist, can be filled with a consistent color and/or intensity to provide a visually acceptable border. For example, display areas for which image information is not available may be filled with a dark or gray border as opposed to allowing noise or other random video information to be displayed in these display areas. In particular, if a 4:3 aspect ratio image is to be displayed without resizing or zooming on a 16:9 aspect ratio output unit, padding is added to the image so that the left and right sides of the displayed image are flanked by solid colored borders or bands. In any event, such padding is not a part of the original image and is typically a function of the particular encoder.

[0050] After padding has been removed from the downscaled image information, the scaled image information is provided to a signature generator 308. As described in greater detail below, the signature generator 308 uses the extracted scaled image

information to generate image signatures based on the centers of mass or centroids of the various color and brightness components of an overall image and sub-images or areas defined within that overall image. In this manner, each image can be described by a signature composed of a set of centroid coordinates that is substantially uniquely characteristic of the distribution of color and brightness within that image. Further, a series of such signatures associated with a series or sequence of video frames or images can be used to uniquely represent and/or identify a video program from which the video frames or images were extracted.

[0051] Signature information 310, which is a sequence of signatures of frames or images associated with and uniquely representative of a selected video program, is conveyed to, for example, the central processing unit 210 (Fig. 2). As described in greater detail below, the central processing unit 210 is configured to compare the received signature information 310 to reference signature information (e.g., sets of signature sequences representative of known video programs) to determine the identity of a video program currently selected by the demodulator 202 (Fig. 2).

[0052] Fig. 4 is an example processor-based system 400 that executes software or firmware instructions stored on a machine readable medium to implement the data acquisition unit 206 (Fig. 2). The example processor-based system 400 includes a processor 402, which may be any suitable microprocessor such as, for example, a processor from the Intel Pentium® family of microprocessors. The processor 402 may be communicatively coupled to a non-volatile memory 404 and a volatile memory 406. The non-volatile memory 404 may be implemented using, for example, electrically erasable programmable read only memory (EEPROM), read only memory (ROM), etc. The volatile memory 406 may be implemented using, for example, static random access memory (SRAM), dynamic random access memory (DRAM), etc.

The processor 402 may also be coupled to a mass storage device 408, which may be implemented using, for example, a disk drive that stores digital information using a magnetic or optical media.

[0053] The processor 402 can retrieve and execute machine readable instructions or software programs that are stored on one or more of the memories 404 and 406 and/or the mass storage device 408 to perform the functions of the data acquisition unit 206 (Fig. 2) and, in particular, the functions of the blocks 300-308 shown in Fig. 3.

[0054] The processor 402 is also in communication with an input/output (I/O) unit 410, that enables the system 400 to communicate with, for example, the demodulator 202 (Fig. 2) and/or the central processing unit 210 (Fig. 2). The I/O unit 410 may include circuitry for performing network communication functions (e.g., Ethernet communication functions), phone line communication functions (e.g., modem functions), peripheral device communication functions (e.g., universal serial bus communications, parallel port communications, etc.) to enable the system 400 to communicate with one or more input devices such as, for example, a mouse, keyboard, etc. and/or one or more output devices such as, for example, a video display, a printer, etc.

[0055] Fig. 5 is flow diagram depicting one manner in which the processor-based system 400 shown in Fig. 4 may be programmed to implement the example data acquisition unit 206 (Fig. 2). However, persons of ordinary skill in the art will appreciate that the blocks 300-308 (Fig. 3) of the example data acquisition unit 206 (Fig. 2) may be implemented using any desired combination of hardware and software. For example, the data acquisition unit 206 may include one or more application specific integrated circuits, microprocessors executing machine readable

instructions, digital logic components, analog circuitry, etc. configured to operate as blocks 300-308.

[0056] The data acquisition unit 206 (Fig. 2) receives a compressed digital video frame or image from the demodulator 202 (block 500). As described above, the compressed video frames or images received by the data acquisition unit 208 are compressed using the well-known MPEG standard. However, any other compression standards or techniques yielding scaled image information (e.g., downscaled images) for the frames or images could be used instead.

[0057] The received compressed digital video frame or image is scanned to determine the number or percentage of intra-coded macro blocks of which the frame or image is composed (block 502). The processor 402 then determines if the frame or image includes a sufficiently high percentage of intra-coded macro blocks (block 504). The percentage constituting a sufficient percentage may vary depending on the particular application. For example, if a very low program identification failure rate is acceptable, it may be desirable to generate signatures only for entirely intra-coded frames (I-frames or other frames that contain 100% intra-coded blocks) to maximize the amount of image information that can be used to generate the signature information for the frames or images. On the other hand, if a higher program identification failure rate is acceptable, frames having a lesser percentage of intra-coded blocks may be sufficiently intra-coded.

[0058] If a scanned frame is not sufficiently intra-coded (block 504), the processor 402 awaits another frame or image at block 500. On the other hand, if it is determined at block 504 that a scanned image or frame is sufficiently intra-coded, the processor 402 extracts the downscaled image information (e.g., the values of the DC coefficients) from the frequency domain macro blocks making up the image or frame

(block 506). The extraction of the downscaled image at block 506 may also include a conversion to spatial domain pixel information in the case where frequency domain coefficients other than just the DC coefficient values are extracted from each frequency domain block.

[0059] The processor 402 then removes image information or image areas associated with padding such as, for example, borders or other image portions inserted to enable an image that may not properly fill a display area to be displayed in an unobjectionable manner (block 508). In this manner, the processor 402 can generate signature information for the frame or image in a manner that does not include any video information that is not part of the original image.

[0060] The information representative of the image (i.e., the downscaled image containing selected pixel information), from which padding has been removed, may optionally be weighted (block 510). The processor 402 may weight the downscaled image information (e.g., by multiplying each of the pixel values by a number ranging from zero to one) to improve the robustness of the signature generation process. For example, the processor 402 may weight the pixel values associated with the center portions of an image or frame more heavily (e.g., using a multiplier closer to one) than those portions of the image or frame that are closer to the periphery of the image or frame. Weighting the central portion of an image more heavily than the peripheral portions of an image may significantly reduce or eliminate signature generation errors that may otherwise result in the event an image has been cropped at its periphery from its original form. In other words, cropping a portion of an image that is given little, if any, weight during the signature generation process will have little, if any, effect on the accuracy of the signature generation process.

[0061] The processor 402 then generates the signature information using the downscaled information from those frames or images that are sufficiently intra-coded (block 512). As described above, certain image areas may be removed prior to the signature generation process (block 512) such as, for example, those areas associated with padding (block 508). In addition, some or all of any remaining areas may be weighted (block 510) prior to the signature generation process (block 512).

[0062] Following the generation of a signature for a selected frame or image, the processor 402 may locally store the signature on the mass storage device 408 and/or the volatile memory 406 (block 514). The processor 402 may then send signatures and downscaled image information as it is generated (block 512) and stored (block 514) or, alternatively, periodically in sets or groups of signatures, to the central processing unit 212 (block 516) for matching analysis and program identification. After generating each signature (block 512) and any storing and sending activities (blocks 514 and 516), the processor 402 waits for another image or frame (block 500).

[0063] An example signature generation process that may be used to implement block 512 of Fig. 5 is discussed below in connection with Figs. 6-13. In general, the data acquisition unit 206 (Fig. 2) generates video signatures by calculating the centroids or centers of mass for each of the image color components (e.g., Red, Green, Blue, Yellow, etc.) and brightness components (e.g., Black/White). In particular, each center of mass or centroid is calculated using a downscaled image (e.g., a subset of the frequency coefficients and, thus, a subset of spatial domain pixel values) extracted from each of the frequency domain macro blocks making up an image or frame. Of course, as noted above, certain areas may be eliminated if associated with padding and/or may be weighted to reduce or eliminate the effects of image cropping.

[0064] The center of mass calculations or centroid calculations sum the moments of the downscaled image pixel values. In particular, to calculate the horizontal (e.g., x-axis) position within the frame or image for an image component center of mass or centroid, the value for each pixel is multiplied by its column number within its associated image or frame, the individual moments are summed, and the sum is divided by a maximum column moment value to provide a normalized horizontal position for the center of mass or centroid for that image component. Similarly, to calculate the vertical (e.g., y-axis) position within the frame or image for the center of mass or centroid, the value for each pixel is multiplied by its row number within the frame, the individual moments are summed, and the sum is divided by a maximum row moment value to provide a normalized vertical position for the center of mass or centroid for that image component. Mathematically, the normalized horizontal and vertical positions of the centroid for an image component (i.e., a particular color or brightness) "I" can be expressed as a percentage using Equations 1 and 2 below. In Equations 1 and 2, the value "C" is the total number of columns (e.g., the number of pixels per line) within the image or frame for which the signature is being calculated, the value "R" is the total number of rows (e.g., lines), and the values I[r][c] are the values for the pixel at row "r" and column "c" for component "I" (e.g., Red, Green, Blue, Yellow, brightness, etc.).

[0065] Equation 1 $$centroid_x = \frac{100\sum_{r=0}^{R-1}\sum_{c=0}^{c=C-1} c * I[r][c]}{C\sum_{r=0}^{R-1}\sum_{c=0}^{C-1} I[r][c]}$$

[0066] Equation 2 $$centroid_y = \frac{100\sum_{r=0}^{R-1}\sum_{c=0}^{c=C-1} r * I[r][c]}{R\sum_{r=0}^{R-1}\sum_{c=0}^{C-1} I[r][c]}$$

[0067] Of course, as noted above, images or frames may be weighted to eliminate or reduce the effects of cropping and the like. As a result, the values I[r][c] (i.e., the downscaled image pixel values) may be different from the original image or frame. In addition, the above centroid or center of mass calculations are normalized. Using normalized centroid information to generate signatures for images or frames or sequences of signatures for a video sequence can reduce or eliminate the effects of image scaling, shifting, etc.

[0068] Fig. 6 is an example of an image or frame 600 for which a signature can be calculated using the method described above in connection with Equations 1 and 2. To clearly illustrate the manner in which signature information is generated using Equations 1 and 2, the image or frame 600 includes four circles 602, 604, 606 and 608, each of which is a pure color within a particular color model. For example, the circles 602-608 may be red, green, blue and yellow, respectively. In addition, to keep the example simple, the colored circles 602-608 are of equal and uniform brightness.

[0069] Using Equations 1 and 2 above to generate the normalized horizontal and vertical coordinates for the centroids or centers of mass for each of the colors and brightness components of the image 600 results in the set of coordinate pairs (X_1, Y_1), (X_1, Y_3), (X_2, Y_2), (X_3, Y_1), and (X_3, Y_3). The pair (X_1, Y_1) is the centroid of the color component associated with the circle 608, (X_1, Y_3) is the centroid of the color component associated with the circle 606, (X_2, Y_2) is the centroid of the brightness associated with the image 600, (X_3, Y_1) is the centroid of the color component associated with the circle 602, and (X_3, Y_3) is centroid of the color component associated with the circle 604.

[0070] The set of normalized coordinate pairs for the centroids or centers of mass of the various color and brightness components that combine to compose the image or

frame 600 are substantially uniquely representative of the image 600. For instance, moving only the circle 602 horizontally toward the right of the image 600 will significantly affect the horizontal component of the centroid for the circle 602 (e.g., the value X_3 will move accordingly).

[0071] The set of normalized coordinate pairs for the image 600 can be used in several manners to define a signature for the image 600. For example, the signature for the image 600 may be defined as a collection or set of the centroid coordinate pairs for each component color and/or brightness making up an image. In particular, a signature "S" for an image could be defined as S = (Red_x, Red_y, $Green_x$, $Green_y$, $Blue_x$, $Blue_y$, $Yellow_x$, $Yellow_y$, $Brightness_x$, $Brightness_y$), where Red_x is the horizontal position of the centroid for the color red, Red_y is the vertical position of the centroid for the color red, etc. Accordingly, the signature for the example image 600 calculated using such a collection or set is S = (X_3, Y_1, X_3, Y_3, X_1, Y_3, X_1, Y_1, X_2, Y_2).

[0072] Alternatively, a signature based on the normalized coordinates of the color and brightness image components can be formed using relative position information between two or more of the image components. For example, a signature can be formed using vectors or relative movement or location information for several image components based on the absolute normalized coordinates for one image component. In the case of the example image 600, if the absolute coordinates for the centroid of the color component red are used (i.e., X_3, Y_1), the positions of the remaining components (i.e., green, blue, yellow and brightness) are described relative to red and one another and follow a path 610 within the image 600. Thus, the position of the centroid for the green component can be defined relative to the red component, the position of the centroid for the blue component relative to the green component, the

position of the centroid for the yellow component relative to the blue component and the position of the brightness component relative to the yellow component. Such a signature may be expressed mathematically as shown in Equation 3 below.

[0073] Equation 3 $S = (\Delta X_g, \Delta Y_g, \Delta X_b, \Delta Y_b, \Delta X_y, \Delta Y_y, \Delta X_{bglt}, \Delta Y_{bglt})$

[0074] The delta X and Y values represent horizontal and vertical displacements from the horizontal and vertical positions of the preceding centroid within the set of centroid positions making up the signature "S." Thus, the values ΔX_g and ΔY_g represent the difference between the coordinates for the centroid of the green component and the red component (i.e., $\Delta X_g = X_3 - X_3 = 0$ and $\Delta Y_g = Y_3 - Y_1$), the values ΔX_b and ΔY_b represent the difference between the coordinates for the centroid of the blue component and the green component (i.e., $\Delta X_b = X_1 - X_3$ and $\Delta Y_b = Y_3 - Y_3 = 0$), etc.

[0075] As shown in Equation 3 above, the absolute coordinates for the position of the centroid of the red component are not included to provide a signature that is not sensitive to shifting or movement of an entire image within the frame 600. For example, when using a signature generation technique based on relative centroid positions (such as that provided by Equation 3 above), a displacement of all four of the circles 602-608 by the same horizontal and vertical distances within the frame 600 will not affect the signature generated (i.e., the relative centroid coordinates or positions will not change). Alternatively or additionally, the positions of one or more of the signature components signature may be generated based on the position of the image component centroid with respect to a predetermined or fixed reference point.

[0076] While the example image 600 of Fig. 6 is described as being based on a color model having red, green, blue, yellow and brightness components, other color

models and, thus, image components could be used instead. For example, many well-known color models including, for example, RGB, HIS, YUV, YCrCb, CIELAB and the like may be used in conjunction with the example methods and apparatus disclosed herein.

[0077] Further, image information may be received by the data acquisition unit 206 (Fig. 2) in a form based on one color model and converted to another color model to facilitate and/or improve the signature generation process. For example, the data acquisition unit 206 may receive MPEG image information from the demodulator 202. As described above, MPEG images or frames are formed using a YUV or YCrCb color model. During signature generation (block 512 of Fig. 5), the data acquisition unit 206 may convert the luminance and chrominance information provided by the YCrCb or YUV models to provide color information for red, green, blue, yellow and brightness components. Because the relationships between the different color models are well known, a detailed description of such a conversion process is not provided herein.

[0078] While the above examples and, particularly, Equations 1 and 2, depict the use of normalized centroid coordinates, non-normalized centroid information may be used as well. However, as described below, the use of non-normalized centroid information may result in increased sensitivity to image scaling and the like, which may result in a higher probability of failing to identify or falsely identifying an image or sequence of images (e.g., a video program).

[0079] For purposes of clarity, the distribution of components (e.g., colors, brightness, etc.) within the frame or image 600 is greatly simplified. Namely, the color components composing the frame 600 are represented as non-overlapping, symmetrically distributed circles. Of course, most images or frames making up a

video program are composed of a significantly more complex distribution of color and brightness components than the simplified case shown in Fig. 6.

[0080] Fig. 7 depicts an example image or frame 700 in which three image components (e.g., three colors of a color model) are distributed in a more complex non-uniform manner. For clarity, the image 700 is shown as three component layers 702, 704 and 706 in which each image component is distributed in a non-uniform manner. For instance, the layer 702 may be a red layer, the layer 704 may be a green layer and the layer 706 may be a blue layer having respective centroids or centers of mass (X_1, Y_1), (X_2, Y_2) and (X_3, Y_3). One having ordinary skill in the art will readily appreciate that the signature generation technique described above in connection with Fig. 6 and Equations 1, 2 and 3 may similarly be applied to images having more complex component distributions such as the image 700 of Fig. 7.

[0081] While the signature generation technique described in connection with Fig. 6 above provides substantially unique sets of normalized component centroids (i.e., horizontal and vertical coordinate pairs), certain component distributions may result in significantly reduced signature uniqueness. For example, Fig. 8 depicts a frame or image 800 having a circle 802 of a pure color component (e.g., red, green, blue, etc.) The circle 802 has a centroid 804 located at the "+" at the center of the circle 802. Fig. 9 depicts an example frame or image 900 having two circles 902 and 904 of a pure color component the same as that composing the circle 802 of the image 800. A centroid 906 for this color component of the image 900 is located at the "+." Fig. 10 depicts another example frame or image 1000 having a ring-shaped object 1002 composed of the same color component as that composing the circles 802, 902 and 904 of Figs. 8 and 9. A centroid 1004 for this color component of the image 1000 is identically positioned within the image 1000 as the centroids 804 and 906 are

positioned within the images 800 and 900. Thus, in this instance, the centroids for a particular color component for three substantially different distributions of that color component are all identically positioned within their respective images or frames and, thus, cannot be used to uniquely distinguish between the images 800, 900 and 1000.

[0082] Another difficultly that can arise when attempting to generate unique signatures for video images occurs with images having substantially symmetric component distributions. Figs. 11 and 12 are example frames or images 1100 and 1200 that contain relatively symmetric distributions of a particular component. In particular, the frame 1100 contains three identical elliptical shapes 1102, 1104 and 1106, each of which is composed of a single component (e.g., a single color component). Using Equations 1 and 2 above, the center of mass or centroid of the component distribution shown in Fig. 11 is located at (X_1, Y_1), which is designated within the image 1100 using a "+" sign at reference numeral 1108.

[0083] Fig. 12 also contains three elliptical shapes 1202, 1204 and 1206 that are composed of the same component and are of the same shape and size as the shapes 1102, 1104 and 1106 of Fig. 11. Although the shapes 1202, 1204 and 1206 are distributed within the image or frame 1200 in a substantially different manner than the shapes 1102, 1104 and 1106 are distributed within the frame 1100, using Equations 1 and 2 above to generate a centroid for the component distribution within the frame 1200 yields a centroid location 1208 that is identical to the centroid location 1108 of the component distribution of Fig. 11 (i.e., X_1, Y_1).

[0084] Those having ordinary skill in the art will, of course, recognize that in practice, most images (e.g., color images) include more than one component (e.g., red, green, blue, etc.). As a result, even if the centroid for one of the image components fails to be uniquely associated with that image, the remaining components may,

nevertheless, provide a set of centroids that is substantially unique for purposes of identifying that image. However, signatures composed of fewer substantially unique component centroids (i.e., the set of centroid locations is less unique) can significantly decrease the reliability of image identifications (e.g., misidentifications may occur) based on those sets of centroids.

[0085] As described in greater detail in connection with Fig. 13 below, a signature for a frame or image can be made more unique by sub-dividing the image or frame into a plurality or regions or areas, calculating the component centroids for these sub-divided regions or areas and forming a signature for the frame or image including component centroids for the overall image and the component centroids for the sub-divided regions or areas. Thus, a signature generated in this manner is less sensitive to the aforementioned problems discussed in connection with Figs. 8-12 above.

[0086] Fig. 13 depicts an example frame or image 1300 that contains three identical elliptical shapes 1302, 1304 and 1306, all of which are composed of the same component (e.g., a single color). As depicted by the dashed lines, the image 1300 has been sub-divided into four quadrants labeled Q0, Q1, Q2 and Q4. The centroid for the overall image 1300 is located at the "+" designated by the reference numeral 1306 and the centroids for the quadrants Q0, Q1, Q2 and Q3 are designated by the "+" signs designated by respective reference numerals 1308, 1310, 1312 and 1314, respectively.

[0087] Thus, when an image is partitioned or sub-divided into four sub-images, regions or areas, each image component (e.g., a color or brightness component) may be represented using five centroids (i.e., five horizontal and vertical coordinate pairs or ten values), one of which corresponds to the overall image and the remaining four of which correspond to the four sub-images or regions. For an image containing red,

green, blue, yellow and brightness components, set containing a total of twenty-five centroids (i.e., twenty five horizontal and vertical coordinate pairs or fifty values) may be used to form a signature for the image or frame. An example of such a signature can be represented as depicted in Table 4 below.

	RED	GREEN	BLUE	YELLOW	BRIGHTNESS
OVERALL IMAGE	X_1, Y_1	X_2, Y_2	X_3, Y_3	X_4, Y_4	X_5, Y_5
Q0	X_6, Y_6	X_7, Y_7	X_8, Y_8	X_9, Y_9	X_{10}, Y_{10}
Q1	X_{11}, Y_{11}	X_{12}, Y_{12}	X_{13}, Y_{13}	X_{14}, Y_{14}	X_{15}, Y_{15}
Q2	X_{16}, Y_{16}	X_{17}, Y_{17}	X_{18}, Y_{18}	X_{19}, Y_{19}	X_{20}, Y_{20}
Q3	X_{21}, Y_{21}	X_{22}, Y_{22}	X_{23}, Y_{23}	X_{24}, Y_{24}	X_{25}, Y_{25}

TABLE 4

[0088] Of course, more or fewer image components may be used if desired. Additionally, fewer or more partitions, sub-images or regions or areas may be used. For example, sub-regions may be further sub-divided in a recursive manner to achieve any desired level of signature uniqueness. In other words, a greater number of sub-images or sub-divided areas may be defined within an image or frame to generate a signature having a greater amount of distinguishing information. Further, the sub-image areas or regions do not have to be identically shaped and sized. For example, relatively smaller sub-divisions or sub-images may be used within the central region of an overall image and relatively larger sub-divisions may be used within the peripheral regions of an image. Still further, while the signature generation example given in connection with Fig. 13 uses normalized non-relative centroid coordinates or locations, relative centroid locations as discussed above may be used instead.

[0089] The above-described signature generation techniques employing sub-images or regions within images or frames to increase signature uniqueness can be used to improve the reliability of an image identification process, particularly in cases where there is a significant amount of symmetry among images being identified. However, there are still further problems that may be encountered for certain types of images or frames. For example, images having a relatively constant distribution of components across the entire image tend to produce centroids that are located within the center of the frame or image, regardless of the color, hue and/or brightness of the image.

[0090] Centroids calculated for frames or images having a constant value that is substantially greater than zero will all be relatively stable and centered within the images. Thus, an entirely medium gray image and an entirely dark gray image will both result in centroids that are centered within the image, thereby making it impossible to distinguish these two images on the basis of their image component centroids. In general, these types of images contain little, if any, information and may, for example, be perceived as blank images.

[0091] For frames or images having a constant value that is near to zero, video signal noise may cause the centroid to vary from frame to frame, even if the images are perceptually identical (e.g., all the images are blank). In such a case, calculating the centroid based on Equations 1 and 2 above yields unstable results (i.e., signature values) that may significantly reduce the reliability with which the video programming associated with these images can be identified.

[0092] An alternative signature generation technique may be employed for the images or frames that contain relatively constant information (e.g., the distribution of one or more image components is relatively uniform within the frames or images),

such as those described above. In particular, if during execution of the example method shown in Fig. 5 it is determined that the majority of spatial domain values (e.g., the downscaled image) are all about the same value, block 512 may generate the signature for the frame or image being processed using such an alternative signature generation technique. One such alternative signature generation technique may be based on calculating component coordinates using Equation 4 below.

[0093] Equation 4 $X = -100$

[0094] Equation 5 $Y = 100 * K / K_{\max}$

[0095] The values X and Y are the representative horizontal and vertical coordinates of a substituted or pseudo-centroid, the value "K" is an estimated constant value such as, for example, a trend or average pixel value(s) for a component of the image being processed, and the value K_{max} is a maximum possible average pixel value for the component. As noted above, Equation 4 does not provide an actual geometric centroid but, rather, a pair of coordinates that can be used to serve the function of a substantially unique coordinate pair for a relatively blank or uniform image. Thus, using Equation 4 to calculate representative coordinates for one image entirely filled with medium gray and another image entirely filled with dark gray will yield different pseudo-centroids or coordinate pairs that enable substantially unique signatures for these images to be formed.

[0096] Yet another difficulty in generating substantially unique signatures occurs for images that are composed primarily of dark foreground (e.g., dark text) on a substantially white background. In these cases, the relatively high (and constant) background values associated with the white portions of the image have a much

greater effect on the center of mass or centroid than the relatively low foreground values associated with the darker foreground.

[0097] As a result, signatures formed using centroids for these kinds of images will typically not be sufficiently unique to identify differences between, for example, an image containing one text block in a given location and another image containing a different text block in the same or a different location. In these cases, the image values may be inverted (i.e., the image may be inverted so that the foreground (e.g., textual information) is relatively light and the background is relatively dark) so that the foreground has a much more significant effect on the centroid of the image. The pixel values associated with the inverted image are then used to generate the centroid(s) and, thus, the signature for the image(s). However, when using Equations 1 and 2 described above to calculated the centroid values, the centroid values may be negated (i.e., multiplied by -1) to indicated that the centroid values correspond to an inverted image.

[0098] As discussed above, the data acquisition unit 206 (Fig. 2) receives video frames or images (e.g., compressed video or MPEG frames) from the demodulator 202 (Fig. 2) and generates signatures and downscaled images for some or all of these received frames or images using, for example, the methods described above. As described in greater detail in connection with Figs. 14 and 15 below, the central processing unit 210 (Fig. 2) is configured to compare sequences of signatures received from the data acquisition unit 206 (Fig. 2) to reference sequences of signatures associated with known video programs (e.g., television commercials, television shows, etc.) to identify one or more selected programs and forward the unidentified video clip to the central facility 216.

[0099] Initially, the central processing unit 210 (Fig. 2) receives signature information from the data acquisition unit 206 (Fig. 2) (block 1400). The central processing unit 210 then determines whether the received signature information is the start or beginning of a sequence (block 1402). If the received signature information is the start of a sequence at block 1402, the central processing unit 210 selects one or more reference signature sequences from a database or library of signature sequences (block 1404), which may be stored within the memory or mass storage device 214 (Fig. 2), and appends the selected signature sequences to a dynamic accumulation table or intermediate results table. On the other hand, if the central processing unit 210 determines at block 1402 that the received signature information is not the start of a sequence, then control is passed to block 1406.

[00100] The reference signatures accumulated at block 1404 (candidate signature sequences) are to be compared to the sequence of signatures currently being received (suspect signature sequence) to determine if an exact or substantial match exists and, if such a match exists, identify the video program associated with the suspect signature sequence. In general, signature sequences may be represented as $[S_A][S_B][S_C][S_D]\ldots$, where S_A is a first signature (e.g., a set of image component centroids generated as set forth above) for a frame or image, S_B is another signature (e.g., another set of image component centroids) associated with a subsequent frame or image, etc. Accordingly, one useful manner of selecting candidate or reference signature sequences (block 1404) in a case where the initial signature received at block 1400 is S_A is to select all signature sequences from the database or library of known signature sequences that include the signature S_A within a predetermined number of signatures from the beginning of the sequence. For example, the signature sequences listed below in Table 2, if in the database or library, may be selected at

block 1404 and appended to the accumulation or intermediate results table. As can be recognized from Table 2 below, the selected signature sequences do not necessarily begin with the signature S_A but, instead, include the signature S_A. From the example group of selected signature sequences shown in Table 2, only signature sequences including the signature S_A within the first three signatures may have, for example, been selected.

Sequence #	REFERENCE SIGNATURE SEQUENCES
1	$[S_A][S_F][S_K][S_N][S_Z]$
2	$[S_A][S_H][S_L][S_N][S_V]$
3	$[S_A][S_F][S_K][S_P][S_Q]$
4	$[S_A][S_F][S_G][S_P][S_J]$
5	$[S_X][S_A][S_F][S_G][S_N]$
6	$[S_X][S_Y][S_A][S_G][S_N]$

TABLE 2

[00101] Following the comparison at block 1406, the central processing unit 210 updates match results for each of the reference signature sequences (block 1408) in the accumulation or intermediate results table. In general, the match results track, for each reference sequence of signatures, if the individual signatures within a sequence of signatures generated by the data acquisition unit 206 (Fig. 2) match corresponding signatures within the reference sequences of signatures. Thus, the match results can be represented within a table in which each row of the table corresponds to a different reference signature sequence and each column of the table corresponds to a relative temporal position within the sequence. Table 3 below is an example table that represents the match results after having received the signatures S_A and S_F. The value

"1" indicates a match occurred at block 1406, the value "0" indicates a match did not occur and "X" indicates a position within the sequence that has not yet been tested (i.e., compared to a signature received from the data acquisition unit 206).

Sequence #	MATCH RESULTS				
1	1	1	X	X	X
2	1	0	X	X	X
3	1	1	X	X	X
4	1	1	X	X	X
5	0	1	1	X	X
6	0	0	1	0	0

TABLE 3

[00102] The processing unit 210 then eliminates non-matching reference signature sequences from the accumulation or intermediate results table (e.g., from Table 2). For example, sequence number two may be eliminated for having at least one non-matching signature. However, in some cases it may be desirable to only eliminate sequences having two non-matching signatures or a greater number of non-matching signatures. For this example, only sequences having three or more non-matching signatures are eliminated at block 1410. As a result, only signature sequence six is eliminated following the receipt and processing of the second signature S_F.

[00103] Continuing with the above example, following the receipt of the signature S_F, each of the remaining signature sequences has at least two untested positions. As a result, the processing unit 210 will loop through blocks 1400-1420 at least two additional times. If the signatures S_G and S_N are received as third and fourth signatures, respectively, no additional comparisons will be required at block 1406

after receiving the signature S_N (i.e., there are no untested sequence positions at that point). Thus, the state of the match results for the above example is as depicted in Table 4 below.

Sequence #	MATCH RESULTS				
1	1	1	0	0	0
2	1	0	0	0	0
3	1	1	0	0	0
4	1	1	1	0	0
5	0	1	1	1	1
6	0	0	1	0	0

TABLE 4

[00104] As can be seen from Table 4 above, signature sequences one, two, three and six have been eliminated following the receipt of the signature S_N because these sequences contained at least three non-matching signatures upon receipt of the signature S_N.

[00105] The central processing unit 210 examines the match results to determine if there is a matching sequence (block 1414). In the case of the above example, signature sequence five is an identical match and, thus, is a matching sequence. However, in some cases the processing unit 210 may consider a substantial match (i.e., a non-identical match) sufficient. For example, the processing unit 210 may consider three out of four matches for a signature sequence to be a matching sequence. Additionally or alternatively, the central processing unit 210 may consider the reference signature sequence having the greatest number of matching signatures to be a matching sequence, regardless of the percentage of matching signatures. Still

further, if two or more reference signature sequences result in the same percentage or number of matches, the central processing unit 210 may, based on historical information, identify the matching reference sequence of signatures as that sequence that occurs most frequently (i.e., the most probable sequence of signatures). More generally, the number or percentage of matching signatures required to satisfy a matching condition depends on what level of inaccurate video program identification is acceptable for a particular application. In other words, if a relatively low level of inaccurate video program identification is acceptable, then a lower percentage or number of matching signatures may be acceptable to satisfy a match condition. On the other hand, if a relatively high level of inaccurate video program identification is acceptable, then a higher percentage or number of matching signatures may be acceptable to satisfy a match condition.

[00106] In any event, if the central processing unit 210 determines that a signature sequence match has been found at block 1414, the central processing unit 210 then identifies the video sequence or program associated with the matching reference signature sequence (block 1416). Any desired data structures and/or database search techniques may be used. For example, once a matching sequence of signatures has been identified, the sequence number or identifier associated with the matching sequence of signatures may be used to access (e.g., via an indexing or lookup method) textual information associated with the audio and/or video program corresponding to that identifier or sequence number. Alternatively, a set of tables organized in a linked tree-like data structure may be used. In particular, each of the tables may be indexed using centroids or coordinate pairs (e.g., horizontal and vertical coordinates). In this manner, a first coordinate pair or centroid associated with a signature is used to index to a link to a subsequent table. The next coordinate pair of the signature is then used

to index within the subsequent table to another table. This process continues until all coordinate pairs associated with all of the signatures within a signature sequence have been exhausted at a final table. The last coordinate pair is then used to index to textual information (e.g., in the form of metadata) describing the video program associated with the sequence of signatures information (i.e., sequence of centroids or coordinate pairs used to index through the linked tables). A searchable tree-like data structure such as that described above provides a relatively short search time. In the case where the video programs being identified are television commercials a relatively faster search technique may be highly advantageous because a relatively large number of commercials (e.g., 1,000,000 or more) may be contained within the database to be searched.

[00107] If, on the other hand, at block 1414 the processing unit 210 determines that a matching sequence cannot be found, the processing unit 210 determines if a manual identification is required or desired (block 1417). If, at block 1414, a manual identification is required, a human operator may intervene and manually identify the video program (block 1418). For example, the human operator may view the video sequence to determine the identity of the sequence. If the video program identified by the human operator at block 1418 was previously not contained within the database, the sequence may be added to the database.

[00108] On the other hand, if the video program was already stored in the database but was associated with a different sequence, the operator may update the reference information to include possible signature sequences for that video program. In some cases, multiple signature sequences may be needed to represent a single video program that can be conveyed to the demodulator 202 using somewhat different encoding at a broadcast station (not shown). An efficient manner to store and search

multiple signature sequences for a single video program is to represent the sequence of signature positions for which multiple signatures are possible using a logical OR data structure. For example, a reference sequence of signatures may be expressed as $[S_A][S_B|S_N][S_G][S_F|S_K]$, where the "|" means OR. Thus, continuing the example, the signature sequences $[S_A][S_B][S_G][S_F]$, $[S_A][S_N][S_G][S_K]$, $[S_A][S_B][S_G][S_K]$ and $[S_A][S_N][S_G][S_F]$ are all matches to the reference sequence of signatures and, thus, are all associated with the same video program. Storing reference signature information using the above-described OR-based data structure can significantly reduce the amount of memory needed to maintain a library of reference signatures and can substantially reduce the amount of time needed to search such a library of reference signatures for matching signatures. The activities associated with blocks 1418 and 1420 may be performed at, for example, the central facility 216 (Fig. 2).

[00109] While the example method described in connection with Figs. 14 and 15 is described as being executed within the central processing unit 210, some or all of the functions associated with the example method may be performed within the data acquisition unit 206 or any other device associated with the system 200 shown in Fig. 2.

[00110] Although certain methods, apparatus and articles of manufacture have been described herein, the scope of coverage of this patent is not limited thereto. To the contrary, this patent covers all methods, apparatus and articles of manufacture fairly falling within the scope of the appended claims either literally or under the doctrine of equivalents.

What is claimed is:

1. A method of generating a video signature, comprising:

receiving compressed video information;

extracting frequency coefficient information from the compressed video information;

calculating image component centroid information based on the extracted frequency coefficient information; and

generating the video signature using the image component centroid information.

2. A method as defined in claim 1, further comprising converting the frequency coefficient information to spatial domain information and using the spatial domain information to calculated the image component centroid information.

3. A method as defined in claim 1, wherein the compressed video information includes at least one MPEG frame.

4. A method as defined in claim 1, wherein the compressed video information includes at least one substantially intra-coded frame.

5. A method as defined in claim 1, wherein frequency coefficient information includes DC coefficients extracted from macro blocks composing at least a portion of the compressed video information.

6. A method as defined in claim 1, wherein the image component centroid information includes normalized centroid data.

7. A method as defined in claim 1, wherein the image component centroid information includes centroid information associated with a plurality of image components.

8. A method as defined in claim 7, wherein the plurality of image components includes image components associated with a color model.

9. A method as defined in claim 1, wherein generating the video signature using the image component centroid information includes generating a set of image component centroids associated with a plurality of image components.

10. A method as defined in claim 1, wherein generating the video signature using the image component centroid information includes generating a set of image component centroids associated with a plurality of areas within an image associated with the compressed video information.

11. A method as defined in claim 1, further comprising inverting at least some of the compressed image information in response to a determination that the at least some of the compressed image information corresponds to relatively dark foreground information on a relatively light background.

12. A method as defined in claim 1, further comprising determining that at least a portion of the compressed video information is substantially uniform and generating the video signature using a constant associated with an image component value instead of the image centroid information.

13. A method as defined in claim 12, wherein the constant is one of an average and a trend value associated with a plurality of images.

14. A method as defined in claim 1, further comprising weighting the extracted frequency coefficient information prior to generating the video signature.

15. A system for generating a video signature, comprising:

a memory; and

a processor coupled to the memory and programmed to:

receive compressed video information;

extract frequency coefficient information from the compressed video information;

calculate image component centroid information based on the extracted frequency coefficient information; and

generate the video signature using the image component centroid information.

16. A system as defined in claim 15, wherein the processor is programmed to convert the frequency coefficient information to spatial domain information and to calculate the image component centroid information using the spatial domain information.

17. A system as defined in claim 15, wherein the compressed video information includes at least one MPEG frame.

18. A system as defined in claim 15, wherein the compressed video information includes at least one substantially intra-coded frame.

19. A system as defined in claim 15, wherein frequency coefficient information includes DC coefficients extracted from macro blocks composing at least a portion of the compressed video information.

20. A system as defined in claim 15, wherein the image component centroid information includes normalized centroid data.

21. A system as defined in claim 15, wherein the image component centroid information includes centroid information associated with a plurality of image components.

22. A system as defined in claim 21, wherein the plurality of image components includes image components associated with a color model.

23. A system as defined in claim 15, wherein the processor is programmed to generate the video signature using the image component centroid information by generating a set of image component centroids associated with a plurality of image components.

24. A system as defined in claim 15, wherein the processor is programmed to generate the video signature using the image component centroid information by generating a set of image component centroids associated with a plurality of areas within an image associated with the compressed video information.

25. A system as defined in claim 15, wherein the processor is programmed to invert at least some of the compressed image information in response to a determination that the at least some of the compressed image information corresponds to relatively dark foreground information on a relatively light background.

26. A system as defined in claim 15, wherein the processor is programmed to determine that at least a portion of the compressed video information is substantially uniform and generate the video signature using a constant associated with an image component value instead of the image centroid information.

27. A system as defined in claim 26, wherein the constant is one of an average and a trend value associated with a plurality of images.

28. A system as defined in claim 15, wherein the processor is programmed to weight the extracted frequency coefficient information prior to generating the video signature.

29. A computer readable medium having instructions stored thereon that, when executed, cause a machine to:

receive compressed video information;

extract frequency coefficient information from the compressed video information;

calculate image component centroid information based on the extracted frequency coefficient information; and

generate a video signature using the image component centroid information.

30. A computer readable medium having instructions stored thereon that, when executed, cause the machine to convert the frequency coefficient information to spatial domain information and to calculate the image component centroid information based on the spatial domain information.

31. A computer readable medium as defined in claim 29, wherein the compressed video information includes at least one MPEG frame.

32. A computer readable medium as defined in claim 29, wherein the compressed video information includes at least one substantially intra-coded frame.

33. A computer readable medium as defined in claim 29, wherein frequency coefficient information includes DC coefficients extracted from macro blocks composing at least a portion of the compressed video information.

34. A computer readable medium as defined in claim 29, wherein the image component centroid information includes centroid information associated with a plurality of image components.

35. A computer readable medium as defined in claim 29 having instructions stored thereon that, when executed, cause the machine to generate the video signature using the image component centroid information by generating a set of image component centroids associated with a plurality of image components.

36. A computer readable medium as defined in claim 29 having instructions stored thereon that, when executed, cause the machine to generate the video signature using the image component centroid information by generating a set of image component centroids associated with a plurality of areas within an image associated with the compressed video information.

37. A computer readable medium as defined in claim 29 having instructions stored thereon that, when executed, cause the machine to invert at least some of the compressed image information in response to a determination that the at least some of the compressed image information corresponds to relatively dark foreground information on a relatively light background.

38. A computer readable medium as defined in claim 29 having instructions stored thereon that, when executed, cause the machine to determine that at least a portion of the compressed video information is substantially uniform and

generate the video signature using a constant associated with an image component value instead of the image centroid information.

39. A system for generating a signature associated with a video program, the system comprising:

a frame scanner to scan a video frame associated with the video program;

an intra-coded macro block extractor to extract intra-coded macro blocks from the video frame;

a coefficient extractor to extract DC coefficients from the intra-coded macro blocks; and

a signature generator to calculate a plurality of centroids associated with video frame based on the extracted DC coefficients and to form the signature based on the plurality of centroids.

40. A system as defined in claim 39, wherein the frame scanner is adapted to selectively send substantially intra-coded video frames to the intra-coded macro block extractor.

41. A system as defined in claim 39, wherein the video program includes one of a television commercial and a television show.

42. A system as defined in claim 39, wherein the video frame is composed according to a digital video compression standard.

43. A system as defined in claim 42, wherein the digital video compression standard is the MPEG standard.

44. A system as defined in claim 39, wherein the plurality of centroids are associated with a plurality of image components.

45. A system as defined in claim 44, wherein the plurality of image components are associated with a color model.

46. A system as defined in claim 39, wherein the plurality of centroids are associated with a plurality of areas within the video frame.

47. A method of identifying a video program, comprising:

receiving a sequence of signatures, wherein each of the signatures includes a set of centroids corresponding to one of a plurality of frames of the video program;

comparing the sequence of signatures to a set of reference sequences of signatures; and

identifying the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures.

48. A method as defined in claim 46, wherein each of the sets of centroids includes centroids associated with image components.

49. A method as defined in claim 48, wherein the image components are associated with a color model.

50. A method as defined in claim 46, wherein each of the sets of centroids includes centroids associated with a plurality of areas within its corresponding one of the plurality of frames.

51. A method as defined in claim 46, wherein comparing the sequence of signatures to the set of reference sequences of signatures includes comparing the sequence of signatures to each reference sequence of signatures.

52. A method as defined in claim 51, wherein comparing the sequence of signatures to each reference sequence of signatures includes sequentially comparing each signature within the sequence of signatures to each of the signatures within at least one of the reference sequences of signatures.

53. A method as defined in claim 46, wherein identifying the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures includes identifying the video program in response to identifying a matching sequence within the set of reference sequences of signatures.

54. A method as defined in claim 46, wherein identifying the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures includes providing textual information describing the video program.

55. A method as defined in claim 46, wherein identifying the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures includes manually identifying the video program in response to a failure to identify a matching sequence within the set of reference sequences of signatures.

56. A method as described in claim 55, further comprising adjusting at least one reference sequence of signatures from the set of reference sequences of signatures in response to different encoding methods.

57. A method as defined in claim 46, wherein video program is one of a television commercial and a television show.

58. A system for identifying a video program, comprising:

a memory; and

a processor coupled to the memory and programmed to:

receive a sequence of signatures, wherein each of the signatures includes a set of centroids corresponding to one of a plurality of frames of the video program;

compare the sequence of signatures to a set of reference sequences of signatures; and

identify the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures.

59. A system as defined in claim 58, wherein each of the sets of centroids includes centroids associated with image components.

60. A system as defined in claim 59, wherein the image components are associated with a color model.

61. A system as defined in claim 58, wherein each of the sets of centroids includes centroids associated with a plurality of areas within its corresponding one of the plurality of frames.

62. A system as defined in claim 58, wherein the processor is programmed to compare the sequence of signatures to the set of reference sequences of signatures by comparing the sequence of signatures to each reference sequence of signatures.

63. A system as defined in claim 62, wherein the processor is programmed to compare the sequence of signatures to each reference sequence of signatures by sequentially comparing each signature within the sequence of signatures to each of the signatures within at least one of the reference sequences of signatures.

64. A system as defined in claim 58, wherein the processor is programmed to identify the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures by identifying the video program in response to identifying a matching sequence within the set of reference sequences of signatures.

65. A computer readable medium having instructions stored thereon that, when executed, cause a machine to:

receive a sequence of signatures, wherein each of the signatures includes a set of centroids corresponding to one of a plurality of frames of a video program;

compare the sequence of signatures to a set of reference sequences of signatures; and

identify the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures.

66. A computer readable medium as defined in claim 65, wherein each of the sets of centroids includes centroids associated with image components.

67. A computer readable medium as defined in claim 65, wherein each of the sets of centroids includes centroids associated with a plurality of areas within its corresponding one of the plurality of frames.

AMENDED CLAIMS

[received by the International Bureau on 26 March 2004 (26.03.04);
original claims 1-67 replaced by new claims 1-80]

1. A method of generating a video signature, comprising:

receiving compressed video information;

selecting a frame from the compressed video information based on a number of intra-coded macro blocks within the frame;

calculating image component centroid information based on the selected frame; and

generating the video signature using the image component centroid information.

2. A method as defined in claim 1, wherein the number of intra-coded macro blocks within the frame is a substantial portion of all macro blocks within the frame.

3. A method as defined in claim 1, further comprising extracting scaled image information from the frame and using the scaled image information to calculate the image component centroid information.

4. A method as defined in claim 3, wherein extracting the scaled image information from the frame includes extracting only intra-coded macro blocks from the frame.

5. A method as defined in claim 4, wherein extracting the scaled image information includes extracting only a portion of each of the intra-coded macro blocks.

6. A method as defined in claim 5, wherein the portion of each of the intra-coded macro blocks includes only DC coefficients.

7. A method as defined in claim 3, further comprising converting the scaled image information to spatial domain information and using the spatial domain information to calculate the image component centroid information.

8. A method as defined in claim 3, further comprising weighting the scaled image information prior to generating the video signature.

9. A method as defined in claim 1, wherein the compressed video information includes at least one MPEG frame.

10. A method as defined in claim 1, wherein the image component centroid information includes normalized centroid data.

11. A method as defined in claim 1, wherein the image component centroid information includes centroid information associated with a plurality of image components.

12. A method as defined in claim 11, wherein the plurality of image components includes image components associated with a color model.

13. A method as defined in claim 1, wherein generating the video signature using the image component centroid information includes generating a set of image component centroids associated with a plurality of image components.

14. A method as defined in claim 1, wherein generating the video signature using the image component centroid information includes generating a set of image component centroids associated with a plurality of areas within an image associated with the compressed video information.

15. A method as defined in claim 1, further comprising inverting at least some of the compressed image information in response to a determination that the at least some of the compressed image information corresponds to relatively dark foreground information on a relatively light background.

16. A method as defined in claim 1, further comprising determining that at least a portion of the compressed video information is substantially uniform and generating the video signature using a constant associated with an image component value instead of the image centroid information.

17. A method as defined in claim 16, wherein the constant is one of an average and a trend value associated with a plurality of images.

18. A system for generating a video signature, comprising:

a memory; and

a processor coupled to the memory and programmed to:

receive compressed video information;

select a frame from the compressed video information based on a number of intra-coded macro blocks within the frame;

calculate image component centroid information based on the selected frame; and

generate the video signature using the image component centroid information.

19. A system as defined in claim 18, wherein the number of intra-coded macro blocks within the frame is a substantial portion of all macro blocks within the frame.

20. A system as defined in claim 18, wherein the processor is programmed to extract scaled image information from the frame and to use the scaled image information to calculate the image component centroid information.

21. A system as defined in claim 20, wherein the processor is programmed to extract the scaled image information from the frame by extracting only intra-coded macro blocks from the frame.

22. A system as defined in claim 21, wherein the processor is programmed to extract the scaled image information by extracting only a portion of each of the intra-coded macro blocks.

23. A system as defined in claim 22, wherein the portion of each of the intra-coded macro blocks includes only DC coefficients.

24. A system as defined in claim 20, wherein the processor is programmed to convert the scaled image information to spatial domain information and to use the spatial domain information to calculate the image component centroid information.

25. A system as defined in claim 20, wherein the processor is programmed to weight the scaled image information prior to generating the video signature.

26. A system as defined in claim 18, wherein the compressed video information includes at least one MPEG frame.

27. A system as defined in claim 18, wherein the image component centroid information includes normalized centroid data.

28. A system as defined in claim 18, wherein the image component centroid information includes centroid information associated with a plurality of image components.

29. A system as defined in claim 28, wherein the plurality of image components includes image components associated with a color model.

30. A system as defined in claim 18, wherein the processor is programmed to generate the video signature using the image component centroid information by generating a set of image component centroids associated with a plurality of image components.

31. A system as defined in claim 18, wherein the processor is programmed to generate the video signature using the image component centroid information by generating a set of image component centroids associated with a plurality of areas within an image associated with the compressed video information.

32. A system as defined in claim 18, wherein the processor is programmed to invert at least some of the compressed image information in response to a determination that the at least some of the compressed image information corresponds to relatively dark foreground information on a relatively light background.

33. A system as defined in claim 18, wherein the processor is programmed to determine that at least a portion of the compressed video information is substantially uniform and generate the video signature using a constant associated with an image component value instead of the image centroid information.

34. A system as defined in claim 33, wherein the constant is one of an average and a trend value associated with a plurality of images.

35. A machine readable medium having instructions stored thereon that, when executed, cause a machine to:

receive compressed video information;

select a frame from the compressed video information based on a number of intra-coded macro blocks within the frame;

calculate image component centroid information based on the selected frame; and

generating a video signature using the image component centroid information.

36. A machine readable medium as defined in claim 35, wherein the number of intra-coded macro blocks within the frame is a substantial portion of all macro blocks within the frame.

37. A machine readable medium as defined in claim 35 having instructions stored thereon that, when executed, cause the machine to extract scaled image information from the frame and use the scaled image information to calculate the image component centroid information.

38. A machine readable medium as defined in claim 37 having instructions stored thereon that, when executed, cause the machine to extract the scaled image information from the frame by extracting only intra-coded macro blocks from the frame.

39. A machine readable medium as defined in claim 38 having instructions stored thereon that, when executed, cause the machine to extract the scaled image information by extracting only a portion of each of the intra-coded macro blocks.

40. A machine readable medium as defined in claim 39, wherein the portion of each of the intra-coded macro blocks includes only DC coefficients.

41. A machine readable medium as defined in claim 37 having instructions stored thereon that, when executed, cause the machine to convert the scaled image information to spatial domain information and use the spatial domain information to calculate the image component centroid information.

42. A machine readable medium as defined in claim 37 having instructions stored thereon that, when executed, cause the machine to weight the scaled image information prior to generating the video signature.

43. A machine readable medium as defined in claim 35, wherein the compressed video information includes at least one MPEG frame.

44. A machine readable medium as defined in claim 35, wherein the image component centroid information includes normalized centroid data.

45. A machine readable medium as defined in claim 35, wherein the image component centroid information includes centroid information associated with a plurality of image components.

46. A machine readable medium as defined in claim 45, wherein the plurality of image components includes image components associated with a color model.

47. A machine readable medium as defined in claim 35 having instructions stored thereon that, when executed, cause the machine to generate the video signature using the image component centroid information by generating a set of image component centroids associated with a plurality of image components.

48. A machine readable medium as defined in claim 35 having instructions stored thereon that, when executed, cause the machine to generate the video signature using the image component centroid information by generating a set of image component centroids associated with a plurality of areas within an image associated with the compressed video information.

49. A machine readable medium as defined in claim 35 having instructions stored thereon that, when executed, cause the machine to invert at least some of the compressed image information in response to a determination that the at least some of the compressed image information corresponds to relatively dark foreground information on a relatively light background.

50. A machine readable medium as defined in claim 35 having instructions stored thereon that, when executed, cause the machine to determine that at least a portion of the compressed video information is substantially uniform and generate the video signature using a constant associated with an image component value instead of the image centroid information.

51. A machine readable medium as defined in claim 50, wherein the constant is one of an average and a trend value associated with a plurality of images.

52. A system for generating a signature associated with a video program, the system comprising:

a frame scanner to scan video frames associated with the video program, wherein the frame scanner is configured to select a video frame based on a number of intra-coded macro blocks within the video frame;

an intra-coded macro block extractor to extract intra-coded macro blocks from the video frame;

a scaled image extractor to extract a scaled image from the intra-coded macro blocks; and

a signature generator to calculate a plurality of centroids associated with video frame based on the scaled image and to form the signature based on the plurality of centroids.

53. A system as defined in claim 52, wherein the frame scanner is adapted to selectively send substantially intra-coded video frames to the intra-coded macro block extractor.

54. A system as defined in claim 52, wherein the video program includes one of a television commercial and a television show.

55. A system as defined in claim 52, wherein the video frame is composed according to a digital video compression standard.

56. A system as defined in claim 55, wherein the digital video compression standard is based on the MPEG standard.

57. A system as defined in claim 52, wherein the plurality of centroids are associated with a plurality of image components.

58. A system as defined in claim 57, wherein the plurality of image components are associated with a color model.

59. A system as defined in claim 52, wherein the plurality of centroids are associated with a plurality of areas within the video frame.

60. A method of identifying a video program, comprising:

receiving a sequence of signatures, wherein each of the signatures includes a set of centroids corresponding to one of a plurality of substantially intra-coded frames of the video program;

comparing the sequence of signatures to a set of reference sequences of signatures; and

identifying the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures.

61. A method as defined in claim 60, wherein each of the sets of centroids includes centroids associated with image components.

62. A method as defined in claim 60, wherein the image components are associated with a color model.

63. A method as defined in claim 60, wherein each of the sets of centroids includes centroids associated with a plurality of areas within its corresponding one of the plurality of frames.

64. A method as defined in claim 60, wherein comparing the sequence of signatures to the set of reference sequences of signatures includes comparing the sequence of signatures to each reference sequence of signatures.

65. A method as defined in claim 64, wherein comparing the sequence of signatures to each reference sequence of signatures includes sequentially comparing each signature within the sequence of signatures to each of the signatures within at least one of the reference sequences of signatures.

66. A method as defined in claim 60, wherein identifying the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures includes identifying the video program in response to identifying a matching sequence within the set of reference sequences of signatures.

67. A method as defined in claim 60, wherein identifying the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures includes providing textual information describing the video program.

68. A method as defined in claim 60, wherein identifying the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures includes manually identifying the video program in response to a failure to identify a matching sequence within the set of reference sequences of signatures.

69. A method as described in claim 68, further comprising adjusting at least one reference sequence of signatures from the set of reference sequences of signatures in response to different encoding methods.

70. A method as defined in claim 60, wherein video program is one of a television commercial and a television show.

71. A system for identifying a video program, comprising:

a memory; and

a processor coupled to the memory and programmed to:

receive a sequence of signatures, wherein each of the signatures includes a set of centroids corresponding to one of a plurality of substantially intra-coded frames of the video program;

compare the sequence of signatures to a set of reference sequences of signatures; and

identify the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures.

72. A system as defined in claim 71, wherein each of the sets of centroids includes centroids associated with image components.

73. A system as defined in claim 72, wherein the image components are associated with a color model.

74. A system as defined in claim 71, wherein each of the sets of centroids includes centroids associated with a plurality of areas within its corresponding one of the plurality of frames.

75. A system as defined in claim 71, wherein the processor is programmed to compare the sequence of signatures to the set of reference sequences of signatures by comparing the sequence of signatures to each reference sequence of signatures.

76. A system as defined in claim 75, wherein the processor is programmed to compare the sequence of signatures to each reference sequence of signatures by sequentially comparing each signature within the sequence of signatures to each of the signatures within at least one of the reference sequences of signatures.

77. A system as defined in claim 71, wherein the processor is programmed to identify the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures by identifying the video program in response to identifying a matching sequence within the set of reference sequences of signatures.

78. A computer readable medium having instructions stored thereon that, when executed, cause a machine to:

receive a sequence of signatures, wherein each of the signatures includes a set of centroids corresponding to one of a plurality of substantially intra-coded frames of a video program;

compare the sequence of signatures to a set of reference sequences of signatures; and

identify the video program based on the comparison of the sequence of signatures to the set of reference sequences of signatures.

79. A computer readable medium as defined in claim 78, wherein each of the sets of centroids includes centroids associated with image components.

80. A computer readable medium as defined in claim 78, wherein each of the sets of centroids includes centroids associated with a plurality of areas within its corresponding one of the plurality of frames.

Statement under Article 19(1)

According to the amendments, claims 1-67 have been canceled and new claims 1-80 (pages 44-56) have been substituted therefor. In addition, a substitute abstract page with the correct new page number (page 57) is submitted herewith.

Support for these amendments may be found throughout the above-referenced international application. No new matter has been included.

Entry of the foregoing amendments is respectfully requested.

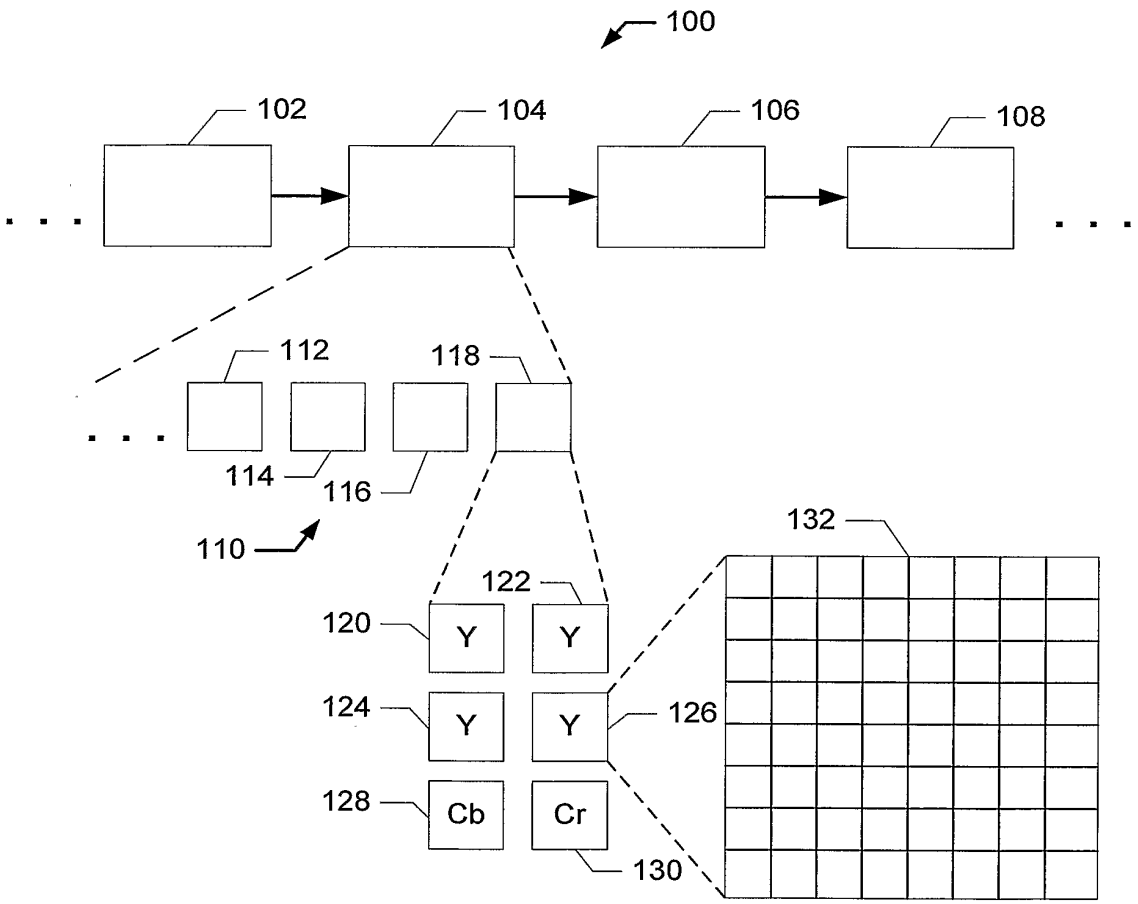

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FIG. 1

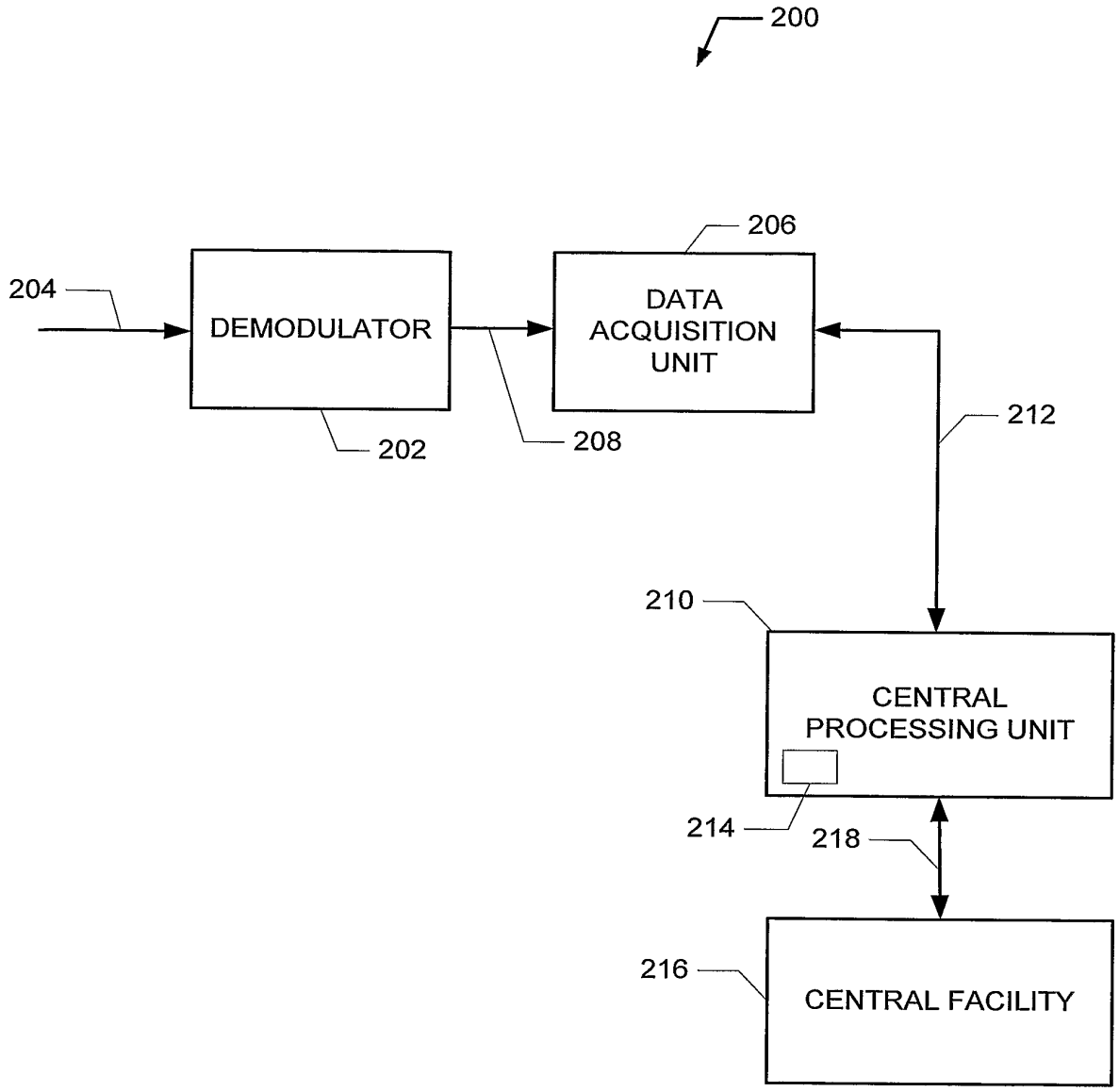

200
204
DEMODULATOR
206
DATA ACQUISITION UNIT
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212
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CENTRAL PROCESSING UNIT
214
218
216
CENTRAL FACILITY

FIG. 2

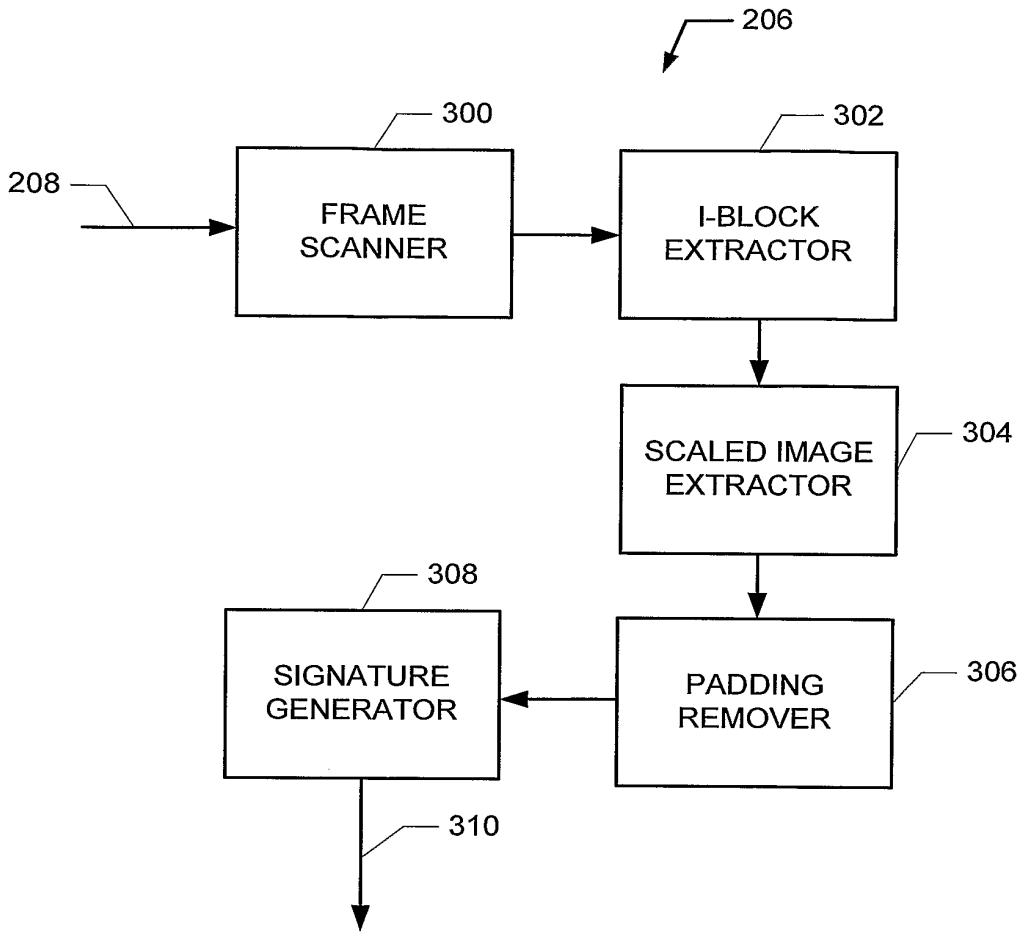

206
300
302
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FRAME SCANNER
I-BLOCK EXTRACTOR
SCALED IMAGE EXTRACTOR
304
308
SIGNATURE GENERATOR
PADDING REMOVER
306
310

FIG. 3

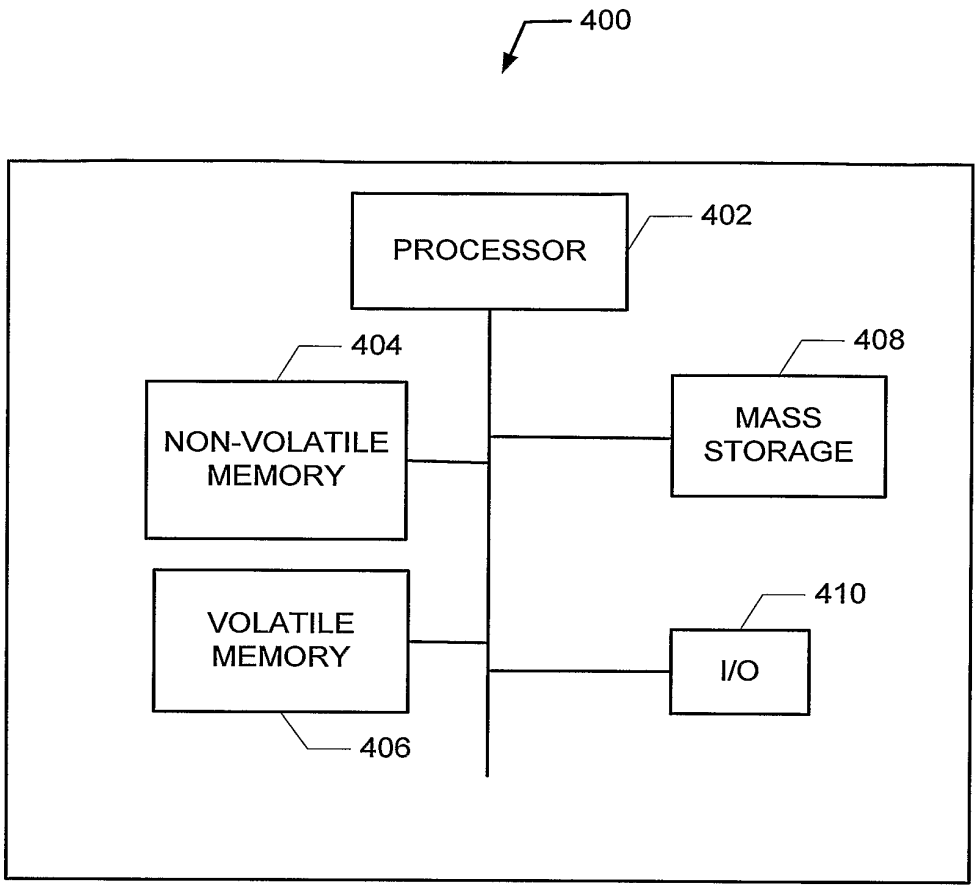

400
PROCESSOR
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404
NON-VOLATILE MEMORY
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MASS STORAGE
VOLATILE MEMORY
410
I/O
406

FIG. 4

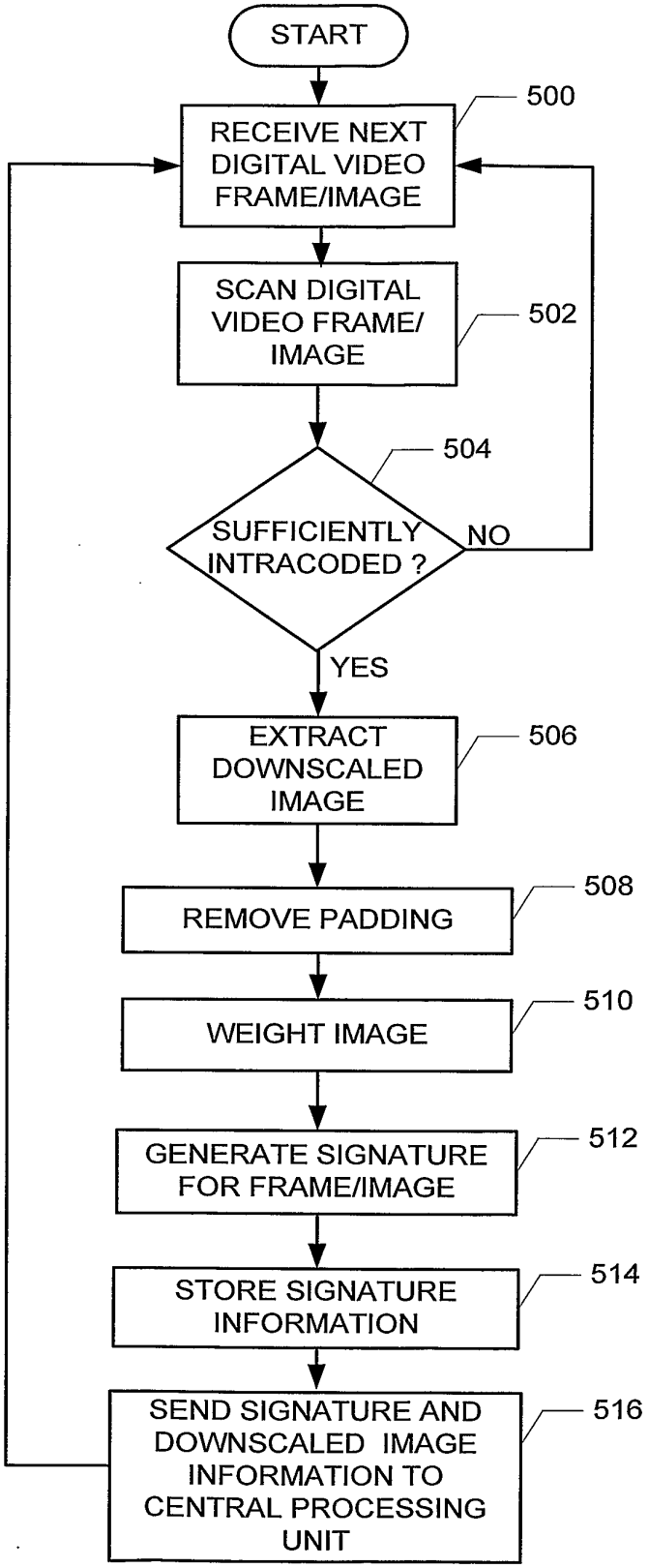

START
RECEIVE NEXT DIGITAL VIDEO FRAME/IMAGE
500
SCAN DIGITAL VIDEO FRAME/ IMAGE
502
SUFFICIENTLY INTRACODED ?
504
NO
YES
EXTRACT DOWNSCALED IMAGE
506
REMOVE PADDING
508
WEIGHT IMAGE
510
GENERATE SIGNATURE FOR FRAME/IMAGE
512
STORE SIGNATURE INFORMATION
514
SEND SIGNATURE AND DOWNSCALED IMAGE INFORMATION TO CENTRAL PROCESSING UNIT
516

FIG. 5

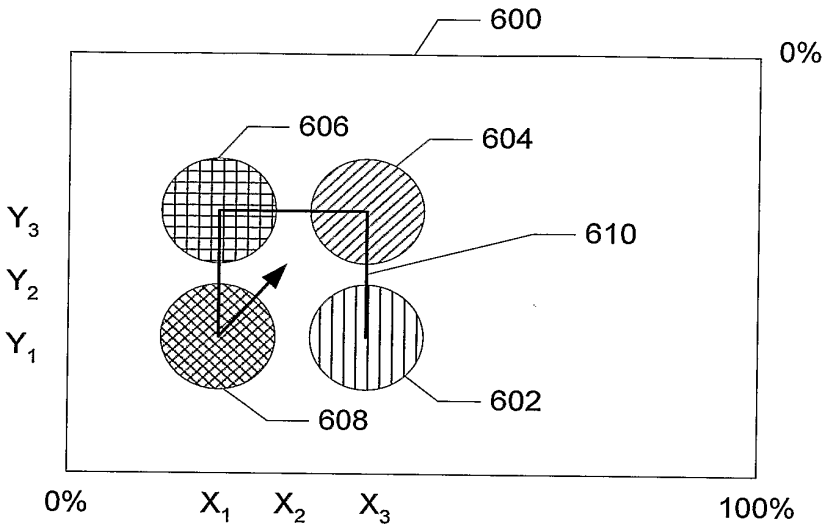


FIG. 6

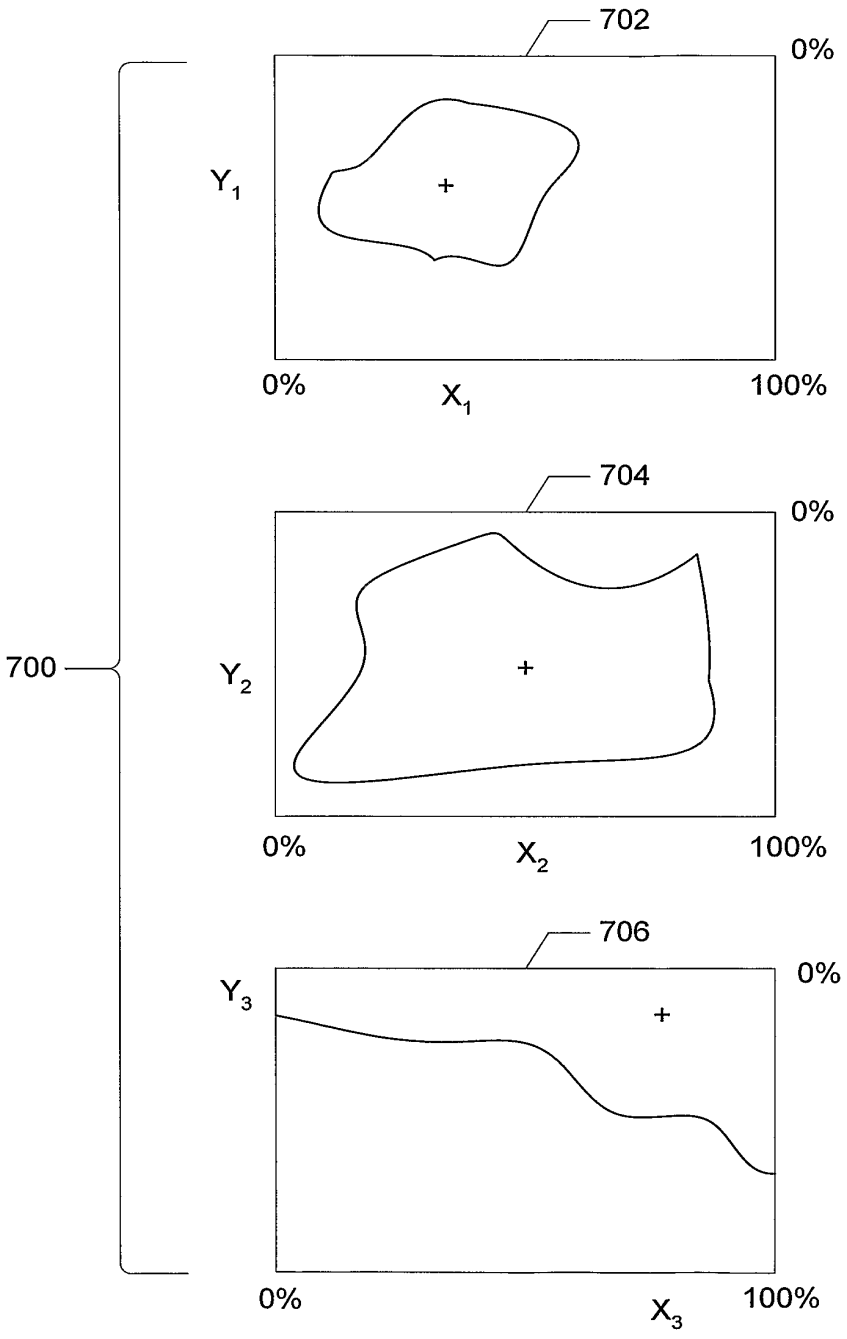


FIG. 7

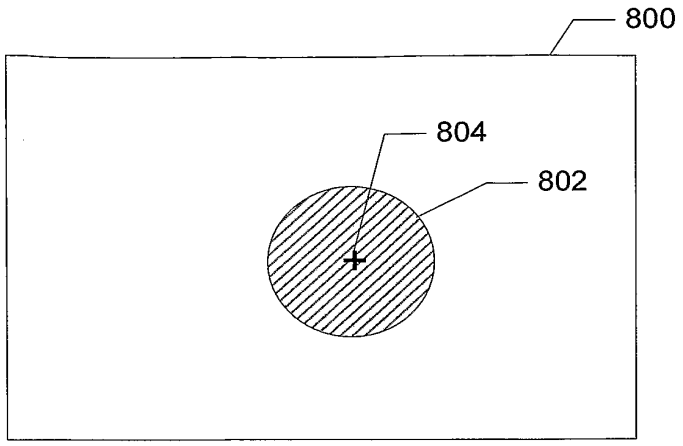


FIG. 8

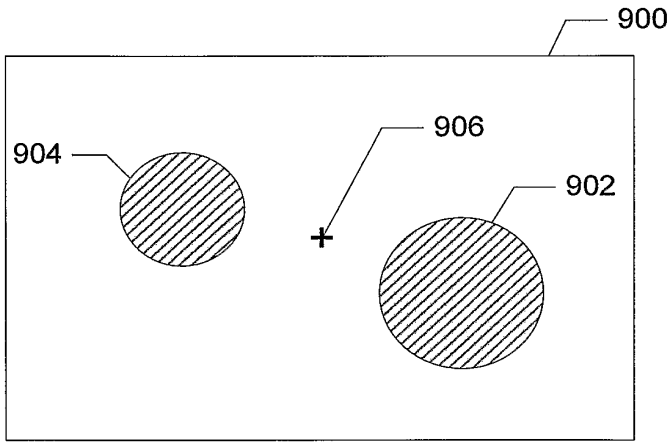


FIG. 9

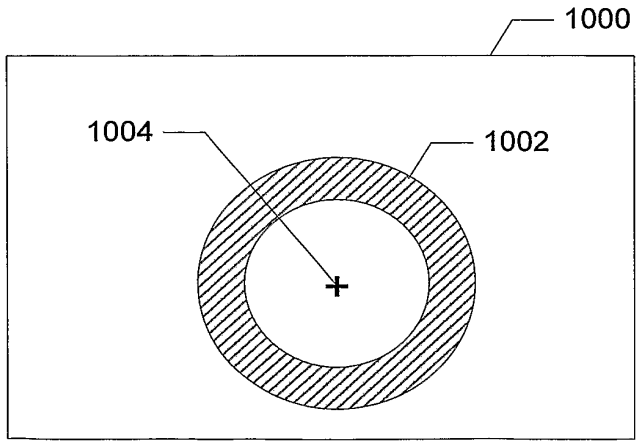


FIG. 10

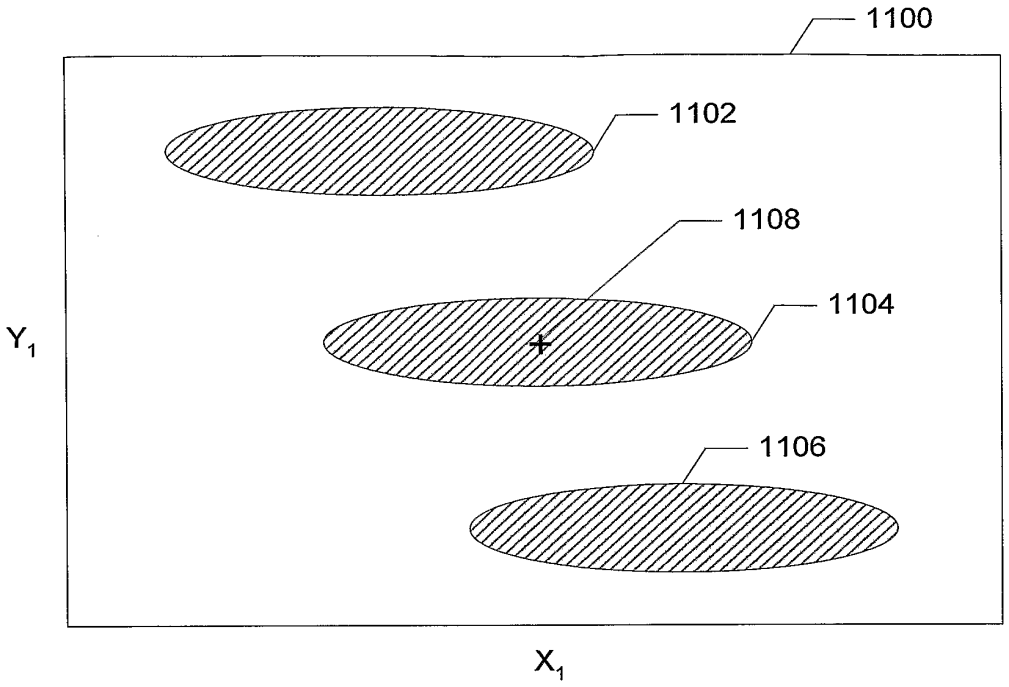


FIG. 11

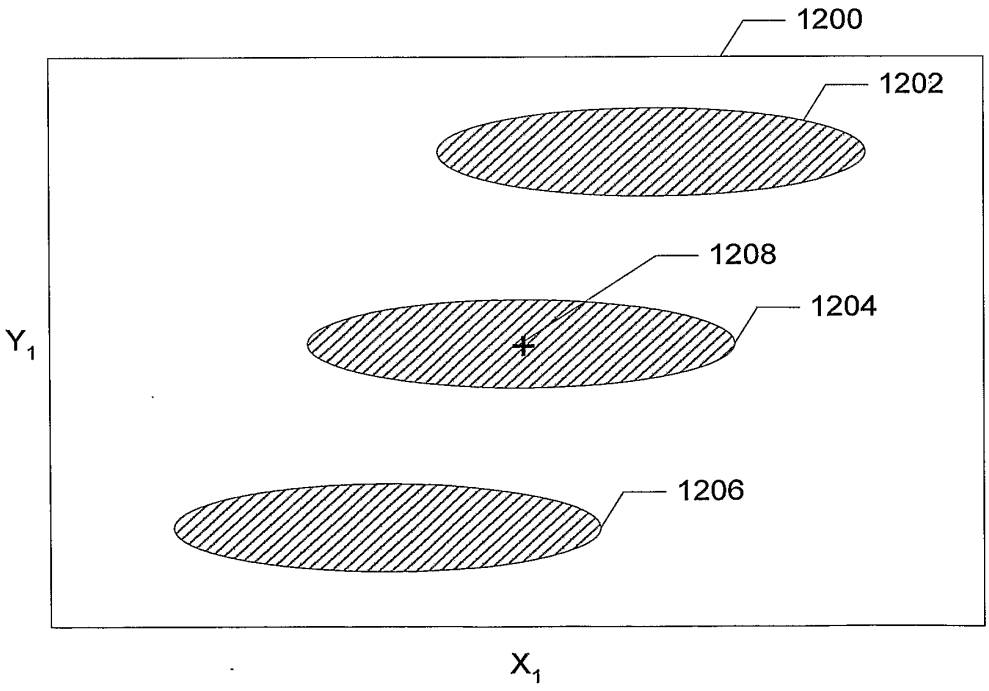


FIG. 12

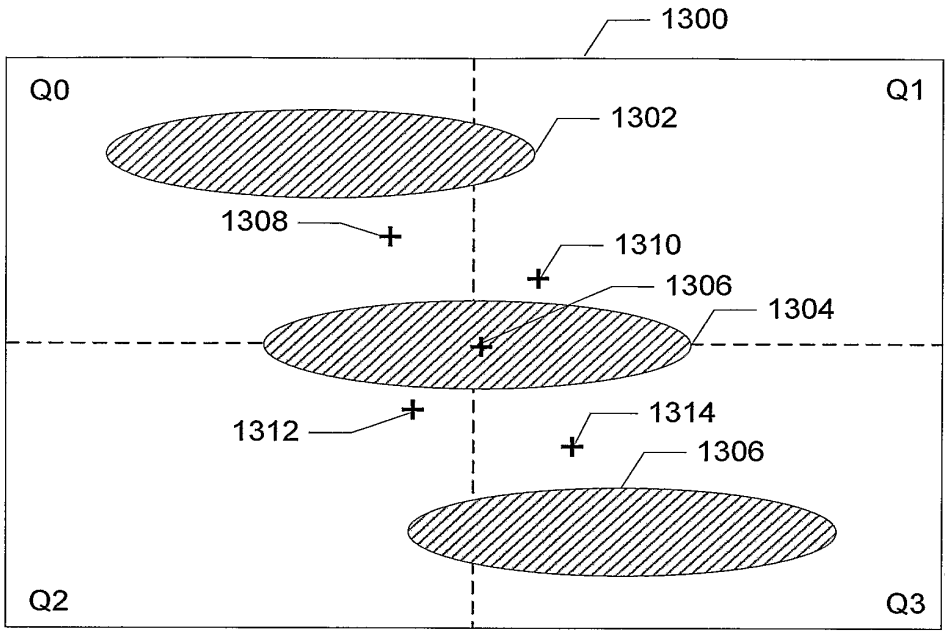


FIG. 13

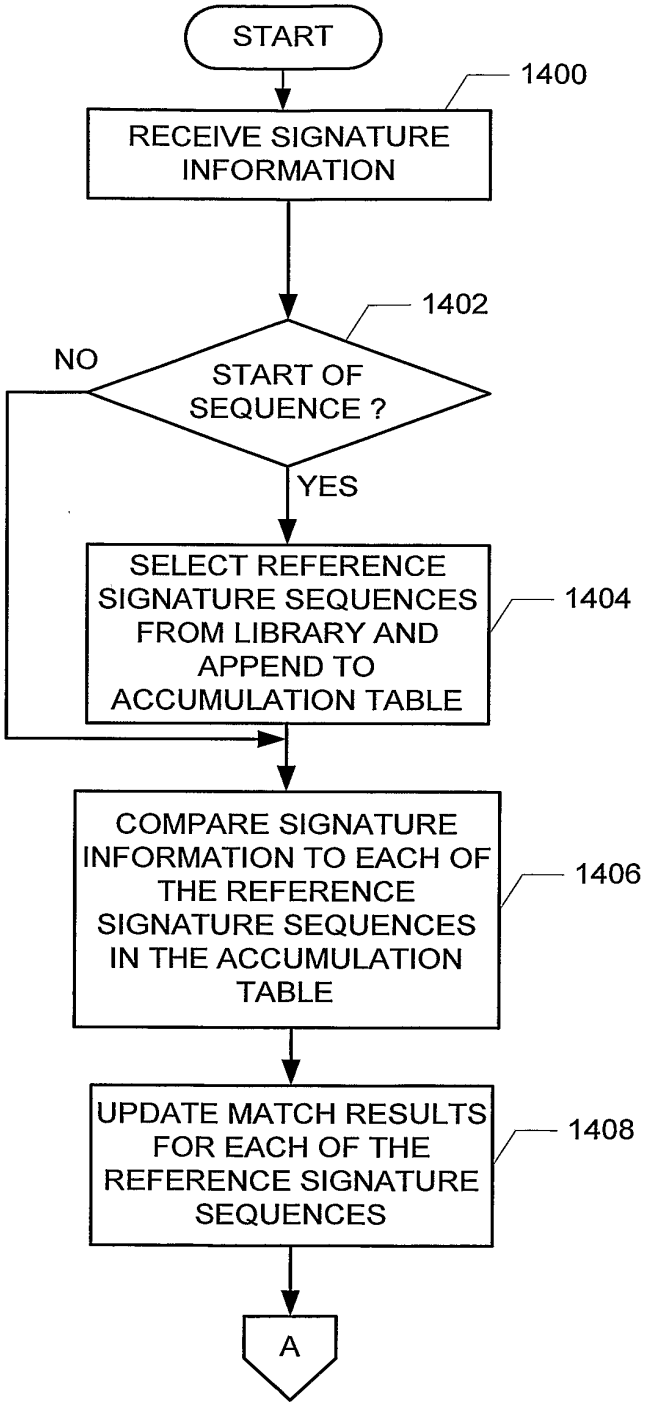

START
1400
RECEIVE SIGNATURE INFORMATION
1402
NO
START OF SEQUENCE ?
YES
SELECT REFERENCE SIGNATURE SEQUENCES FROM LIBRARY AND APPEND TO ACCUMULATION TABLE
1404
COMPARE SIGNATURE INFORMATION TO EACH OF THE REFERENCE SIGNATURE SEQUENCES IN THE ACCUMULATION TABLE
1406
UPDATE MATCH RESULTS FOR EACH OF THE REFERENCE SIGNATURE SEQUENCES
1408
A

FIG. 14

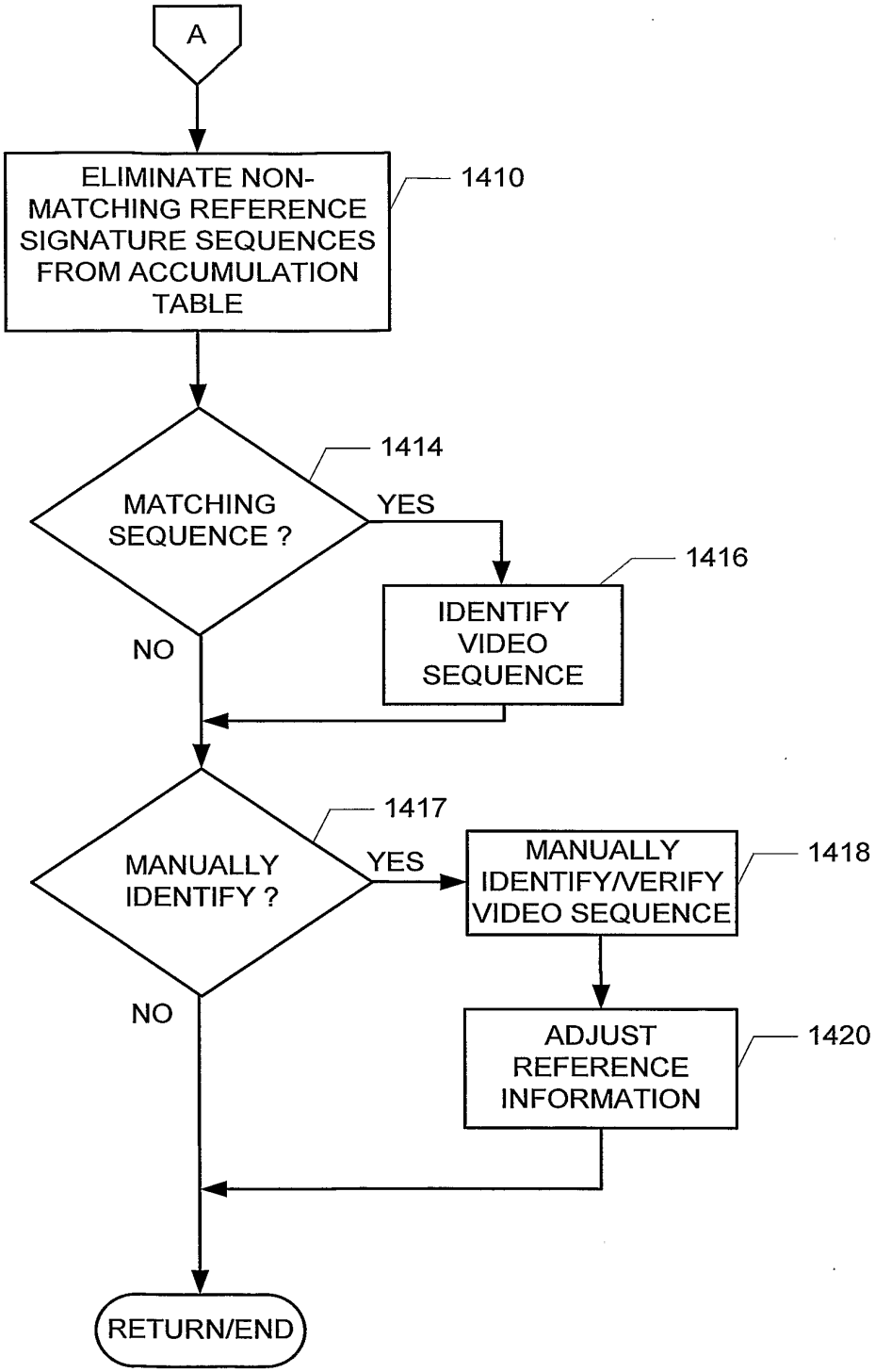

A
ELIMINATE NON-MATCHING REFERENCE SIGNATURE SEQUENCES FROM ACCUMULATION TABLE
1410
MATCHING SEQUENCE ?
1414
YES
NO
IDENTIFY VIDEO SEQUENCE
1416
MANUALLY IDENTIFY ?
1417
YES
NO
MANUALLY IDENTIFY/VERIFY VIDEO SEQUENCE
1418
ADJUST REFERENCE INFORMATION
1420
RETURN/END

FIG. 15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/29219

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : H04N 7/12
US CL : 375/240.26
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)
U.S. : 375/240.26; 348/700

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 practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,100,941 A (DIMITROVA ET AL) 08 AUGUST 2000, FIGS. 6 AND 7.	1-67
X	US 6,496,228 B1 (MCGEE ET AL) 17 DECEMBER 2002, FIGS. 2-7.	1-67

☐ Further documents are listed in the continuation of Box C. ☐ See patent family 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 application or patent 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

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"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

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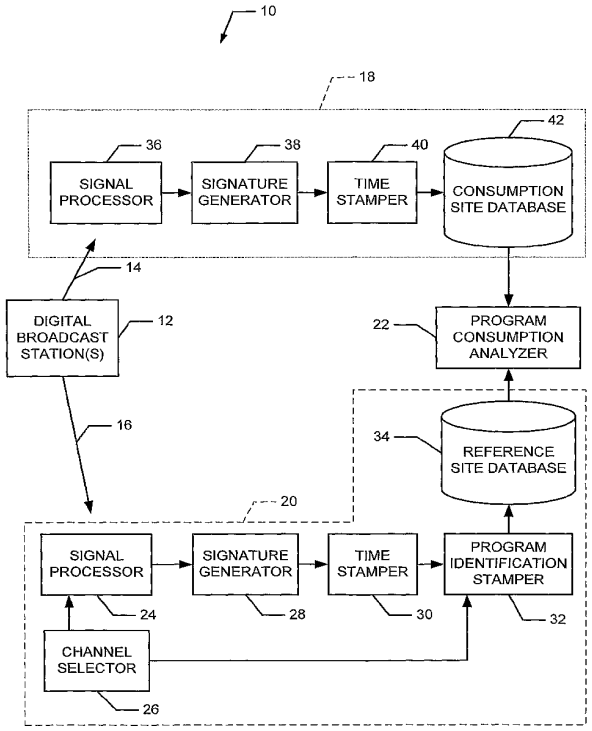
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[Continued on next page]

(54) Title: SIGNATURE-BASED PROGRAM IDENTIFICATION APPARATUS AND METHODS FOR USE WITH DIGITAL BROADCAST SYSTEMS



(57) Abstract: Signature-based program identification apparatus and methods for use with digital audio and/or video systems are disclosed. The disclosed systems and methods develop signatures of digital audio and/or video content from a digital data stream at two or more sites and compare the signatures to one another to identify the content.

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SIGNATURE-BASED PROGRAM IDENTIFICATION APPARATUS AND METHODS FOR USE WITH DIGITAL BROADCAST SYSTEMS

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates generally to digital broadcast systems and, more specifically, to signature-based audio/video content identification apparatus and methods for use with digital audio/video content delivery systems.

BACKGROUND

[0002] Digital audio/video content delivery and distribution systems have undergone rapid development and deployment in recent years due, at least in part, to their ability to efficiently distribute large numbers of high-fidelity video and/or audio content and programs as well as other digital services or content over a wide geographic region. For example, in the case of satellite-based digital television and wireless digital video/audio delivery systems, little, if any, land-based infrastructure (e.g., ground stations, cable lines, etc.) is needed to provide services to subscribers on a world-wide basis. As a result, such satellite-based and other wireless systems enable digital broadcasters and audio/video content providers to develop markets for their content, programs and/or services in remote and/or underdeveloped regions of the world in a cost-effective manner.

[0003] In general, regardless of whether a digital audio/video content delivery system uses one or more satellites, cable transmission lines, ground-based wireless transmission stations, the Internet or any combination thereof, such a system enables users to receive high-fidelity video and/or audio content, as well as user-interactive features or tools such as, for example, pictographic program guides, grid-based guides, etc. that enable users to plan and perform program consumption activities.

More specifically, digital audio/video content delivery systems that deliver digital television may transmit one or more high-bandwidth signals, each of which is typically composed of a stream of data or data packets having a plurality of video, audio and/or other digital programs multiplexed therein. Users or subscribers typically have a digital decoder unit which, in the case of a digital video or television system, is commonly referred to as a "set-top box." The set-top box can, based on subscriber commands, selectively de-multiplex data packets associated with a particular program from a particular data stream, decode those data packets and send a signal to a television or video monitor for viewing. Some digital televisions provide integrated or built-in set-top box functionality and, thus, do not require a separate set-top box.

[0004] Of course, as is the case with analog content providers and broadcasters, digital content providers and broadcasters (e.g., digital television, audio, etc.) desire to meter (i.e., monitor) the consumption of the programs and/or other services provided to users or subscribers to thereby generate audience program consumption behavior or patterns. Such audience consumption behavior or patterns may be used to develop program ratings information, to improve targeted marketing or advertising campaigns, to improve the types of programs and/or services and the times at which those programs and/or services are delivered, to assess the value of a particular time slot and program for purposes of determining what advertisers should pay for usage of that time slot., etc.

[0005] A metering system designed for use with an analog content delivery system, such as an analog television system, generates viewing records or other viewing information that is typically collected from a group of statistically selected households. Each of the statistically selected households has a data logging and

processing unit commonly referred to as a "home unit" or "site unit." The site unit is usually coupled to a variety of attachments that provide inputs to the site unit or that receive outputs from the site unit. For example, a frequency detector may be used to detect the local oscillator frequency of the television to identify the channel to which the television is currently tuned. Also, for example, a people counter, may be located in the viewing space of the television and in communication with the site unit, thereby enabling the site unit to actively or passively detect the identities of the persons currently viewing programs displayed on the television. In some cases, the metering system is designed to capture signature information associated with audio and/or video content that has been consumed in the household.

[0006] The site unit usually processes its inputs, including the inputs from its attachments, to produce viewing records. In general, the viewing records typically contain program identification information (i.e., information that can be used to identify a particular program, such as channel information obtained from the frequency detector and signature information) and audience information such as the numbers and/or identities of people viewing that particular program obtained from the people counter. The viewing records may be generated on a periodic basis (i.e., at fixed time intervals) or may be generated in response to a change in an input such as, for example, a change in the identities or number of persons viewing the television, a change in the channel tuning information (i.e., a channel change), etc. Of course, viewing records may contain any other information such as the identities of viewers present at the viewing time.

[0007] Often, the site unit collects a quantity of viewing records and transmits collected viewing records, usually daily, to a central office or data processing facility for further processing or analysis. The data processing facility receives viewing

records from site units located in some or all of the statistically selected households and additionally receives information from one or more reference sites. The reference sites are typically configured to capture information associated with the audio/video content broadcast to specific content distribution areas. For example, a reference site may collect signatures for all of the audio and/or video content distributed within its assigned area and then transmit the collected signatures to the data processing facility. The data processing facility analyzes the viewing records to ascertain the viewing behaviors of a particular household or group of households selected from all participating households. Additionally, the central data processing facility may generate viewing behavior statistics and other parameters indicative of viewing behavior associated with all of the participating households.

[0008] To generate viewing behavior information from viewing records, the central office or data processing facility may compare each of the signatures generated by a household unit to the signatures generated by the reference site. When a signature from the household unit matches a signature from a reference site, the identity of the content associated with matching signatures may be determined using data such as a list of content (i.e., a schedule lineup of television programming or television guide) associated with the reference site signatures and/or the time at which, and the channel from which, the signature was captured at the reference site. Such a matching process may be carried out for each of the viewing records received by the data processing facility, thereby enabling the data processing facility to reconstruct what programs were watched by all participating households and the times at which the programs were watched. Alternatively, such a matching process may be used only when other data, such as channel data or time data, is unavailable.

[0009] Signature information may be used in the foregoing manner to perform content identification because each signature is designed to uniquely correspond to the content from which it was collected. Thus, a match between two signatures indicates that the matching signatures were derived from the same content. While a variety of signature generation and capture techniques are well known in the art, such techniques are suited for use with audio/video content in an analog format.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Fig. 1 is a block diagram of an example system that uses signatures to identify digital audio/video content.

[0011] Fig. 2 is flow diagram of an example manner in which the system shown in Fig. 1 may be used to identify digital audio/video content consumed at a consumption site.

[0012] Fig. 3 is a diagrammatic view of an example data stream that may be used with the example system shown in Fig. 1.

[0013] Fig. 4 is a diagrammatic view of an example manner in which content reference signature information may be generated using an example digital data stream.

[0014] Fig. 5 depicts an example data structure that may be used to store reference signature information generated using the technique shown in Fig. 4 for a plurality of programs.

[0015] Fig. 6 is a diagrammatic view of an example manner in which sets of data stream signatures may be generated at the consumption site shown in Fig. 1.

[0016] Fig. 7 is an example data structure that may be used to store consumption site signature information generated using the technique depicted in Fig. 6.

[0017] Fig. 8 is an example digital audio/video content delivery metering system that may use the signature-based program identification apparatus and methods described herein.

DETAILED DESCRIPTION

[0018] Fig. 1 is a block diagram of an example system 10 that uses signatures to identify digital audio and/or video content. For purposes of illustration only, the system 10 is portrayed as a digital television broadcast system. However, the system may be implemented as any type of system configured to deliver audio/video content remotely and/or locally for consumption at a consumption site. The system 10 may include one or more digital broadcast stations 12 that transmit video programs, audio programs and/or other digital content or programs (e.g., television programs, advertisements, etc.) via communication paths or links 14 and 16 to at least one consumption site 18 and at least one reference site 20. The digital broadcast stations 12 may include one or more television stations, radio stations, Internet providers or any other transmission sites capable of transmitting video and/or audio content in a digital format. The communication paths or links 14, 16 may be implemented using any desired combination of wireless and hardwired links, including, for example, satellite links, cellular links, telephone lines, cable, Internet, a digital subscriber line, WiFi, Ethernet, etc. Of course, in the case where the digital broadcast stations 12 are transmitting television programs, the digital signals conveyed via the links 14, 16 contain both video and audio information and, in some cases, may also contain other information for providing a graphical program guide and/or other user-interactive features. In the case where the digital broadcast stations 12 are transmitting a plurality of programs simultaneously, the program information may be transmitted using a plurality of separately modulated signals (i.e., independent signals), using one

or more multi-program signals (i.e., signals within which multiple programs are multiplexed), or any combination thereof. For illustrative purposes only, the system 10 described herein and the examples described with respect thereto refer to broadcast content and/or broadcast programs. Broadcast content, as used herein, refers to content that is widely disseminated via any transmission method including any of the methods described above. However, the system described herein is not limited to use with systems that deliver and receive broadcast content. To the contrary, the system described herein is more generally applicable and, thus, is also suitable for use with systems that deliver and receive local content. For example, a television may be used to consume digital content supplied via a local source such as a digital video device (DVD). The system 10 described herein can be used to generate signatures and identify content delivered locally as well as content delivered via a broadcast system and can be used to generate signatures and identify content that was delivered via a broadcast system and then recorded for playback at a later time via a local device, such as a video cassette player, a digital video recorder, etc. Of course, signatures generated using content delivered via a local source can only be identified if the data processing facility has reference signatures that correspond to such locally delivered content. Signatures that correspond to locally delivered content can typically be obtained by using publicly released content that is usually consumed via a local device such as movies available on video cassette or digital versatile disks, musical recordings available on compact discs, movies and/or musical recordings downloadable via the Internet, etc.

[0019] The consumption site 18 shown in Fig. 1 is typically associated with the viewing location of a person subscribing to or otherwise enabled to access the services provided by one or more of the digital broadcast stations/services 12 although

it may also be the site of a digital television having access to a non-subscription broadcasting system/service. The consumption site 18 may be the home of an individual, a business location, including, without limit, any location, indoor or outdoor, at which content may be consumed. Although one consumption site (i.e., the consumption site 18) is shown in Fig. 1 for purposes of simplifying the following description, a plurality of other such consumption sites typically have access to the signals transmitted by the digital broadcast stations 12. Likewise, while a single reference site 20 is shown in Fig. 1, other such reference sites could be included within the system 10.

[0020] While the reference site 20 is described below as having a single signal processing channel (i.e., the ability to process content delivered via a single channel at any given time), multiple signal processing channels are typically employed. Thus, the reference site 20 is typically configured to process information associated with multiple channels and multiple content simultaneously, thereby enabling the reference site 20 to generate a library of content identification information. In light of the exemplary system 10 being described herein as a digital television broadcast system, the content delivered thereby is hereinafter referred to as television programs or programs. However, as described above, the system 10 is not limited to processing television programs to generate signatures but may instead be used to process any type of digital audio content and/or digital video content. Each of the signal processing channels may be tuned to a particular channel or program so that information associated with each of those tuned channels or programs may be processed simultaneously to develop a library of reference information (e.g., signature information) over a given time period (e.g., a rolling twenty-four hour period).

[0021] In general, the example reference site 20 shown in Fig. 1 receives signals from the digital broadcast stations 12 and selectively processes one or more broadcast program data streams contained within those signals to generate a series of reference signatures for each program data stream that is selected for processing. The reference signatures are generated by using or extracting raw binary information contained within the digital program data streams so that, within a particular time interval, each series of reference signatures is substantially uniquely characteristic of the program data stream from which the reference signature generation information was extracted. Thus, as will be described in greater detail below, the reference signature information may be used to later identify broadcast programs from which the reference signature information was derived. For example, a reference signature generated using the information contained within a known television program signal may be used to identify that television program within an unknown or unidentified signal. More specifically, if the unknown or unidentified signal contains a signature which substantially matches the reference signature information associated with a known program, it can be reliably determined that the unknown or unidentified signal contains the known program.

[0022] The consumption site 18 is located within the same broadcast region as the reference site 20 and, therefore, receives the same broadcast signals that are received at the reference site 20. The consumption site 18 generates a series of signatures in a manner similar or identical to that of the reference site 20 for the program currently being consumed (e.g., viewed, listened to, etc.) at the consumption site 18. However, as the subscriber or user at the consumption site 18 changes the currently selected program, the series of signatures generated by the consumption site 18 changes in a corresponding manner. Thus, the series of signatures generated by the consumption

site 18 may include a plurality of distinct signature sequences, each of which may correspond to a different program, and each of which may have a length corresponding to the amount of time spent consuming that program (e.g., the amount of time during which the consumption site 18 was tuned to that program).

[0023] As described in greater detail below, a program consumption analyzer 22 receives the series of signatures generated by the consumption site 18 (and other consumption sites in the event more than one consumption site is used within the system 10) and compares the signatures therein to the reference signatures generated by the reference site 20. Typically, the program consumption analyzer 22 does not receive any program identification information along with the series of signatures received from the consumption site 18 because the consumption site 18 is not typically configured to generate such information. The program consumption analyzer 22 can compare the series of signatures generated by one or more consumption sites such as, for example, the consumption site 18, to reference signatures associated with known programs to ascertain the identities of programs viewed and the times at which the programs were viewed at the consumption site 18.

[0024] Now turning in detail to the reference site 20 shown in Fig. 1, a signal processor 24 extracts data associated with a particular channel as determined by a channel selector 26. The signal processor 24 can use known techniques to demodulate, demultiplex (if a multi-program signal has been demodulated), and decode program data received via the link or communication path 16. Some or all of the data extracted by the signal processor 24 may be audio data sent in conjunction with video information such as, for example, digital television signals, advertisements, etc. Alternatively, some or all of the data extracted and processed by the signal processor 24 may be video data or information. In the case where the

signal processor 24 receives digital television signals from the digital broadcast stations 12, the channel selector 26 controls the signal processor 24 to extract data packets having a particular identifier (e.g., in the data packet header) associated with a particular broadcast channel.

[0025] Each of the broadcast stations 12 may transmit one or more digital data streams, each of which may be associated with a particular major channel. In turn, each major channel may include two or more minor channels or sub-channels, each of which may include a video data stream and one or more audio data streams. The reference site 20 retains program lineup information that supplies tuning information to the channel selector 26. For example, the lineup information may provide packet identifiers for each of the major and minor channels, video data streams, audio data streams, etc. along with program identification information (e.g., program titles or names) for each of the channels indexed over time. In this manner, the channel selector 26 can be configured using the program lineup information to cause the signal processor 24 to select video and/or audio data packets having identifiers associated with a particular major and/or minor channel. Typically, in the case where more than one signal processing channel is employed within the reference site 20, each processing channel has a channel selector configured to cause its corresponding signal processor to select data packets associated with a different channel. In that case, as noted above, the reference site 20 can be configured to generate signature information simultaneously for a plurality of channels for a predetermined period of time (e.g., a rolling twenty-four hour period).

[0026] In some example systems, one or more broadcast programs may be associated with more than one audio data stream. For example, multiple audio data streams, each of which is associated with a different language, may be associated with

a single video program. In cases where a broadcast channel or program includes a plurality of alternative audio data streams, the signal processor 24 may selectively extract or parse data packets associated with one, some or all of the available audio data streams.

[0027] The signal processor 24 sends extracted or parsed data packets associated with the currently selected channel to a signature generator 28. The signature generator 28 uses information within the extracted data to generate a series of signatures substantially uniquely characteristic of the selected program or channel data stream(s). In examples where the currently selected channel includes a plurality of alternative audio data streams, the signature generator 28 may receive data packets associated with one, some or all of those audio data streams from the signal processor 24 and generates a series of signatures for each of the data streams. As described in greater detail in connection with Figs. 2 and 3, the signature generator 28 may combine or otherwise use portions of data packets to generate signatures. In particular, the signature generator 28 may concatenate cyclical redundancy check (CRC) values associated with the data packets in a manner that generates a series of digital values (i.e., signatures) that is substantially unique to the program data stream currently being extracted by the signal processor 24.

[0028] The reference site 20 also includes a time stamper 30 and a program identification stamper 32. The time stamper 30 associates a time value with each signature value generated by the signature generator 28. The program identification stamper 32, based on the channel currently selected by the channel selector 26, uses program lineup information and the time stamp values to identify the program currently being processed by the signal processor 24. In addition, the program identification stamper 32 associates the information pertaining to the identity of the

program currently being processed with the signature information generated by the signature generator 28. Each generated reference signature is stored along with its time stamp and program identification information within a reference site database 34.

[0029] Reference signature information may be generated for multiple programs and, in some cases, multiple audio/video data streams for one or more of the multiple programs, and stored within the reference site database 34. For example, the signal processor 24 and channel selector 26 could be configured to select different programs or channels at different times for processing. In that case, the reference site database 34 contains reference signatures for different programs, where the reference signature information generated for each program was generated at a different time.

[0030] Additionally or alternatively, as noted above, the reference site 20 may be configured to provide multiple processing channels so that reference signature information can be generated for a plurality of programs simultaneously. In that case, the reference site 20 may include an additional signal processor 24, channel selector 26, signal generator 28, time stamper 30 and/or program identification stamper 32 for each additional processing channel. In the case where the reference site 20 includes multiple processing channels, each of the channel selectors 26 is typically configured to cause its corresponding signal processor 24 to extract data packets associated with a different major and/or minor broadcast channel. Also, once configured, the channel selectors 26 are typically not reconfigured and, thus, control their respective channels to extract data packets associated with a particular channel on an ongoing basis.

[0031] The consumption site 18 includes a signal processor 36, a signature generator 38, a time stamper 40 and a consumption site database 42, all of which may be similar to the signal processor 24, the signature generator 28, the time stamper 30 and the reference site database 34, respectively. However, as depicted in the example

system 10 of Fig. 1, the consumption site 18 does not have blocks similar to the program identification stamper 32 and the program selector 26. While the consumption site 18 may employ an apparatus that enables a user or subscriber to control program selection, any such program selection apparatus does not output information that can be readily used to extract and store currently selected program identification information in the consumption site database 42.

[0032] The time stampers 30 and 40 are preferably substantially synchronized so that if the signature generators 28 and 38 generate signatures at substantially the same instant of time, the time values generated by the time stampers 30 and 40 and associated with those signatures are substantially the same. However, as described in greater detail below, absolute synchronization of the time stampers 30 and 40 is not required if the program consumption analyzer 22 is configured to look for signature matches in the reference site database 34 within a window (i.e., a range) of time surrounding a suspected time at which a consumption site signature was generated.

[0033] Any or all of the signal processors 24, 36, the signature generators 28, 38, the time stampers 30, 40, the program identification stamper 32, the channel selector 26, the reference site database 34, the program consumption analyzer 22 and the consumption site database 42 may be implemented using any desired combination of hardware, firmware and/or software. For example, each of the reference site 20, the consumption site 18 and the program consumption analyzer 22 may utilize a computer system or other processor system that executes machine readable instructions or programs to implement the apparatus and methods described herein. The machine readable instructions or programs may be embodied in software stored on a tangible medium such as a CD-ROM, a floppy disk, a hard drive, a digital versatile disk (DVD), and/or a memory.

[0034] The databases 34, 42 may be implemented using any known mass storage device(s) such as, for example, magnetic and optical disk drives. In addition, the databases 34, 42 may be combined into a single or common database, which may be embodied on a single or multiple mass storage devices, accessible by the program consumption analyzer 22.

[0035] Fig. 2 is flow diagram of an example manner in which the system 10 shown in Fig. 1 may be used to identify digital broadcast programs consumed at the consumption site 18. The signal processors 24, 36 acquire data associated with a program selected for consumption by a user at the consumption site 18 (blocks 70, 71). For example, the signal processors 24, 36 may extract or parse audio and/or video data associated with a particular program from a multi-program digital television signal sent by the digital broadcast stations 12 (blocks 70, 71). The signature generators 28, 38 then generate signature information by, for example, concatenating CRCs or portions of CRCs associated with the extracted data (blocks 72 and 73). Each signature may, for example, be generated using a portion of one or more CRCs in a manner that results in a substantially unique digital value that is substantially uniquely characteristic of the extracted data and, thus the program, currently being consumed at a particular time. In general, generating a signature composed of a large number of bits increases the probability that the signature is unique to the program currently being consumed (i.e., decreases the probability that another program, if consumed at the same time, would result in the same signature). However, signatures having a large number of bits increases processing overhead and, thus, may decrease the overall processing speed and efficiency of the system 10 (Fig. 1). Each signature generated by the signature generators 28, 38 is stored along with a time stamp generated by the time stampers 30, 40 (block 74).

[0036] The program consumption analyzer 22 (Fig. 1) extracts the signature information or data (along with associated time stamps) stored within the consumption site database 42 and compares this signature information to the reference signature information stored within the reference site database 34 during a relevant time period (block 76). In particular, the program consumption analyzer 22 examines the time stamp values associated with the signatures from the consumption site database 42 that are currently being analyzed to reference signature information stored within the reference site database 34 during a relevant range of times or window of time. Due to unequal signal transmission delays between the digital broadcast stations 12 and the sites 18 and 20, the program consumption analyzer 22 may compare the signature information from the consumption site database 42 that is currently being analyzed to reference site information that was acquired over a somewhat longer amount of time (i.e., a wider or larger time window). For example, the comparison may extend several seconds prior to and following the time associated with the earliest and latest time stamps of the consumption site signature information being analyzed, thereby eliminating the need for absolute or precise synchronization between the sites 18 and 20 (e.g., the time stampers 30 and 40).

[0037] Because the user at the consumption site 18 can change the program being consumed (e.g., by changing channels), the program consumption analyzer 22 analyzes the series of signatures provided by the consumption site database 42 using sets or blocks of signatures representative of consumption activity over a relatively brief time interval such as, for example, thirty seconds. Of course, any other time interval could be used instead.

[0038] For each comparison made, the program consumption analyzer 22 determines whether a substantial match of the consumption site signature information

has been found within the reference site database 34 (block 78). If a substantial match has been found, the program consumption analyzer 22 uses the program identification information stored along with the reference signature information to identify the program that was consumed within the consumption site 18 (block 80). In the event that a match is not found, any desired non-match handling routines may be used to determine and initiate an appropriate action (block 82). For example, such non-match handling routines may include a window adjustment routine to enable adjustment of the relevant time window used by the program consumption analyzer, may display or otherwise output a closest match for final determination by, for example, a reference site operator.

[0039] Fig. 3 is a diagrammatic view of an example data stream 100 that may be used with the example system 10 shown in Fig. 1. The example data stream 100 includes a plurality of data packets 102, 104 and 106 having respective payload or data portions 108, 110 and 112, respective CRC portions 114, 115 and 116 and respective header portions 117, 118 and 119. The payload portions 108, 110 and 112 include information related to audio and/or video content that may be presented to a user via an output device. On the other hand, the CRC portions 114, 115 and 116 and header portions 117, 118 and 119 are non-payload digital information.

[0040] The data stream 100 may be compliant with any known digital transmission protocol or standard. For example, in the case where the digital broadcast stations 12 are transmitting digital television signals that are compliant with the Advanced Television Systems Committee (ATSC) standard, the data stream 100 may be a Dolby AC-3 compliant digital audio signal. By way of background, the Dolby AC-3 standard is a compressed multi-channel digital audio standard that was developed by the Dolby Corporation and that was adopted by the ATSC for use with digital

television transmissions within the United States of America. In any event, if the data stream 100 is an AC-3 compliant data stream, the data packets 102-106 are transmitted at a rate of 31.25 per second (i.e., a packet every 32 milliseconds) and the CRCs 114-116 within the data packets 102-106 are sixteen-bit values.

[0041] The digital data stream 100 may instead be compliant with other protocols or standards such as, for example, the European Digital Video Broadcast (DVB) standard, the Japanese Terrestrial Integrated Services Digital Broadcasting (ISDB-T) standard, Motion Picture Expert Group – 2 (MPEG-2) standard, MPEG-1, MPEG-3, MPEG-4 Advanced Audio Code or any other version of MPEG, or any other similar or different digital video and/or audio transmission standard or protocol. In general, any digital data stream that provides audio and/or video information that can be extracted from the data stream can be used to implement the signature-based program identification apparatus and methods described herein. Thus, any digital data stream that can be used to generate unique signatures may be used. By way of example, any digital data stream having a substantially random sequence of digital values, e.g., CRCs or any other predetermined data packet portions that are computationally related to data packet content, may be used to generate unique signatures. More specifically, predetermined data packet portions that are computed based on other portions of data packet content (e.g., CRCs) can provide sufficiently random sequences of digital values that may be used to implement the apparatus and methods described herein. It should be understood that while the sequences of digital values generated by the apparatus and methods described herein are, numerically speaking, substantially random, they are computationally deterministic with respect to the channel and program data packets from which they are derived. As a result, the sequences of digital values generated using the apparatus and methods described

herein are substantially uniquely characteristic of the content from which they are derived.

[0042] Further, it should be understood that both broadcast station characteristics and program content can contribute to the uniqueness of the digital sequences generated using the apparatus and methods described herein. Thus, in the event that a program is transmitted simultaneously (e.g., simulcast) by two or more broadcast stations, the digital sequences generated by two or more receiving stations (e.g., reference sites and consumption sites) for two or more simulcast versions of a program using the apparatus and methods described herein can, nevertheless, be different due to differences in the characteristics of the broadcasting stations. For example, it is highly improbable that two broadcast stations encoding the same program will encode (e.g., compress) the program content in precisely the same manner to generate identical digital data packets. Thus, if CRCs, or any other predetermined data packet portions that are computationally related to other data packet content, are used to form signatures for two or more versions of a simulcast program, each version of the simulcast program will yield a different, distinguishable sequence of digital values.

[0043] Fig. 4 is a diagrammatic view of an example manner in which program reference signature information may be generated using an example digital data stream 120. The example digital data stream 120 includes a plurality of data packets 122, 124, 126, 128 and 130 having respective data portions 132, 134, 136, 138 and 140, respective CRCs 141, 142, 143, 144 and 145, and respective header portions 146, 147, 148, 149 and 150. The example data stream 120 is associated with a particular type of program (e.g., a digital television program).

[0044] As depicted in the example of Fig. 4, the signature generator 28 (Fig. 1) forms signatures for selected ones of the data packets 122-130 (as opposed to all of the data packets) to reduce the amount of reference signature information generated and, thus, the amount of reference signature information to be stored in the reference site database 34. Although the example of Fig. 4 depicts signatures being generated for half the data packets (i.e., by skipping every other data packet), more or fewer data packets could be skipped (i.e., a signature may be generated for every X data packets) if desired or, alternatively, signatures could be generated for every data packet. In general, as the number of skipped data packets increases, the amount of signature information generated for the program associated with the data stream 120 decreases. However, as will been seen in connection with the following discussion, as the amount of reference signature information generated decreases, the amount of signature information generated by the consumption site 18 may have to be significantly increased to guarantee that the signature information generated at the consumption site 18 will include at least one or two reference signature matches.

[0045] The signature generator 28 generates a signature S(N) by combining portions of the CRCs 143 and 145. Such a combination may involve a concatenation of the entire CRCs 143 and 145, a concatenation of equal size or unequal size portions of the CRCs 143 and 145, a mathematical or logical operation (e.g., a summation, division, multiplication, ANDing, ORing, etc.) using the CRCs 143 and 145 (or portions thereof) as operands, or some other combining technique. One reference signature generation technique that is particularly useful in the case where the example data stream 120 is an AC-3 compliant audio data stream concatenates the CRCs of data packets that are a predetermined number of data packets apart. With this reference signature generation technique, the signature S(N) of a data packet N is

mathematically given by Equation 1 below where the value "X" is the number of data packets skipped between signature generations.

[0046] Equation 1 $S(N) = CRC(N+X) * 2^{16} + CRC(N)$

[0047] Thus, if the number of data packets skipped between signatures equals thirty-two, the generation of signatures starting with a data packet "1" according to Equation 1 above results in the generation of signatures S(1), S(33), S(65), S(96).... More generally, the use of Equation 1 as described above generates signatures S(N) using a sliding window of two CRCs that are X data packets apart. This sliding window is shown in two successive positions represented by the brackets labeled S(N) and S(N+X), respectively, of Fig. 4.

[0048] Of course, the reference signature generation technique represented diagrammatically in Fig. 4 is only one example and many other variations of the technique shown thereby may be employed with similar results. For example, the number of data packets skipped (i.e., value X) may be made greater than or less than thirty-two. Further, the number of bits in the resulting signatures may be less than or greater than thirty-two. For example, four bits of the data packet N+X may be concatenated with the full sixteen bits of the data packet N to form a twenty bit signature. Still further, bits from more than two CRCs may be used to form each signature, in which case, signatures could have more than thirty-two bits. In the case where three or more CRCs are combined, the sliding window can be envisioned as having three or more corresponding prongs. Still further, in the case where three or more CRCs are used to generate signatures, the CRCs may be evenly spaced within the data stream so that there are equal numbers of skipped data packets between each of the CRCs. Alternatively, the CRCs may be spaced in an unequal manner so that

the number of skipped data packets between one pair of CRCs used to generate a signature is greater than or less than the number of skipped data packets between another pair of CRCs used to generate that same signature.

[0049] Fig. 5 depicts an example data structure 170 that may be used to store reference signature information generated using the technique shown in Fig. 4 for a plurality of programs 172, 174 and 176. The data structure 170 shown in Fig. 5 depicts signature information for three programs (i.e., programs A, B and C) being generated substantially simultaneously. In other words, population of the data structure 170 with reference signature information requires the reference site 20 (Fig. 1) to have multiple signal processing channels that simultaneously capture or extract data packets associated with three programs. The reference signature values are stored in the data structure 170 according to the program with which they are associated (i.e., Program ID) and the times at which the data packets to which the reference signature value corresponds were acquired. In examples where reference signature information is generated using the technique described in connection with Fig. 4, the data stream 120 is an AC-3 compliant audio data stream, and the sliding window skips thirty-two packets (i.e., X=32), the times T(N), T(N+X), etc. are one second apart, and the reference signatures are generated using pairs of CRCs that are thirty-two packets (i.e., one second) apart (i.e., $S_A(N)$, $S_A(N+32)$, $S_A(N+64)$, etc.)

[0050] When comparing consumption site signature information (retrieved from the consumption site database 42 shown in Fig. 1) to reference site signature information, which may be stored in the reference site database 34 (Fig. 1) using a data structure similar or identical to the data structure 170 (Fig. 5), the program consumption analyzer 22 uses the time data (i.e., data associated with the columns T(N), T(N+X), etc.) to limit the comparison to a relevant time window. For example,

if the signature information processed by the program consumption analyzer 22 includes signatures generated at times T(N+X) and T(N+2X), the program consumption analyzer 22 may compare all of the reference signatures associated with the columns T(N+X) and T(N+2X) with the consumption site signatures currently being processed.

[0051] Although the time stampers 30, 40 are preferably substantially synchronized to maintain approximately the same absolute time, transmission delay times may result in the reference site 20 and the consumption site 18 processing data packets and generating signatures therefrom at somewhat different times. As a result, the time stamps accompanying consumption site signatures may not precisely match the time stamps associated with corresponding reference signatures (e.g., T(N), T(N+X), etc. of the data structure 170 of Fig. 5) and, in some cases, could be time shifted several seconds or more. Thus, when performing comparisons, the program consumption analyzer 22 may use a tolerance or delay error window to determine if a time stamp associated with the consumption site 18 corresponds to a time stamp associated with the reference site 20, but for a difference in data extraction time and/or transmission delay time. For example, if a time stamp associated with a consumption site signature is an absolute time T, the program consumption analyzer 22 may look for signature matches within the reference site database 34 (within, for example, a data structure similar or identical to the database 170 of Fig. 5) over a time window of $T-W_1$ to $T+W_2$, where W_1 may be, for example, three seconds and W_2 may be, for example, five seconds. Of course, other values for W_1 and W_2, including equal values, could be used instead.

[0052] Before discussing additional example techniques for generating consumption site signatures, it should be recognized that to enable exact matching of

signatures between the reference site 20 and the consumption site 18, individual signatures are generated in a consistent manner at the reference site 20 and the consumption site 18. Thus, for example, if the reference site 20 generates signatures by concatenating pairs of CRCs that are thirty-two data packets apart, then the individual signatures generated at the consumption site 18 are also generated by concatenating pairs of CRCs that are thirty-two data packets apart.

[0053] Although the techniques used at the consumption site 18 and the reference site 20 for generating individual signatures are consistent or the same, the sets of signatures generated by the consumption site 18 and the reference site 20 do not necessarily have to be the same. In other words, the consumption site 18 may generate sets of signatures that include signatures associated with data packets for which the reference site 20 has not generated signatures. Likewise, the reference site 20 may generate signatures for data packets for which the consumption site 18 has not generated signatures. Of course, the sets of data packets for which signatures are generated by the consumption and reference sites 18 and 20 have to overlap sufficiently (i.e., a sufficient number of matching signatures) to enable the program consumption analyzer 22 to reliably identify programs consumed at the consumption site 18 based on the reference signature data.

[0054] Fig. 6 is a diagrammatic view of an example manner in which sets of signatures associated with a program data stream may be generated by the consumption site 18 shown in Fig. 1. In general, the technique depicted in Fig. 6 repeatedly generates signatures for blocks or sets of consecutive data packets 200 and 202 separated by a delay 204. Each of the signatures within the sets 200 and 202 is generated in the same manner as individual signatures generated at the reference site 20. For example, in the case where the reference signatures are generated using the

technique depicted in Fig. 4, each of the signatures within the sets of signatures 200 and 202 is generated using pairs of CRCs that are thirty-two packets apart.

[0055] In addition, each of the sets of signatures 200 and 202 is of a size and, thus, extends over a time period, that guarantees that at least one reference signature corresponding to a data packet for which a signature was generated by the consumption site 18 and included in the set would have been generated by the reference site 20 during the same time period. As indicated above, the sets of signatures 200 and 202 are composed of signatures for consecutive data packets (i.e., no data packets are skipped within a set). Thus, in a case where the reference site 20 generates signatures using the technique depicted in Fig. 4 using pairs of CRCs that are thirty-two packets apart and skipping thirty-two packets between signatures, the sets 200 and 202 include at least thirty-two consecutive signatures, which requires the acquisition of sixty-four consecutive data packet CRCs. In this manner, each of the sets 200 and 202 could include at least one signature corresponding to a reference signature.

[0056] The duration of the delay 204 may be selected to correspond to the nature of program consumption behavior (e.g., channel changing behavior of users). For example, the delay 204 may be selected to be about thirty seconds or any other desired amount of time that enables the signature information gathered at the consumption site 18 to accurately depict the program consumption activities at the consumption site 18. Further, the delay 204 may also be selected to minimize, in view of the accuracy needed in connection with identifying program consumption activities, the amount of data extraction (e.g., CRC extraction), signature generation, signature data storage and comparison activity performed. In general, as the duration of the delay 204 increases, the accuracy (i.e., the resolution) with which program

consumption activities can be determined decreases and the amount of data processing and storage requirements decreases.

[0057] Fig. 7 is an example data structure 220 that may be used to store consumption site signature information using the technique depicted in Fig. 6. In general, the example data structure 220 is formed as an array of signature values (i.e., S(N), S(N+1), etc.) and associated time stamps (i.e., T(N), T(N+1), etc.). First and second signatures sets 222 and 224 correspond to the signature sets 200 and 202, respectively, of Fig. 6. By way of example, each of the signature sets 222 and 224 includes thirty-two signature values. However, due to the delay 204 (Fig. 6), signature values for 864 data packets are skipped in this example and, as a result, the signatures for data packets N+32 to N+927 are not generated. In the case where the data stream provides data packets at a rate of 31.25 per second (e.g., an AC-3 audio data stream), 864 skipped packets corresponds to about twenty-seven seconds.

[0058] In addition to the example signature generation methods discussed in connection with Figs. 4-7, other methods of generating signature information within the consumption and references sites 18 and 20 are possible. For example, in another example method, signatures may be formed for every m^{th} CRC within data streams processed by the consumption site 18 and every n^{th} CRC within data streams processed by the reference site 20, where m and n are relatively prime. In this manner, matching signatures will only be generated at every m*n packets. Each of the signatures may be, for example, composed of twenty bits taken from two consecutive CRCs. However, any other number of consecutive CRCs and/or bits may be used instead.

[0059] In still another example method, reference signature information may be generated at the reference site 20 by dividing CRCs by a predetermined whole

number and storing only those CRCs that are evenly divisible by the whole number along with the number of CRCs since the last evenly divisible CRC was stored in the reference site database 34. Thus, under this method, the reference site database 34 includes data pairs including the number of CRCs since the last CRC evenly divisible by the predetermined whole number was recorded and an associated CRC value. With this example method, data pairs are generated in the same manner as in the reference site 20 over a period of time sufficient to enable reliable comparisons to be performed. Under this method it is possible for a relatively large number of CRCs to be skipped (i.e., that are not evenly divisible by the predetermined whole number). As a result, it is possible to select a maximum number of CRCs that are allowed to elapse. When this maximum number of CRCs has elapsed, regardless of whether the current CRC is divisible by the predetermined whole number, the current CRC value is stored along with the number of CRCs occurring since the last CRC was stored.

[0060] More generally, signatures may be formed using one or more predetermined portions of the data packets composing a digital program stream. For example, rather than CRCs (or portions thereof), signatures may be generated using portions of data packets that are offset a predetermined number of bits from the header portion of the data packets. Additionally, signatures may be formed using all or part of the digital metadata that may form a portion of the digital audio or digital video content.

[0061] Fig. 8 is an example digital broadcast system 300 that may use the signature-based program identification apparatus and methods described herein. The digital television system 300 includes a digital broadcast station 302 that receives digital video and/or audio programs from a plurality of digital content providers 304 and 306. The digital content providers 304 and 306 may provide television programs,

advertisements, audio (e.g., radio) programs, still image information (e.g., web pages), etc. in known manners to the digital broadcast station 302. The digital broadcast station 302 transmits one or more signals containing digital program information to a reference site 308 and at least one consumption or home site 310 via communication paths or links 312, 314. The communication paths or links 312 and 314 may be similar to the communication paths or links 14 and 16 (Fig. 1) and, thus, may include any combination of hardwired or wireless links such as, for example, satellite links, wireless land-based links, cable links, etc. The signals conveyed via the links 312 and 314 may contain multi-program data streams, which are commonly employed with existing digital television transmission systems.

[0062] The reference site 308 and the consumption or home site 310 receive and process the digital signals provided by the digital broadcast station 302 using the program identification apparatus and methods described herein. More specifically, the reference site 308 includes a plurality of decoders (e.g., set-top boxes or the like) 316, 318 and 320 that demodulate, demultiplex and decode audio, video and/or other data packets received from the digital broadcast station 302. In an example, each of the decoders 316, 318 and 320 provides data packets associated with a different program that is currently being broadcast to a reference site processor 322. In other words, the digital decoder 316 may provide data packets associated with a program A while the decoders 318 and 320 provide data packets associated with respective programs B and C. In any case, the reference site processor 322 is configured to control and/or has information indicating to which program each of the decoders 316, 318 and 320 is currently tuned.

[0063] The reference site processor 322 includes the apparatus and methods described herein for generating reference signature information for a plurality of

simultaneously broadcast television programs. In particular, the reference site processor 322 may include the signature generator 28, the time stamper 30 and the program identification stamper 32, all of which are shown and described in connection with Fig. 1. In addition, the reference site processor 322 can be implemented to use any of the reference signature generation methods described herein such as, for example, the method described in connection with Figs. 4 and 5. The reference site processor 322 sends the reference signature information it generates to a central processing facility 324, which stores the reference signature information in a database 326 using, for example, the data structure 170 of Fig. 5.

[0064] The consumption site 310 could be, for example, a statistically selected home containing a digital television, a digital radio, a computer, etc. The consumption site 310 includes an output unit 328 (e.g., a video display, speaker, etc.) The consumption site 310 also includes a decoder (e.g., a set-top box) 330, which may be similar or identical to the decoders 316-320. Such decoders are well-known and, thus, are not described in greater detail herein. The decoder 330 provides audio and/or video signals 334 to the output unit 328 that are used to output the program currently selected for consumption. In addition, the decoder 330 also provides signals containing information 336 associated with a currently tuned program to the site unit 332. Such signals may, for example, be audio signals provided using the well-known Sony/Phillips Digital Interface Format (S/PDIF), or using any other desired format that provides data packets associated with digital broadcasts.

[0065] The site unit 332 processes the signals 336 received from the decoder 330 to generate signature information therefrom and conveys the signature information to the central processing facility 324. Thus the site unit 332 includes a signature generator such as, for example, the signature generator 38, and a time stamper such

as, for example, the time stamper 40, both of which may be used as described in connection with Figs. 6 and 7 to generate consumption site signature information.

[0066] The central processing facility 324, among other tasks, is configured to perform the functions of the program consumption analyzer 22 discussed in connection with Figs. 1 and 2. Thus, the central processing facility 324 compares signature information generated at the consumption site 328 to the reference signature information stored in the database 326 to identify the programs consumed at the consumption site 310. The central processing facility 324 may additionally analyze the program consumption information it generates for the consumption site 310 and, possibly, other consumption sites (not shown), to ascertain the consumption behaviors at those consumption sites and/or to develop ratings.

[0067] Although certain methods, apparatus and articles of manufacture have been described herein, the scope of coverage of this patent is not limited thereto. To the contrary, this patent covers all embodiments including apparatus, methods and articles of manufacture fairly falling within the scope of the appended claims either literally or under the doctrine of equivalents.

What is claimed is:

1. A method of identifying a digital data stream having at least one of audio content and video content, comprising:

receiving first signature information associated with a content consumption site, wherein the first signature information is generated using digital information extracted from predetermined portions of the digital data stream;

comparing the first signature information to second signature information associated with a reference site; and

identifying the digital data stream based on the comparison of the first and second signature information.

2. A method as defined in claim 1, wherein each of the predetermined portions of the digital data stream are computed based on another portion of the digital data stream

3. A method as defined in claim 1, wherein the predetermined portions of the digital data stream are associated with non-payload portions of the digital data stream.

4. A method as defined in claim 3, wherein the non-payload portions of the digital data stream include a checksum.

5. A method as defined in claim 4, wherein the checksum is a cyclical redundancy check.

6. A method as defined in claim 1, wherein the predetermined portions of the digital data stream are extracted from at least one of an audio data packet and a video data packet.

7. A method as defined in claim 1, wherein the first signature information includes a plurality of digital values associated with a plurality of data packets extracted from the digital data stream.

8. A method as defined in claim 7, wherein each of the plurality of digital values is generated by combining information extracted from at least two of the plurality of data packets.

9. A method as defined in claim 8, wherein combining the information extracted from the at least two of the plurality of data packets includes concatenating the information extracted from the at least two of the plurality of data packets.

10. A method as defined in claim 1, further comprising receiving a time value associated with the digital information.

11. A method as defined in claim 1, further comprising determining if at least a portion of the first signature information matches at least a portion of the second signature information.

12. A method as defined in claim 11, wherein the at least one portion of the first signature information is a first digital value and the at least one portion of the second signature information is a second digital value.

13. A method as defined in claim 1, wherein comparing the first and second signature information includes comparing the first signature information to digital signatures associated with a plurality of digital data streams, each digital data stream having at least one of digital audio content and digital video content.

14. A method as defined in claim 13, wherein the digital signatures associated with the plurality of digital data streams are generated at the reference site.

15. A method as defined in claim 1, wherein comparing the first and second signature information includes using time values to select a relevant portion of the second signature information.

16. A method as defined in claim 1, wherein the digital data stream is at least one of a digital television program and a digital radio program.

17. A method as defined in claim 1, wherein the digital data stream is in a format suitable for transmission via the Internet.

18. A method as defined in claim 1, wherein the audio content is in a format that is compliant with an audio transmission standard.

19. A method as defined in claim 18, wherein the audio transmission standard is compliant with at least one of AC-3, MPEG, and MPEG advanced audio coding.

20. An apparatus for identifying a digital data stream having at least one of audio content and video content, comprising:

a program consumption analyzer programmed to:

receive first signature information associated with a content consumption site, wherein the first signature information is generated using digital information extracted from predetermined portions of the digital data stream;

compare the first signature information to second signature information associated with a reference site; and

identify the digital data stream based on the comparison of the first and second signature information.

21. An apparatus as defined in claim 20, wherein each of the predetermined portions of the digital data stream are computed based on another portion of the digital data stream

22. An apparatus as defined in claim 20, wherein the digital information is extracted from at least one of an audio data packet and a video data packet.

23. An apparatus as defined in claim 20, wherein the first signature information includes a plurality of digital values associated with a plurality of data packets extracted from the digital data stream.

24. An apparatus as defined in claim 23, wherein each of the plurality of digital values is generated by combining information extracted from at least two of the plurality of data packets.

25. An apparatus as defined in claim 24, wherein combining the information extracted from the at least two of the plurality of data packets includes concatenating the information extracted from the at least two of the plurality of data packets.

26. An apparatus as defined in claim 20, wherein the digital information includes a checksum.

27. An apparatus as defined in claim 26, wherein the checksum is a cyclical redundancy check.

28. An apparatus as defined in claim 20, wherein the first signature information includes a time value associated with the digital information.

29. An apparatus as defined in claim 20, wherein the program consumption analyzer determines if at least a portion of the first signature information matches at least a portion of the second signature information.

30. An apparatus as defined in claim 29, wherein the at least one portion of the first signature information is a first digital value and the at least one portion of the second signature information is a second digital value.

31. An apparatus as defined in claim 20, wherein the program consumption analyzer compares the first and second signature information by comparing the first signature information to digital signatures associated with a plurality of broadcast programs.

32. An apparatus as defined in claim 31, wherein the digital signatures are generated at a reference site.

33. An apparatus as defined in claim 20, wherein the program consumption analyzer compares the first and second signature information using time values to select a relevant portion of the second signature information.

34. An apparatus as defined in claim 20, wherein the digital data stream includes at least one of a digital television program, and a digital radio program.

35. A method as defined in claim 20, wherein the digital data stream is in a format suitable for transmission via the Internet.

36. An apparatus as defined in claim 20, wherein the audio content is in a format that is compliant with an audio transmission standard.

37. An apparatus as defined in claim 36, wherein the audio transmission standard is compliant with at least one of AC-3, MPEG and MPEG advanced audio coding.

38. A machine readable medium having instructions stored thereon that, when executed, cause a machine to:

receive first signature information associated with a content consumption site, wherein the first signature information is generated using digital information extracted from predetermined portions of a digital data stream associated with the content;

compare the first signature information to second signature information associated with a reference site; and

identify the content based on the comparison of the first and second signature information.

39. A machine readable medium as defined in claim 38, wherein the content is audio content.

40. A machine readable medium as defined in claim 38, wherein the content is video content.

41. A machine readable medium as defined in claim 38, wherein each of the predetermined portions of the digital data stream are computed based on another portion of the digital data stream.

42. A machine readable medium as defined in claim 38, wherein the digital information is extracted from at least one of an audio data packet and a video data packet.

43. A machine readable medium as defined in claim 38, wherein the first signature information includes a plurality of digital values associated with a plurality of data packets extracted from the content.

44. A machine readable medium as defined in claim 43, wherein each of the plurality of digital values is generated by combining information extracted from at least two of the plurality of data packets.

45. A machine readable medium as defined in claim 44, wherein combining the information extracted from the at least two of the plurality of data packets includes concatenating the information extracted from the at least two of the plurality of data packets.

46. A machine readable medium as defined in claim 38, wherein the digital information includes a checksum.

47. A machine readable medium as defined in claim 46, wherein the checksum is a cyclical redundancy check.

48. A machine readable medium as defined in claim 38 having instructions stored thereon that, when executed, cause the machine to receive a time value associated with the digital information.

49. A machine readable medium as defined in claim 38 having instructions stored thereon that, when executed, cause the machine to determine if at least a portion of the first signature information matches at least a portion of the second signature information.

50. A machine readable medium as defined in claim 49, wherein the at least one portion of the first signature information is a first digital value and the at least one portion of the second signature information is a second digital value.

51. A machine readable medium as defined in claim 38 having instructions stored thereon that, when executed, cause the machine to compare the first and second signature information by comparing the first signature information to digital signatures associated with a plurality of digital data streams.

52. A machine readable medium as defined in claim 51, wherein the digital signatures are generated at the reference site.

53. A machine readable medium as defined in claim 38 having instructions stored thereon that, when executed, cause the machine to compare the first and second signature information using time values to select a relevant portion of the second signature information.

54. A machine readable medium as defined in claim 38, wherein the content includes at least one of a digital television program, and a digital radio program.

55. A machine readable medium as defined in claim 38, wherein the content includes content that is in a format that is suitable for transmission via the Internet.

56. A machine readable medium as defined in claim 38, wherein the content is in a format that is compliant with an audio transmission standard.

57. A machine readable medium as defined in claim 56, wherein the audio transmission standard is compliant with at least one of AC-3, MPEG and MPEG advanced audio coding.

58. A method of generating digital data stream signatures, comprising:

acquiring a plurality of data packets associated with a digital data stream;

extracting digital values from at least some of the plurality of data packets; and

generating a plurality of signatures based on the digital values.

59. A method as defined in claim 58, further comprising:

associating at least one of an identifier indicative of a content contained in the digital data stream and a time value with the plurality of signatures.

60. A method as defined in claim 58, wherein each of the digital values is computationally related to a corresponding one of the plurality of data packets.

61. A method as defined in claim 58, wherein the digital data stream includes audio content and wherein each of the plurality of data packets is associated with the audio content.

62. A method as defined in claim 61, wherein each of the plurality of data packets is formatted according to an audio transmission standard.

63. A method as defined in claim 62, wherein the audio transmission standard is compliant with at least one of AC-3, MPEG and MPEG advanced audio coding.

64. A method as defined in claim 58, wherein the digital data stream includes content comprising at least one of a digital television program and a digital radio program.

65. A method as defined in claim 58, wherein the digital data stream is formatted for transmission via the Internet.

66. A method as defined in claim 58, wherein extracting the digital values from the at least some of the plurality of data packets includes extracting checksums from the at least some of the plurality of data packets.

67. A method as defined in claim 58, wherein generating the plurality of signatures based on the digital values includes combining at least portions of the digital values to generate the signatures.

68. A method as defined in claim 67, wherein combining the at least portions of the digital values to generate the signatures includes concatenating the at least portions of the digital values.

69. A method as defined in claim 58, wherein the digital values are checksums.

70. An apparatus for generating signatures, comprising:

a signal processor that acquires at least one data packet associated with a content comprising at least one of digital audio content and digital video content; and

a signature generator that extracts values from the at least one data packet and generates a signature based on the extracted values.

71. An apparatus as defined in claim 70, wherein each of the extracted values is computationally related to a corresponding one of the at least one data packet.

72. An apparatus as defined in claim 70 including a time stamper that associates time values with the extracted values.

73. An apparatus as defined in claim 70 including a program stamper that associates an identifier indicative of the content with the signature.

74. An apparatus as defined in claim 70, wherein the at least one data packet is associated with audio information contained in the content.

75. An apparatus as defined in claim 70, wherein the at least one data packet is formatted to comply with an audio transmission standard.

76. An apparatus as defined in claim 75, wherein the audio transmission standard is compliant with at least one of AC-3, MPEG and MPEG advanced audio coding.

77. An apparatus as defined in claim 70, wherein the content is a digital television program.

78. An apparatus as defined in claim 70, wherein the signature generator is configured to extract the values from the at least one data packet by extracting a checksum from the data packet.

79. An apparatus as defined in claim 70, wherein the signature generator is configured to generate the signature based on the extracted values by combining at least portions of the extracted values to generate the signature.

80. An apparatus as defined in claim 79, wherein the signature generator is configured to combine the at least portions of the extracted values to generate the signatures by concatenating the at least portions of the extracted values.

81. An apparatus as defined in claim 80, wherein the extracted values are checksums.

82. A method of identifying a digital television program, comprising:

receiving consumption site signature information associated with the digital television program from a consumption site;

comparing the consumption site signature information to reference site signature information associated with the digital television program, wherein the consumption site signature information and the reference site signature information are generated using predetermined data packets; and

identifying the digital television program based on the comparison of the consumption site signature information and the reference site signature information.

83. A method as defined in claim 1, wherein the predetermined data packets are computationally related to other data packets.

84. A method as defined in claim 1, wherein receiving the consumption site signature information includes receiving a plurality of digital values and time values associated with the digital values.

85. A method as defined in claim 84, wherein the digital values are generated using checksums extracted from a digital television signal.

86. A method as defined in claim 1, including determining if at least some of the consumption site signature information matches at least some of the reference signature site information.

87. A method as defined in claim 1, wherein identifying the digital television program based on the comparison of the consumption site signature information and the reference site signature information includes using a program identifier associated with the reference site signature information to identify the digital television program.

88. An apparatus for identifying a digital television program, comprising:

a processing site; and

a database coupled to the processing site, wherein the processing site is programmed to:

receive consumption signature information associated with the digital television program from a consumption site, wherein the consumption signature information is generated based on one or more predetermined data packets;

compare the consumption signature information to reference signature information associated with the digital television program; and

identify the digital television program based on the comparison of the consumption signature information and the reference signature information.

89. An apparatus as defined in claim 88, wherein at least portions of the predetermined data packets are computationally related to at least portions of other data packets.

90. An apparatus as defined in claim 88, wherein the processing site is programmed to receive the consumption signature information including a plurality of digital values and time values associated with the digital values.

91. An apparatus as defined in claim 90, wherein the digital values are generated using checksums extracted from a digital television signal.

92. An apparatus as defined in claim 88, wherein the processing site is programmed to determine if at least some of the consumption signature information matches at least some of the reference signature information.

93. An apparatus as defined in claim 88, wherein the processing site uses a program identifier associated with the reference signature information to identify the digital television program.

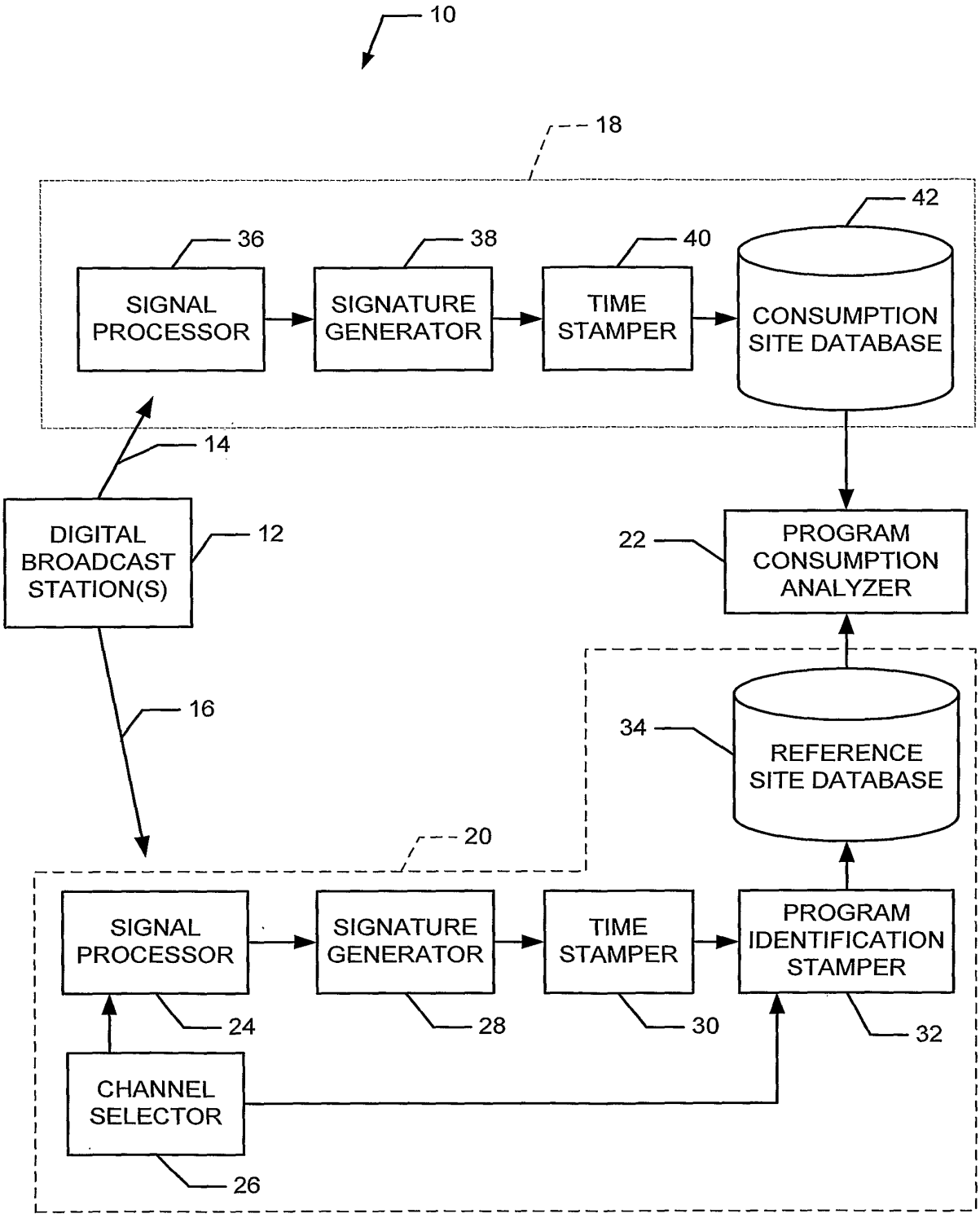

10
18
42
36
38
40
SIGNAL PROCESSOR
SIGNATURE GENERATOR
TIME STAMPER
CONSUMPTION SITE DATABASE
14
DIGITAL BROADCAST STATION(S)
12
22
PROGRAM CONSUMPTION ANALYZER
16
34
REFERENCE SITE DATABASE
20
SIGNAL PROCESSOR
SIGNATURE GENERATOR
TIME STAMPER
PROGRAM IDENTIFICATION STAMPER
24
28
30
32
CHANNEL SELECTOR
26

FIG. 1

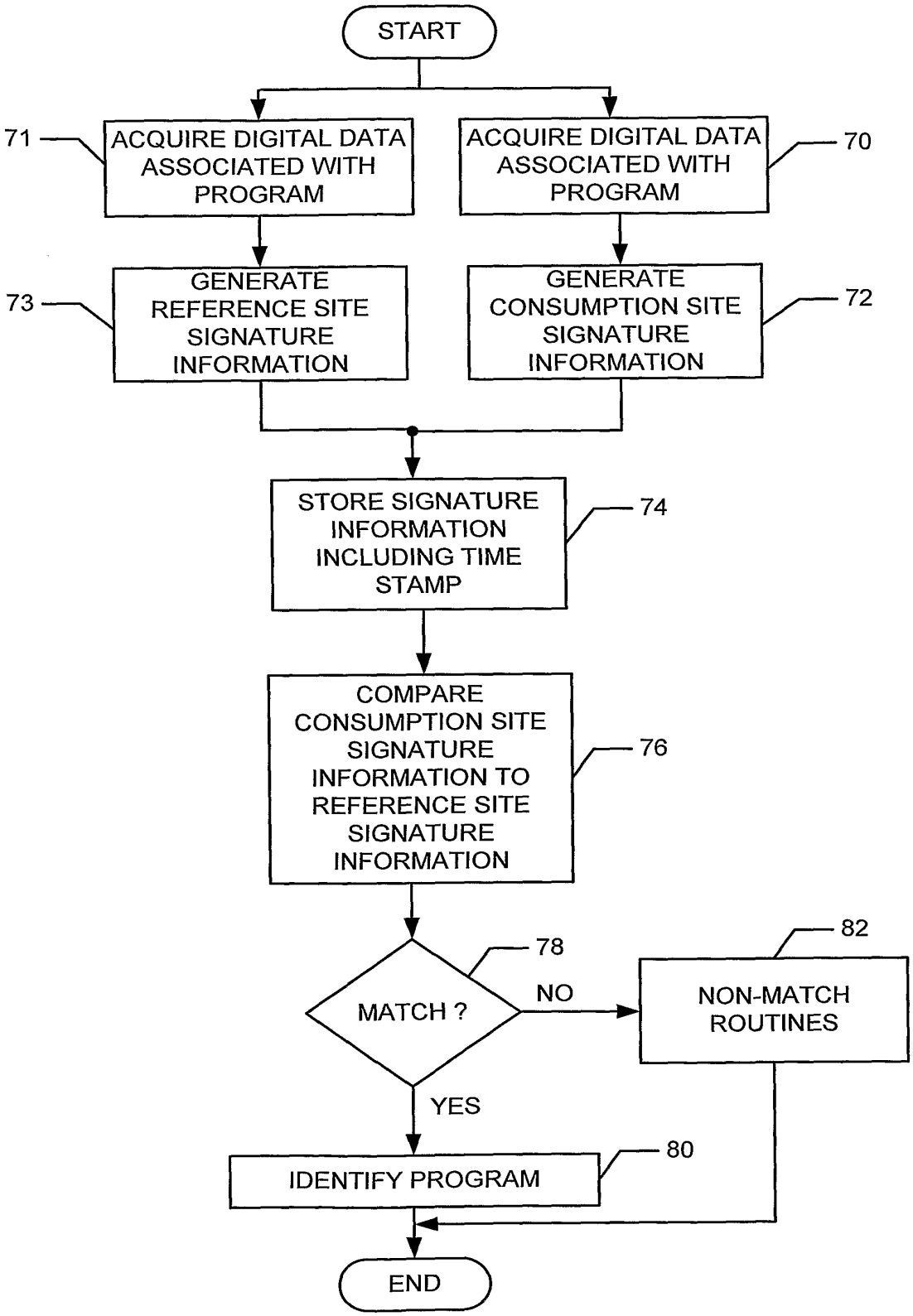

START
71
ACQUIRE DIGITAL DATA ASSOCIATED WITH PROGRAM
ACQUIRE DIGITAL DATA ASSOCIATED WITH PROGRAM
70
73
GENERATE REFERENCE SITE SIGNATURE INFORMATION
GENERATE CONSUMPTION SITE SIGNATURE INFORMATION
72
STORE SIGNATURE INFORMATION INCLUDING TIME STAMP
74
COMPARE CONSUMPTION SITE SIGNATURE INFORMATION TO REFERENCE SITE SIGNATURE INFORMATION
76
78
MATCH ?
NO
82
NON-MATCH ROUTINES
YES
IDENTIFY PROGRAM
80
END

FIG. 2

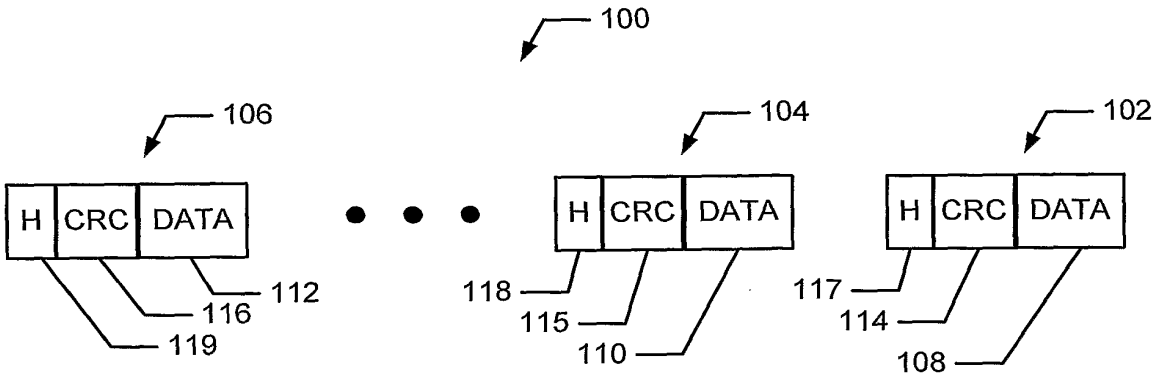


FIG. 3

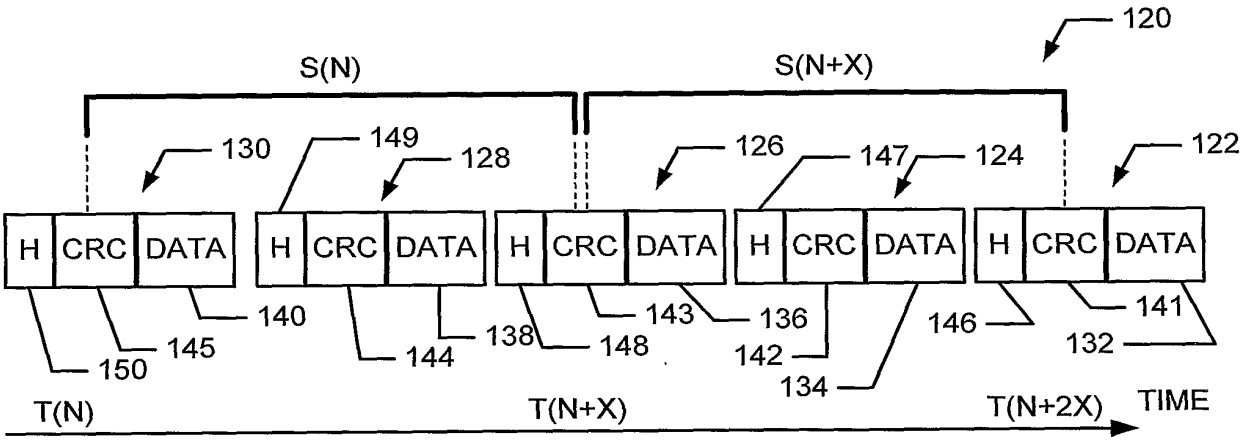


FIG. 4

170

172
174
176

Program ID	T(N)	T(N+X)	T(N+2X)	T(N+3X)	...
A	$S_A(N)$	$S_A(N+X)$	$S_A(N+2X)$	$S_A(N+3X)$	...
B	$S_B(N)$	$S_B(N+X)$	$S_B(N+2X)$	$S_B(N+3X)$	...
C	$S_C(N)$	$S_C(N+X)$	$S_C(N+2X)$	$S_C(N+3X)$	...

FIG. 5

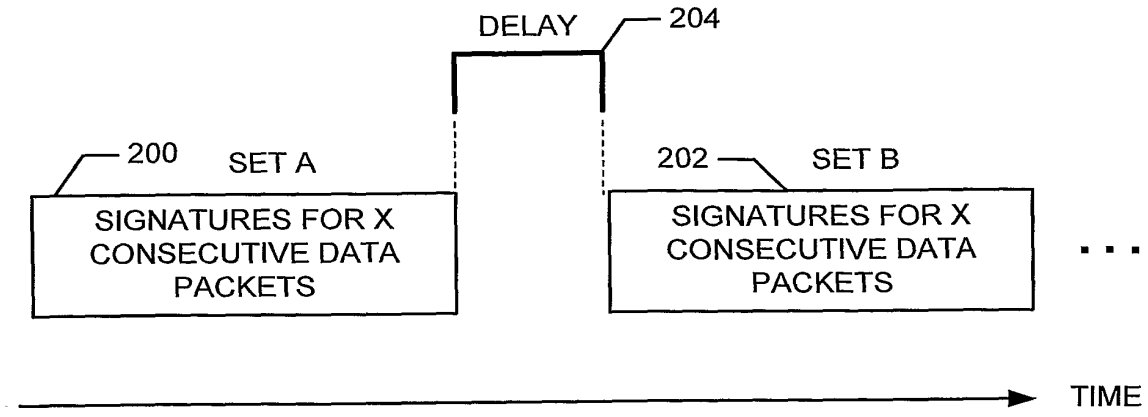

DELAY
204
200
SET A
202
SET B
SIGNATURES FOR X CONSECUTIVE DATA PACKETS
SIGNATURES FOR X CONSECUTIVE DATA PACKETS
TIME

FIG. 6

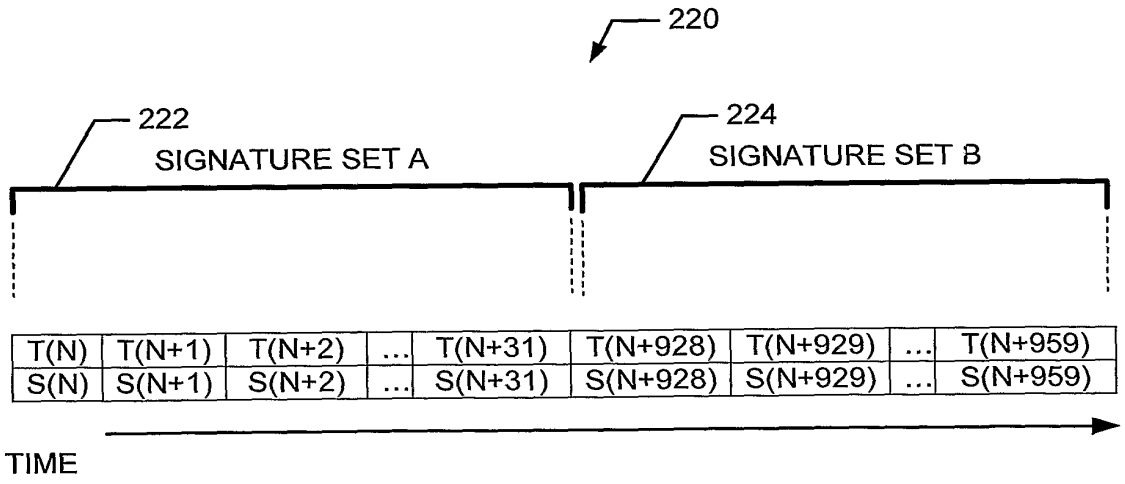

220
222
SIGNATURE SET A
224
SIGNATURE SET B
T(N) T(N+1) T(N+2) ... T(N+31) T(N+928) T(N+929) ... T(N+959)
S(N) S(N+1) S(N+2) ... S(N+31) S(N+928) S(N+929) ... S(N+959)
TIME

FIG. 7

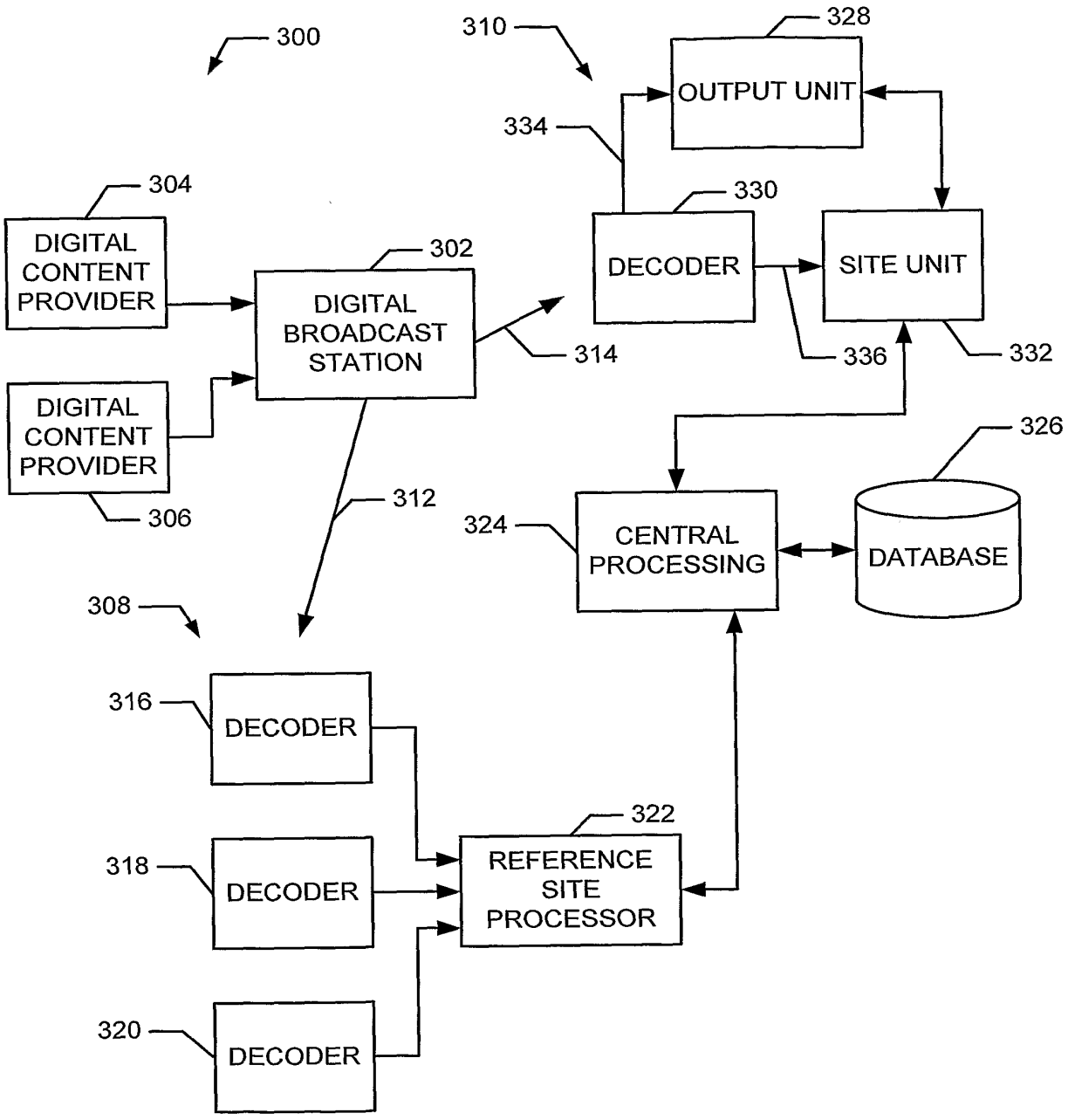

300
310
328
OUTPUT UNIT
334
304
DIGITAL CONTENT PROVIDER
330
DECODER
SITE UNIT
302
DIGITAL BROADCAST STATION
314
336
332
DIGITAL CONTENT PROVIDER
306
326
312
324
CENTRAL PROCESSING
DATABASE
308
316
DECODER
322
318
DECODER
REFERENCE SITE PROCESSOR
320
DECODER

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/22562

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04N 9/00, 7/16, 7/00

US CL : 725/9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21; 348/465

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)

U.S. : 725/9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21; 348/465

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 practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2002/0010919 A1 (Lu et al.) 24 January 2002 (24.01.2002), [0031-0052]	1-3,6-11,14,16-19,20-25,28,29,32,34-36-38,40-45,48,49,52,54-56-58-64,65,67,68,70-77,79,80 --- 4,5,12,13,15,17,19,26,27,30,31,33,35,37,39,46,47,50,51,53,55,57,63,65,66,69,76,78,81
X --- Y	US 2003/0005430 A1 (Kolessar) 02 January 2003 (02.01.2003), [0030-0056]	82-84,86,87,88,89,90,92,93 --- 4,5,26,27,46,47,78,81,85,91

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"E" earlier application or patent published on or after the international filing date

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search

31 December 2003 (31.12.2003)

Date of mailing of the international search report

22 JAN 2004

Name and mailing address of the ISA/US

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

Facsimile No. (703) 305-3230

Authorized officer

Johnny Ma

Telephone No. (703) 308-HELP

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PCT/US03/22562

INTERNATIONAL SEARCH REPORT

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 4,739,398 (Thomas et al.) 19 April 1988 (19.04.1988), columns 3-10	1,2,6-9,11,20-25,29,38,39,40,41-45,49 ---------- 39
Y	US 5,621,454 (Ellis et al.) 15 April 1997 (15.04.1997), column 10, lines 31-50	2,21,41,60,71,83,89
Y	US 5,481,294 (Thomas et al.) 02 January 1996 (02.01.1996), column 15, lines 1-55	12,13,15,30,31,33,50,51,53,72
Y	US 5,689,509 (Gaytan et al.) 18 November 1997 (18.11.1997), column 4, lines 27-41	
Y	US 5,404,160 (Schober et al.) 04 April 1995 (04.04.1995), column 3, lines 55-63; column 4, lines 37-44.	87,93
A	US 5,485,518 (Hunter et al.) 16 January 1996 (16.01.1996)	
A	US 6,577,346 B1 (Perlman) 10 June 2003 (10.06.2003)	
A	US 4,677,466 (Lert, Jr. et al.) 30 June 1987 (30.06.1987)	
A	US 6,112,053 (Dunki-Jacobs et al.) 29 August 2000 (29.08.2000)	
A	US 2002/0186768 (Dimitrova et al.) 12 December 2002 (12.12.2002)	
A	US 5,974,299 (Massetti) 26 October 1999 (26.12.1999)	
A	US 6,469,749 B1 (Dimitrova et al.) 22 October 2002 (22.10.2002)	
A	US 5,019,899 (Boles et al.) 28 May 1991 (28.05.1991)	
A	US 2003/0023967 A1 (Kim) 30 January 2003 (30.01.2003)	

Form PCT/ISA/210 (second sheet) (July 1998)

Electronic Acknowledgement Receipt	
EFS ID:	12022885
Application Number:	12954604
International Application Number:	
Confirmation Number:	5737
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Customer Number:	51417
Filer:	Michael John Mauriel/Victoria Wilson
Filer Authorized By:	Michael John Mauriel
Attorney Docket Number:	10004-2000115
Receipt Date:	07-FEB-2012
Filing Date:	24-NOV-2010
Time Stamp:	19:20:49
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		100042000115SIDS3.pdf	69299 01d4f880f94cfead5d399025df245dddff4ac007	yes	5

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	4	
	Information Disclosure Statement (IDS) Form (SB08)		5	5	
Warnings:					
Information:					
2	Foreign Reference	WO2005036877A1Deng.pdf	3305789 2e9d34e2cb422038ede6661c0a083b8b7107341e	no	82
Warnings:					
Information:					
3	Foreign Reference	WO2005006768Lee_et_al.pdf	2248459 45dae1fc4dd9c9c5b175d8b884fd777b39bdb774	no	53
Warnings:					
Information:					
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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
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PATENT
Docket No. 10004-2000115

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:	Examiner: 2423
Jonathan S. Steuer et al.	Group Art Unit: Koenig, Andrew Y.
Serial No.: 12/954,604	
Filing Date: November 24, 2010	
For: MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD	

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97 & § 1.98

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

Dear Sir:

Pursuant to 37 C.F.R. § 1.97 and § 1.98, Applicants submit for consideration in the above-identified application the documents listed on the attached Form PTO/SB/08A. The Examiner is requested to make these document(s) of record.

This Information Disclosure Statement is submitted:

☐ This Information Disclosure Statement is submitted before the mailing of a first Office action after the filing of a Request for Continued Examination under § 1.114 (filed concurrently herewith) in accordance with § 1.97(b)(4); accordingly, no fee or separate requirements are required.

☒ **Within three months of the application filing date or before mailing of a first Office Action on the merits; accordingly, no fee or separate requirements are required.**

☐ After receipt of a first Office Action on the merits but before mailing of a final Office Action or Notice of Allowance.

- ☐ The fee set forth in 37 CFR 1.17p is paid herewith.
- ☐ A Certification under 37 C.F.R. § 1.97(e) is provided below; accordingly, no fee is believed to be due.
  - ☐ each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement.
  - ☐ no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

☐ After mailing of a final Office Action or Notice of Allowance, but before payment of the issue fee.

☐ The fee set forth in 37 C.F.R. § 1.17p is paid herewith and a Certification under 37 C.F.R. § 1.97(e) is provided below:

☐ each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement.

☐ no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

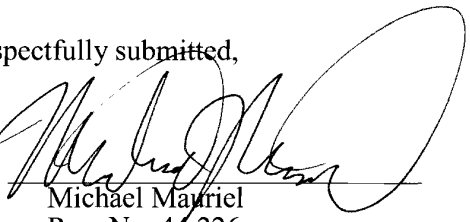
Applicants would appreciate the Examiner initialing and returning the PTO/SB/08A, indicating that the information has been considered and made of record herein.

The information contained in this Information Disclosure Statement under 37 C.F.R. § 1.97 is not to be construed as a representation that: (i) a complete search has been made; (ii) additional information material to the examination of this application does not exist; (iii) the information, protocols, results and the like reported by third parties are accurate or enabling; or (iv) the above information constitutes prior art to the subject invention.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time. The Director is hereby authorized to charge any fees under 37 CFR 1.16 and 1.17 which may be required by this paper to Deposit Account No. 50-4242, referencing docket no. 10004-2000115.

Dated: February 7, 2012

Respectfully submitted,

By: 

Michael Mauriel
Reg. No. 44,226

Mauriel Kapouytian & Treffert LLP
151 First Avenue #23
New York, NY 10003
Telephone: (212) 529-5131
Facsimile: (212) 529-5132

PTO/SB/08a (07-09)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2423
Examiner Name	Koenig, Andrew Y.
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-			
		US-			
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		US-			
		US-			
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
	1	WO 2005/006768 A1	01-20-2005	Lee et al.		
	2	WO 2005/036877 A1	04-21-2005	Deng, Kevin		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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

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

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EFS ID:	11185168
Application Number:	12954604
International Application Number:	
Confirmation Number:	5737
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Customer Number:	51417
Filer:	Michael John Mauriel/Victoria Wilson
Filer Authorized By:	Michael John Mauriel
Attorney Docket Number:	10004-2000115
Receipt Date:	13-OCT-2011
Filing Date:	24-NOV-2010
Time Stamp:	20:37:21
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		100042000115SIDS2.pdf	70725 ab3bdc36904365c011545c2d9ab3c46a9bd35709	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	4
	Information Disclosure Statement (IDS) Form (SB08)	5	5
Warnings:			
Information:			
	Total Files Size (in bytes):	70725	

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

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

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

PATENT
Docket No. 10004-2000115

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:	Examiner: Koenig, Andrew Y.
Jonathan S. Steuer et al.	Group Art Unit: 2423
Serial No.: 12/954,604	
Filing Date: November 24, 2010	
For: MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD	

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97 & § 1.98

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

Dear Sir:

Pursuant to 37 C.F.R. § 1.97 and § 1.98, Applicants submit for consideration in the above-identified application the documents listed on the attached Form PTO/SB/08A. The Examiner is requested to make these documents of record.

This Information Disclosure Statement is submitted:

☐ With the application OR This Information Disclosure Statement is submitted before the mailing of a first Office action after the filing of a Request for Continued Examination under § 1.114 (filed concurrently herewith) in accordance with § 1.97(b)(4); accordingly, no fee or separate requirements are required .

☒ **Within three months of the application filing date or before mailing of a first Office Action on the merits; accordingly, no fee or separate requirements are required.**

☐ After receipt of a first Office Action on the merits but before mailing of a final Office Action or Notice of Allowance.

- ☐ The fee set forth in 37 CFR 1.17p is paid herewith.
- ☐ A Certification under 37 C.F.R. § 1.97(e) is provided below; accordingly, no fee is believed to be due.
  - ☐ each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement.
  - ☐ no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

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The information contained in this Information Disclosure Statement under 37 C.F.R. § 1.97 is not to be construed as a representation that: (i) a complete search has been made; (ii) additional information material to the examination of this application does not exist; (iii) the information, protocols, results and the like reported by third parties are accurate or enabling; or (iv) the above information constitutes prior art to the subject invention.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time. The Director is hereby authorized to charge any fees under 37 CFR 1.16 and 1.17 which may be required by this paper to Deposit Account No. 50-4242, referencing docket no. 10004-2000115.

Dated: October 10, 2011

Respectfully submitted,

By: _____

Michael Mauriel
Reg. No. 44,226

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151 First Avenue #23
New York, NY 10003
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Facsimile: (212) 529-5132

PTO/SB/08a (07-09)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2423
Examiner Name	Koenig, Andrew Y.
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	US- 7,038,619 B2	05-02-2006	Percy et al.	
		US-			
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FOREIGN PATENT DOCUMENTS

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Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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Electronic Acknowledgement Receipt	
EFS ID:	10484159
Application Number:	12954604
International Application Number:	
Confirmation Number:	5737
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
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Filer:	Michael John Mauriel/Victoria Wilson
Filer Authorized By:	Michael John Mauriel
Attorney Docket Number:	10004-2000115
Receipt Date:	08-JUL-2011
Filing Date:	24-NOV-2010
Time Stamp:	20:45:54
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		100042000115SIDS.pdf	63196 ca301793288dce602bcc6d713fefa25d2bfb2371	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	4
	Information Disclosure Statement (IDS) Form (SB08)	5	5
Warnings:			
Information:			
	Total Files Size (in bytes):	63196	

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PATENT
Docket No. 10004-2000115

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:	Examiner: Koenig, Andrew Y.
Jonathan S. Steuer et al.	Group Art Unit: 2423
Serial No.: 12/954,604	
Filing Date: November 24, 2010	
For: MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD	

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Dated: 7-8-2011

Respectfully submitted,

By: _____

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Reg. No. 44,226

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/954,604	11/24/2010	Jonathan S. Steuer	10004-2000115

CONFIRMATION NO. 5737

51417
Mauriel Kapouytian & Treffert LLP
151 1st Avenue
#23
New York, NY 10003

PUBLICATION NOTICE



Title: Media Usage Monitoring and Measurement System and Method

Publication No.US-2011-0131340-A1
Publication Date:06/02/2011

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 3

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2447
Examiner Name	Not Yet Assigned
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	US- 3,919,479	11-11-1975	Moon et al.	
	2	US- 4,677,466	06-30-1987	Lert et al.	
	3	US- 4,697,209	09-29-1987	Kiewit et al.	
	4	US- 5,095,382	03-10-1992	Abe, Kesasku	
	5	US- 5,437,050	07-25-1995	Lamb et al.	
	6	US- 5,512,933	04-30-1996	Wheatley et al.	
	7	US- 5,594,934	01-14-1997	Lu et al.	
	8	US- 5,758,257	05-26-1998	Herz et al.	
	9	US- 5,945,988	08-31-1999	Williams et al.	
	10	US- 6,513,161 B2	01-28-2003	Wheeler et al.	
	11	US- 6,990,453 B2	06-27-2002	Wang	
	12	US- 7,444,353	10-28-2008	Chen et al.	
	13	US- 7,483,975	01-27-2009	Kolessar et al.	
	14	US- 2002/0010919 A1	01-24-2002	Lu et al.	
	15	US- 2002/0038456	03-28-2002	Hansen et al.	
	16	US- 2002/0059577 A1	05-16-2002	Lu et al.	
	17	US- 2002/0072982 A1	06-13-2002	Barton et al.	
	18	US- 2002/0083060	06-27-2002	Wang et al.	
	19	US- 2002/0161741 A1	10-31-2002	Wang et al.	

FOREIGN PATENT DOCUMENTS

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	20	WO 2002/27600 A2	04-04-2002	Shazam Entertainment, LTD	All	
	21	WO 2003/091990 A1	11-06-2003	Shazam Entertainment, LTD	All	
	22	WO 2004/040475 A2	05-13-2004	Koninklijke Philips N.V.	All	

Examiner Signature		Date Considered	

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Sheet 2 of 3

Complete if Known	
Application Number	12/954,604
Filing Date	November 24, 2010
First Named Inventor	Jonathan S. Steuer
Art Unit	2447
Examiner Name	Not Yet Assigned
Attorney Docket Number	10004-2000115

U. S. PATENT DOCUMENTS

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	23	US- 2003/0009469	01-09-2003	Platt et al.	
	24	US- 2004/0001161	01-01-2004	Herley, Cormac	
	25	US- 2004/0122679 A1	06-24-2004	Neuhauser et al.	
	26	US- 2004/0224638	11-11-2004	Fadell et al.	
	27	US- 2005/0086682	04-21-2005	Burges et al.	
	28	US- 2006/0059277 A1	03-16-2006	Zito et al.	
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NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	29	Arbitron, "The Portable People Meter System," www.arbitron.com/protable_people_meters/ppm_system.htm, downloaded on April 25, 2005.	
	30	HEDGES, M. "New measurement devices raise new questions. Will we ever know who's listening?" www.followthemedia.com/number/devices01082004.htm, August 1, 2004.	
	31	Gertner, J. "Watching What You Watch," New York Times Magazine, April 10, 2005.	
	32	GFK AG, "Gfk unveils its multi-talented new MediaWatch," press release, June 14, 2004.	
	33	Nielsen Media Research, "Active/Passive Metering begins July 2004," August 6, 2003.	
	34	Nielsen Media Research, "Summary Report of the Active/Passive (A/P) Meter Regional Test," November 11, 2002.	
	35	Philips Research, "Audio Fingerprinting for automatic music recognition," brochure, www.content.identification.philips.com, downloaded March 9, 2005.	
	36	PINTO, A. "Mediawatch meters a complex mix of media, passively," www.Indiantelevision.com/headlines/y2k5/feb/feb177.htm, February 19, 2005.	

Examiner Signature		Date Considered	

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

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

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

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

Electronic Acknowledgement Receipt	
EFS ID:	10056744
Application Number:	12954604
International Application Number:	
Confirmation Number:	5737
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Customer Number:	51417
Filer:	Michael John Mauriel/Victoria Wilson
Filer Authorized By:	Michael John Mauriel
Attorney Docket Number:	10004-2000115
Receipt Date:	10-MAY-2011
Filing Date:	24-NOV-2010
Time Stamp:	13:24:07
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		100042000115IDS.pdf	106035 1c50c2d27d0f7c57ea889c3c1ace5f4c3326cf02	yes	7

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	4
	Information Disclosure Statement (IDS) Filed (SB/08)	5	7
Warnings:			
Information:			
	Total Files Size (in bytes):	106035	

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.

PATENT
Docket No. 10004-2000115

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:	Examiner: Not Yet Assigned
Jonathan S. Steuer et al.	Group Art Unit: 2447
Serial No.: 12/954,604	
Filing Date: November 24, 2010	
For: MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD	

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. § 1.97 & § 1.98

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

Dear Sir:

Pursuant to 37 C.F.R. § 1.97 and § 1.98, Applicants submit for consideration in the above-identified application the documents listed on the attached Form PTO/SB/08A and B. The Examiner is requested to make these document(s) of record. To the extent required, copies of references have already been provided in the prosecution of related US Application Nos. 11/139,330, 12/283,353, 12/283,354, 12/283,332, 12/283,355 and 12/283,333.

This Information Disclosure Statement is submitted:

☐ With the application OR This Information Disclosure Statement is submitted before the mailing of a first Office action after the filing of a Request for Continued Examination under § 1.114 (filed concurrently herewith) in accordance with § 1.97(b)(4); accordingly, no fee or separate requirements are required .

☒ **Within three months of the application filing date or before mailing of a first Office Action on the merits; accordingly, no fee or separate requirements are required.**

☐ After receipt of a first Office Action on the merits but before mailing of a final Office Action or Notice of Allowance.

- ☐ The fee set forth in 37 CFR 1.17p is paid herewith.
- ☐ A Certification under 37 C.F.R. § 1.97(e) is provided below; accordingly, no fee is believed to be due.
  - ☐ each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement.
  - ☐ no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

☐ After mailing of a final Office Action or Notice of Allowance, but before payment of the issue fee.

☐ The fee set forth in 37 C.F.R. § 1.17p is paid herewith and a Certification under 37 C.F.R. § 1.97(e) is provided below:

☐ each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement.

☐ no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

Applicants would appreciate the Examiner initialing and returning the PTO/SB/08A and B, indicating that the information has been considered and made of record herein.

The information contained in this Information Disclosure Statement under 37 C.F.R. § 1.97 is not to be construed as a representation that: (i) a complete search has been made; (ii) additional information material to the examination of this application does not exist; (iii) the information, protocols, results and the like reported by third parties are accurate or enabling; or (iv) the above information constitutes prior art to the subject invention.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time. The Director is hereby authorized to charge any fees under 37 CFR 1.16 and 1.17 which may be required by this paper to Deposit Account No. 50-4242, referencing docket no. 10004-2000115.

Dated: May 9, 2011

Respectfully submitted,

By: _____
Michael Mauriel
Reg. No. 44,226

Mauriel Kapouytian & Treffert LLP
151 First Avenue #23
New York, NY 10003
Telephone: (212) 529-5131
Facsimile: (212) 529-5132

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 12/954,604

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	82		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	270		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	110		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	25 minus 20 =	* 5	x 26 =	130	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	12 minus 3 =	* 9	x 110 =	990			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	1582		TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/954,604	11/24/2010	2447	1647	10004-2000115	25	12

CONFIRMATION NO. 5737

UPDATED FILING RECEIPT

51417
Mauriel Kapouytian & Treffert LLP
151 1st Avenue
#23
New York, NY 10003

OC000000046102449

Date Mailed: 02/23/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Jonathan S. Steuer, New York, NY;
Christopher W. Otto, Fremont, CA;

Assignment For Published Patent Application

Anonymous Media Research, LLC, New York, NY

Power of Attorney: The patent practitioners associated with Customer Number 51417

Domestic Priority data as claimed by applicant

This application is a DIV of 11/139,330 05/26/2005
which claims benefit of 60/574,836 05/27/2004

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 12/14/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/954,604**

Projected Publication Date: 06/02/2011

Non-Publication Request: No

Early Publication Request: No
** **SMALL ENTITY** **

Title

Media Usage Monitoring and Measurement System and Method

Preliminary Class

709

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).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/954,604	11/24/2010	Jonathan S. Steuer	10004-2000115

CONFIRMATION NO. 5737

51417
Mauriel Kapouytian & Treffert LLP
151 1st Avenue
#23
New York, NY 10003

POA ACCEPTANCE LETTER

OC000000046102379

Date Mailed: 02/23/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/17/2010.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/mbayou/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

COPY

Customer Number: 51417
Attorney Docket No. 1004-2000100

COMBINED DECLARATION FOR A PATENT APPLICATION
AND POWER OF ATTORNEY

As the below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD

the specification of which:

(check one) [ ] is attached hereto.
[X] was filed as U.S. application Ser. No. **11/139,330** on **May 26, 2005**
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I do not know and do not believe that the invention was ever patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application.

I do not know and do not believe that the invention was in public use or on sale in the United States of America more than one year prior to this application.

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

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me on the same subject having a filing date before that of the application on which priority is claimed:

			Priority Claimed
NONE			[ ] [ ]
(Number)	(Country)	(Day/Month/Year filed)	Yes No

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

60/574,836	**May 27, 2004**	**Pending (as of May 26, 2005)**
(Application Serial No.)	(Filing Date)	(Status: pending/expired)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States Patent application(s), or under § 365(c) of any PCT international applications designating the United States 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 international application(s) 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 occurred between the filing date of the prior application and the national or PCT international filing date of this application:

None		
(Application Serial No.)	(Filing Date)	(Status: patented/pending/abandoned)

I hereby appoint the following Attorneys and/or agents to prosecute this application and any continuation or divisional applications based hereon, and to transact all business in the Patent and Trademark Office connected therewith:

The undersigned hereby authorizes the U.S. attorney(s) or agent(s) named herein to accept and follow instructions from the assignee, if any, of the undersigned as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney(s) or agent(s) and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney(s) or agent(s) named herein will be so notified by the undersigned.

As a named inventor, I hereby appoint the registered practitioner(s) identified by Customer No. 51417 to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, whose firm name, mailing address, telephone number, and facsimile number for this application are:

MAURIEL PATENT PRACTICE
168 Second Ave., Box 352
New York, NY 10003
Telephone: (212) 529-5131
Fax No.: (212) 529-5132

Send all official correspondence to:

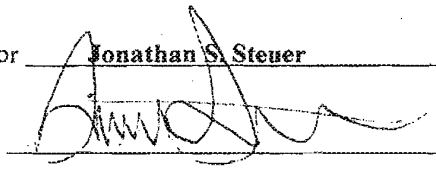
Michael Mauriel
Mauriel Patent Practice
168 Second Ave., Box 352
New York, NY 10003

Direct telephone calls to:

Michael Mauriel
telephone: (212) 529-5131
telecopier: (212) 529-5132

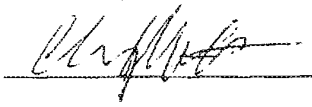
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made in the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, §1001 and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of first inventor **Jonathan S. Steuer**

First inventor's signature  July 26, 2005
date

Residence **New York, NY (USA)**
Citizenship **USA**
Post Office Address **72 E. 3rd St., #2B, New York, NY 10003-0206**

Full name of second inventor **Christopher W. Otto**

Second inventor's signature  July 26, 2005
date

Residence **Fremont, CA (USA)**
Citizenship **USA**
Post Office Address **68802 Lyra St., Fremont, CA 94539**

Electronic Patent Application Fee Transmittal

Application Number:	12954604
Filing Date:	24-Nov-2010
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Filer:	Michael John Mauriel/Victoria Wilson
Attorney Docket Number:	10004-2000115

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	82	82
Utility Search Fee	2111	1	270	270
Utility Examination Fee	2311	1	110	110
Pages:				
Claims:				
Claims in excess of 20	2202	5	26	130
Independent claims in excess of 3	2201	9	110	990
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Late filing fee for oath or declaration	2051	1	65	65
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1647**

Electronic Acknowledgement Receipt	
EFS ID:	9442462
Application Number:	12954604
International Application Number:	
Confirmation Number:	5737
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Customer Number:	51417
Filer:	Michael John Mauriel/Victoria Wilson
Filer Authorized By:	Michael John Mauriel
Attorney Docket Number:	10004-2000115
Receipt Date:	14-FEB-2011
Filing Date:	24-NOV-2010
Time Stamp:	18:27:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$1647
RAM confirmation Number	5352
Deposit Account	
Authorized User	

File Listing:

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

1	Oath or Declaration filed	100042000115Declaration.pdf	127602 4964137b85554c05b9c5bf7b993b90cc4e8a76c6	no	3
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	39648 5b04bd87cfedfbe030196984cdcac34d6b63151b	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	167250		

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

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

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

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 51417

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:
Anonymous Media Research, LLC
72 E. 3rd St., Suite 1B, NY, NY 10003

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	1 DEC 2010
Name	Jonathan S. Steuer	Telephone	866 295 2666
Title	MANAGER & CEO		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Jonathan S. Steuer et al.

Application No./Patent No.: 12/954,604 Filed/Issue Date: November 24, 2010

Titled: MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD

Anonymous Media Research, LLC , a corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

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 therefore is attached.

OR

B. [X] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Jonathan S. Steuer and Christopher W. Otto To: Anonymous Media, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 016861, Frame 0088, or for which a copy thereof is attached.

2. From: Anonymous Media, LLC To: Anonymous Media Research, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. 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).

[X] As required by 37 CFR 3.73(b)(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.

Signature — December 16, 2010 (Date)

Michael Mauriel, Reg. No. 44,226 (Printed or Typed Name) — Attorney for Applicants (Title)

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.

COPY

ASSIGNMENT

THIS ASSIGNMENT, by Anonymous Media LLC, a limited liability company organized under the laws of Delaware and having its registered office at 72 East 3rd Street, Apartment 2B, New York, NY 10003-0206 (hereinafter referred to as the "assignor") witnesseth:

WHEREAS, said assignor is the owner, by prior assignment from the inventors, of certain patent applications for Letters Patent for a Media Usage Monitoring and Measurement System, including at least the following applications:

COUNTRY	APPLICATION NUMBER	FILING DATE
US	11/139,330	May 26, 2005
US	12/283,353	September 11, 2008
US	12/283,354	September 11, 2008
US	12/283,332	September 11, 2008
US	12/283,355	September 11, 2008
US	12/283,333	September 11, 2008
US	12/954,604	November 24, 2010
PCT	PCT/US05/18934	May 27, 2005
EP	05755114.5	May 27, 2005
AU	2005251196	May 27, 2005

(collectively, "The Patent Applications").

WHEREAS, Anonymous Media Research LLC, a limited liability company organized under the laws of Delawarea and having a place of business at 72 East 3rd Street, Apartment 2B, New York, NY 10003-0206 (hereinafter referred to as the "assignee") is desirous of confirming its acquisition of the entire right, title and interest in and to The Patent Applications, and to any Letters Patent or Patents, United States or foreign, to be obtained therefor and thereon:

NOW, THEREFORE, in consideration of One Dollar ($1.00) and other good and sufficient consideration, the receipt of which is hereby acknowledged, said assignor has sold, assigned, transferred and set over, and by these presents do sell, assign, transfer and set over, unto said assignee, its successors, legal representatives and assigns, the entire right, title and interest in and to The Patent Applications for Letters Patent, and any and all Letters Patent or Patents in the United States of America and all foreign countries which may be granted therefor and thereon, and in and to any and all divisions, continuations and continuations-in-part of said application, or reissues or extensions of said Letters Patent or Patents, and all rights under the International Convention for the Protection of Industrial Property, the same to be held and enjoyed by said assignee, for its own use and the use of its successors, legal representatives and assigns, to the full end of the term or terms for which Letters Patent or Patents may be granted, as fully and entirely as the same would has been held and enjoyed by the assignor, had this sale and assignment not been made.

AND for the same consideration, said assignor hereby covenant and agree to and with said assignee its successors, legal representatives and assigns, that, at the time of execution and delivery of these presents, said assignor are the sole and lawful owners of the entire right, title and interest in and to said inventions and the application for Letters Patent above-mentioned, and that the same are unencumbered and that said assignor have good and full right and lawful authority to sell and convey the same in the manner herein set forth.

AND for the same consideration, said assignor hereby covenant and agree to and with said assignee, its successors, legal representatives and assigns, that said assignor will, whenever counsel of said assignee, or the counsel of its successors, legal representatives and assigns, shall advise that any proceeding in connection with said inventions, or said application for Letters Patent, or any proceeding in connection with Letters Patent for said inventions in any country, including interference proceedings, is lawful and desirable, or that any division, continuation or continuation in part of any application for Letters Patent or any reissue or extension of any Letters Patent, to be obtained thereon, is lawful and desirable, sign all papers and documents, take all lawful oaths, and do all acts necessary or required to be done for the procurement, maintenance, enforcement and defense of Letters Patent for said inventions, without charge to said assignee, its successors, legal representatives and assigns, but at the cost and expense of said assignee, its successors, legal representatives and assigns.

AND said assignor hereby request the Commissioner of Patents to issue said Letters Patent of the United States to said assignee as the assignee of said inventions and the Letters Patent to be issued thereon for the sole use of said assignee, its successors, legal representatives and assigns.

Assignor has caused this Patent Assignment to be duly executed by a duly authorized representative on its behalf:

ANONYMOUS MEDIA, LLC

By: _____ Date: 1 DEC 2010

Jonathan Steuer, Manager

Electronic Acknowledgement Receipt	
EFS ID:	9067206
Application Number:	12954604
International Application Number:	
Confirmation Number:	5737
Title of Invention:	Media Usage Monitoring and Measurement System and Method
First Named Inventor/Applicant Name:	Jonathan S. Steuer
Customer Number:	51417
Filer:	Michael John Mauriel/Victoria Wilson
Filer Authorized By:	Michael John Mauriel
Attorney Docket Number:	10004-2000115
Receipt Date:	17-DEC-2010
Filing Date:	24-NOV-2010
Time Stamp:	18:25:44
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	1000420001POA.pdf	163821 5ad6f0573adc8f0e42a698a4fa67eb92ce2add12	no	1

Warnings:
Information:

2	Assignee showing of ownership per 37 CFR 3.73(b).	100042000115Statement373b.pdf	344379 2d453194969729cc05cde799b67c7c961b7e74e3	no	3

Warnings:	
Information:	
Total Files Size (in bytes):	508200

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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 12/954,604

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	82		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	270		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	110		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	25 minus 20 =	* 5	x 26 =	130	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	12 minus 3 =	* 9	x 110 =	990			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	1582		TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/954,604	11/24/2010	2447	0.00	10004-2000115	25	12

CONFIRMATION NO. 5737

51417
Mauriel Kapouytian & Treffert LLP
151 1st Avenue
#23
New York, NY 10003

FILING RECEIPT

OC000000044957318

Date Mailed: 12/16/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Jonathan S. Steuer, New York, NY;
Christopher Otto, Fremont, CA;

Assignment For Published Patent Application

Anonymous Media Research, LLC, New York, NY

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a DIV of 11/139,330 05/26/2005
which claims benefit of 60/574,836 05/27/2004

Foreign Applications

If Required, Foreign Filing License Granted: 12/14/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/954,604**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No
** **SMALL ENTITY** **

Title

Media Usage Monitoring and Measurement System and Method

Preliminary Class

709

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).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/954,604	11/24/2010	Jonathan S. Steuer	10004-2000115

CONFIRMATION NO. 5737

51417
Mauriel Kapouytian & Treffert LLP
151 1st Avenue
#23
New York, NY 10003

FORMALITIES LETTER

OC000000044957319

Date Mailed: 12/16/2010

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. 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 statutory basic filing fee is missing.
  *Applicant must submit $**82** to complete the basic filing fee for a small entity.*
- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
  Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The applicant needs to satisfy supplemental fees problems indicated below.

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

- Additional claim fees of $**1120** as a small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.
- A surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of $**65** for a small entity in compliance with 37 CFR 1.27, must be submitted.

SUMMARY OF FEES DUE:

Total fee(s) required within **TWO MONTHS** from the date of this Notice is $**1647** for a small entity

- $**82** Statutory basic filing fee.
- $**65** Surcharge.
- The application search fee has not been paid. Applicant must submit $**270** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit $**110** to complete the examination fee for a small entity in compliance with 37 CFR 1.27.

- Total additional claim fee(s) for this application is $**1120**
  - $**990** for **9** independent claims over 3.
  - $**130** for **5** total claims over 20.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

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

/mhaile/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/05 (08-08)
Approved for use through 09/30/2010. 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.

UTILITY PATENT APPLICATION TRANSMITTAL

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

Attorney Docket No.	10004-2000115
First Inventor	Jonathan S. Steuer
Title	MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form** (e.g., PTO/SB/17)
2. ☑ **Applicant claims small entity status.** See 37 CFR 1.27.
3. ☑ **Specification** [*Total Pages* 36]
   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* _____]
   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 - 3 pages
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

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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 citations attached
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: Communication - 3 pages

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.: 11/139,330

Prior application information: *Examiner* 2426 *Art Unit:* C. Smith

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Signature		Date	November 24, 2010
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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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Application Data Sheet

Application Information

Application Type::	Regular
Subject Matter::	Divisional
Suggested Group Art Unit::	Not Yet Assigned
CD-ROM or CD-R?::	None
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Petition included?::	No
Secrecy Order in Parent Appl.?::	No

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Representative Information

Customer No.::	51417

Domestic Priority Information

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This Application	Claims Benefit Under 35 U.S.C. 119(e) to	60/574,836	05/27/2004
This Application	Divisional of	11/139,330	05/26/2005

Foreign Priority Information

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Attorney Docket No.: 10004-2000115
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Jonathan S. Steuer

Application No.: Not Yet Assigned | Group Art Unit: Not Yet Assigned

Filing Date: Concurrently Herewith | Examiner: Not Yet Assigned

Title: MEDIA USAGE MONITORING AND MEASUREMENT SYSTEM AND METHOD

COMMUNICATION

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Dear Sir:

Applicants respectfully submit this communication with the application for patent.

Remarks begin on page 2 of this paper.

REMARKS

In this divisional application, the Applicants have submitted claims 1-25 for consideration and examination. Therefore, claims 1-25 are pending in this application. The Applicants want to advise the Examiner that claims 1-16 are identical to, and have been copied from, claims 1-16 of U.S. Patent No. 7,623,823 to Zito et al.

The Applicants further want to advise the Examiner that claims 17-25 are substantially identical to, and have been copied from, claims 1, 2, 3, 4, 12, 15, 16, 1, and 4 respectively, of U.S. Patent No. 7,623,823 to Zito et al., but with modifications to the claims so that the language more closely tracks the terminology used in the present specification.

Claims 1-25 have been submitted to avoid any question of compliance with 35 USC § 135(b) should it ultimately be determined that the subject claims are patentable and that an interference is appropriate. If a determination is ultimately made that an interference is appropriate, a further paper containing the information required by 37 CFR § 41.202 will be submitted. Should the Examiner reach this case for action prior to receiving such a paper of filing, the Applicants respectfully request the Examiner please contact the undersigned at the telephone number set forth below.

As indicated above, claims 1-25 have been copied and are being submitted in this application to preserve the right to request an interference, if appropriate. While having copied claims 1-16 of the 7,623,823 Zito et al. patent to comply with the requirements of 35 USC § 135(b), the Applicants are not making any assertions herein regarding the patentability of these claims.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time. The Director is hereby authorized to charge any fees which may be required by this paper to **Deposit Account No. 50-4242**, referencing docket no. **10004-2000115**.

Dated: November 24, 2010

Respectfully submitted,

By _____
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Media Usage Monitoring and Measurement System and Method

INVENTORS

Jonathan S. Steuer and Christopher W. Otto

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This is a divisional of U.S. Patent Application No. 11/139,330, entitled "Media Usage Monitoring and Measurement System and Method", filed May 26, 2005, which claims priority to U.S. Provisional Patent Application No. 60/574,836, entitled "Open-Ended Device-Independent Media Usage Monitoring and Measurement System", filed May 27, 2004. The contents of these applications is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] Traditional media measurement systems have focused on directly monitoring channels being utilized by audience members. However, as media consumption patterns have become more complex, channel-centric media measurement is inadequate for many purposes. It may be desirable to track usage of particular media content independent of channel. Furthermore, although "channel" identification in a traditional media measurement system may sometimes be limited to radio or television broadcast station, it is increasingly desirable to track usage of media across several types of media delivery vehicles including radio, television, CD, DVD, computer download, portable media players (e.g. MP3 players, iPod), and other vehicles. Furthermore, with respect to tracking consumption of advertisements, it may be inadequate to simply track channel tuning, because, for example, an audience member may mute a broadcast during commercial periods. Thus simply identifying a broadcast channel does not adequately track whether the audience member listened to a particular advertisement.

[0003] Some media measurement systems have used codes to "tag" and track particular content. However, such systems are limited in that they can only track content that has been properly encoded.

[0004] With the development of more robust content recognition technologies, some content recognition systems have recently been deployed which do not rely on codes. For example, Philips, Shazam Entertainment, and others have marketed systems for identifying songs played into a mobile phone. Although such systems can be efficiently deployed in the context of song recognition, deploying such systems in the context of media measurement systems poses particular challenges. Continuous searching against a large database of media content can be computationally intensive. Furthermore, such systems, while increasingly robust, still return some erroneous results, particularly in high-noise environments.

[0005] At the same time, the media measurement context provides opportunities to utilize data exogenous to a particular audio or video data sample. Such opportunities have thus far been insufficiently exploited for the purpose of efficiently applying existing content recognition technologies in the media measurement context. Thus, an improved media measurement system and method is needed.

SUMMARY OF THE INVENTION

[0006] Some embodiments of the present invention provide a media measurement system and method that enhances recognition (e.g. in terms of accuracy or efficiency) of the content of a media sample by analyzing information exogenous to the sample. Some embodiments of the present invention provide a media measurement system and method that utilizes audience data to enhance content identifications. Some embodiments analyze media player log data to enhance content identification. Other embodiments of the present invention analyze sample sequence data to enhance content identifications. Other embodiments analyze sequence data to enhance content identification and/or to establish channel identification. Yet other embodiments provide a system and method in which sample construction and selection parameters are adjusted based upon identification results. Yet other embodiments provide a method in which play-altering activity of an audience member is deduced from content offset values of identifications corresponding to captured samples. Yet other embodiments provide a monitoring and measurement system in which a media monitoring device is adapted to receive a wireless or non-wireless audio signal

from a media player, the audio signal also being received wirelessly by headphones of a user of the monitoring device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The novel features of the invention are set forth in the appended claims. However, for purpose of explanation, several aspects of particular embodiments of the invention are described by reference to the following figures.

[0008] **Figure 1** illustrates an exemplary media usage monitoring and measurement system in accordance with aspects of an embodiment of the present invention.

[0009] **Figure 2** illustrates a media measurement method in accordance with aspects of an embodiment of the present invention.

[0010] **Figure 3** illustrates a process for using and generating information such as that illustrated in **Figure 4** and **Figure 5** and **Figure 3** illustrates an embodiment consistent with aspects of the present invention.

[0011] **Figure 4** illustrates a raw play stream generated by a process such as step 207 of **Figure 2**; a clean play stream and clean play list generated by a scrubbing step such as step 209 of **Figure 2** or steps 301, 302, or 305 of **Figure 3**; and channel data associated with two channels.

[0012] **Figure 5** illustrates a clean play stream, clean play list, channel data, and a clean play list showing deduced play-altering actions. The illustrated data may be generated by systems and methods in accordance with an embodiment of the present invention such as, for example, system 100 of **Figure 1** method 200 of **Figure 2**, and method 300 of **Figure 3**.

[0013] **Figure 6** illustrates timeline structure for data samples generated by system and methods such as module 121 of **Figure 1** and steps 201 and 206 of **Figure 2**.

[0014] **Figure 7** shows an example of a computer system that may be used to execute instruction code contained in a computer program product, the computer program product being in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

[0015] The following description is presented to enable any person skilled in the art to make and use the invention, and is provided in the context of particular applications and their requirements. Various modifications to the exemplary embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments and applications without departing from the spirit and scope of the invention. Thus, the present invention is not intended to be limited to the embodiments shown, but is to be accorded the widest scope consistent with the principles and features disclosed herein.

[0016] **Figure 1** illustrates an exemplary media usage monitoring and measurement system 1000. System 1000 includes media measurement system 100 and monitoring devices 101 in accordance with aspects of an embodiment of the present invention.

[0017] As illustrated, monitoring device 101a includes a microphone 105, a media player port 102, a headphone port 103, and a data upload port 104. A monitored audience member wears monitor 101a during a monitoring period. When the audience member is consuming media from media player 170a without the use of headphones 160a (i.e. if media player 170a has a speaker), monitor 101 captures audio energy acoustically through microphone 105. However, when the audience member desires to use headphones 160a to receive media content from media player 170a (e.g. an MP3 player, iPod, CD player, DVD player, television, radio, computer, or other media player) he or she can plug headphones 160a into headphone port 103 and plug media player 170a into media player port 102. In that case, monitor 101a captures audio energy through media player port 102. Microphone 105 includes a microphone and associated microphone port. However, in alternatives, a monitor may simply have a microphone port into

which a microphone may be plugged or linked via wireless connection. Thus the term "microphone port" will herein refer to any electronics capable of receiving energy captured through a microphone, whether or not a microphone is built into the monitoring device itself.

[0018] As another example, headphones 160b are adapted to receive a content signal 171 via wireless transmission 171 from media player 170b. Monitor 101b is adapted to receive the same content signal 171 from media player 170b. In some embodiments, a syncing process allows monitor 101b to adapt along with headphones 160b and media player 170b to changes in signal 171 so that monitor 101b continues to receive the same signal as headphones 160b. In some embodiments, syncing may be accomplished via a wireless and/or automatic process, such as providing a monitor that responsively changes tuning based on tuning changes between the media player and the headphones.

[0019] Audio data captured by monitors 101, along with associated monitor data (e.g. device ID) (collectively, "audio data /monitor data" 144) may be uploaded to system 100 through upload port 104, directly, via memory device transfer (e.g. flash memory card, floppy disk, CD, etc.) or through a network such as network 150. The audio data uploaded from a monitor 101 may be raw audio data, or may be audio data that has undergone one of a variety of levels of processing prior to upload. For example, the uploaded audio data may include parameters useable to calculate audio signatures (sometimes referred to as audio fingerprints) and landmarks or other values useful in the content recognition process. Alternatively, the audio data may comprise pre-calculated signatures, landmarks, or other data useful for content recognition. On the other hand, in some embodiments, the uploaded audio data may simply represent a raw signal corresponding to audio energy received at monitor 101.

[0020] System 100 is adapted to receive some audience data 143 externally. For example, audience data collected by systems and associated monitors other than those of system 1000 may be utilized by system 100; data based on externally collected and/or externally analyzed demographic, psychographic, or other audience related data might also be received as part of external audience data portion 143. Other audience data may be generated internally by audience data

processing module 123 alone or in combination with measurement analysis module 129 and/or other system components.

[0021] Also, system 100 is adapted to receive media player log data 146. Media player log data 146 may be generated by a media player such as media player 170a or 170b and sent to system 100 through direct connection, memory device transfer or via network 150. Also, a third party might collect such log data which then may be made available through direct connection, memory device transfer, or via network 150. Media player log data 146 includes data logging content played on the media player from which the log data was generated. Although log data 146 does not necessarily reflect what content was actually heard, to the extent the media player generating the log data is used primarily by the audience member associated with the corresponding monitor 101, it can provide a useful basis for initial testing of captured content as will be described further below.

[0022] System 100 is also adapted to receive known content 141 and content meta data 142. Content 141 may include media files associated with a known piece of media content (e.g. a song, movie, commercial, television show, video game, etc.). However, it will be understood by those skilled in the art that "content" in the sense of the known content 141 received by system 100 may, in some embodiments, simply refer to data about signals representing the content and does not necessarily refer to a stored version of the media content itself; e.g. "content" may be stored signatures and landmarks derivable from a song's audio, but not necessarily an audio file useable to play the song itself. On the other hand, in other embodiments, a system such as system 100 may be adapted to receive a useable audio file and then derive data from that file such as signatures, fingerprints, landmarks, etc. that may be readily searched during the content recognition process. Content meta data 142 includes various data relating to content 141. For example, a portion of content 141 might include a particular song as recorded by a particular artist. Corresponding content meta data 142 for that song might include the various albums or other collections in which that song appears; various radio broadcasts (including station and broadcast times) playing the song; movies, advertisements or video games including the song; other songs

that have sampled the song; and various other related information. In the context of a television program, meta data also might include, for example, segment identifications and corresponding time lengths. By distinguishing content data from content meta data in this manner, it is possible to store content data for a single content ID only once, and then add various pieces of meta data as appropriate. For example, a TV program, or program segment, might initially have meta data relating to particular broadcasts. However, at a later date, meta data might be added relating to, for example, a DVD version of the program, without needing to store the program content itself more than once.

[0023] Turning to the details of system 100, audio data and monitor data (e.g. device ID) is received at sample control processing module 121. Module 121 provides monitor data, portions of which might be audience data, to processing module 123. Module 121 also divides the audio data into samples and determines which samples should be submitted for further content recognition testing. In alternative embodiments, the audio data may already have been divided into samples prior to receipt by system 100 (e.g. at monitor 101). In such alternatives, a module such as module 121 might either use the provided divisions or combine the data and then re-divide it into samples as determined by the system. Module 121 may be used either to submit a sample to initial test and filtered search module 122 or to content recognition system 124.

[0024] Initial test and filtered search module 122 conducts one or more initial identification attempts. Several different types of initial identification attempts might be performed. Module 122 may test a captured sample against content associated with the most recently identified content. As another possible initial test, module 122 may test the sample against content identified from a media player log file. Another initial identification test may be carried out in a variety of ways. For example, filtered search module 122 might use audience data from audience data processing module 123 to form parameters and then pass those parameters to content recognition system 124 which then uses the parameters to conduct a filtered search of its content. Alternatively, module 122 might be adapted to utilize an instance of content recognition system 124 that includes content pre-selected based upon relevant audience data. Some examples of

relevant audience data that may be used either to form search parameters or to construct targeted content include:

- age, gender, and other demographic information about the audience member (using the corresponding monitoring device) along with media consumption patterns of other persons sharing similar demographic characteristics

- media consumption patterns of the audience member based on questionnaire input or based on past content identifications associated with that audience member

- media consumption patterns of other audience members who have consumed other media content that has also previously been consumed by the audience member using the corresponding monitoring device

- location of the audience member (alone and/or relative to other audience members)

Of course, the above are just some examples of audience data that may be utilized by system 100.

[0025] After completing the initial identification attempt, filtered search module 122 passes the identification result to ID result module 125. If an identification has been made, the result is passed to play stream generator 126 and to sample control processing module 121. If no identification has been made, then content recognition system 124 performs a search using a larger portion of its content to identify the data sample. The result is passed to ID result module 125 which in turn passes the result to play stream generator 126 and to sample control module 121. Content recognition system 124 is adapted to implement one or more known content recognition methods that identify content by extracting parameters from a media signal and applying an algorithm to those parameters to search for a content match. Those skilled in the art will recognize that many such methods and algorithms exist. One such example is described in U.S. patent application 09/839,476 entitled "System and Methods for Recognizing Sound and Music Signals in High Noise and Distortion" by Wang et al. and published June

27, 2002 with publication number US2002/0083060. Aspects of other such examples are described in the following published PCT applications by Konin-Klijke Philips Electronics N.V.: "Fingerprinting Multimedia Contents" (WO2004/044820, published May 27, 2004), "Fingerprint Extraction" (WO2004/030341 published April 8, 2004), and "Improvements in and Relating to Fingerprint Searching" (WO2004/040475 published May 13, 2004). Such distinct methods and algorithms may have varying degrees of efficiency, accuracy, and applicability to certain types of content (or different settings of a particular algorithm might have different efficiency depending on content type). Thus, in some embodiments, a system such as system 100 may intelligently select among multiple such algorithms (or multiple settings of a single algorithm) based on expected content characteristics. For example, algorithm A might be faster and more accurate at identifying silence than algorithm B, and thus a system such as system 100 of **Figure 1** having a corresponding subsystem for content recognition (such as system 124) might achieve enhanced performance by submitting a sample for processing by algorithm A rather than algorithm B if recent identification results indicate silence. Other differences corresponding to content types (e.g. speaking audio versus music audio) might also be exploited based on prior content identification results to select a most efficient recognition algorithm from a plurality of algorithms. In such an alternative, if the algorithms required different audio data parameters, a monitor might send two sets of parameters for each sample corresponding to each algorithm and then the system would select between the two sets as needed. Alternatively, the two sets of parameters might be calculated by the system based on raw audio data received from a monitoring device.

[0026] Play stream generator 126 generates a raw play stream relating a sequence of samples to content identification results (for an example of a portion of a raw play stream, see **Figure 3** and accompanying text). The raw play stream is then processed by play stream scrubber 127 which analyzes the sequence of sample identification results utilizing sequence data processing module 128. Based on analysis of sequence data and, where appropriate, analysis of audience data via interaction with audience data module 123, play stream scrubber 127 generates a clean play stream and clean play list (see **Figure 3** and accompanying

text) which can then be used by measurement analysis module 129. Results of the media measurement analysis can be obtained via report generator 130.

[0027] In alternative embodiments, many of the system components and corresponding functions performed within a system such as system 100 might instead be implemented on the monitoring devices such as monitoring device 101. For example, many of the functions performed by sample control processing module 121 might instead be performed at a monitoring device. To cite but one example in more detail, if a monitoring device maintains an ongoing reciprocal connection to obtain sample identification results of a media measurement system, then the monitoring device can select which samples to send to the system for recognition analysis. The monitoring device might then also adjust parameters such as sample resolution, the length of a sample time window, and the recognition algorithm selected. This is just one example of how the illustrated embodiment might be modified to shift system components from a central system to a monitoring device. Many other such variations will be apparent to those skilled in the art.

[0028] Also, it will be understood that although **Figure 1** illustrates a particular exemplary division and relationship between "modules," the division illustrated may be readily modified without departing from the spirit and scope of the present invention. For example, in various implementations, the illustrated modules may be combined into larger modules or the functions performed may be distributed across several modules. The term "module" and the associated illustrated division of system components is chosen for purposes of ease of description only and does not limit how particular systems consistent with the present invention might be constructed.

[0029] **Figure 2** illustrates a media measurement method 200 in accordance with aspects of an embodiment of the present invention. One or more elements of method 200 may be carried out, for example, by system 100 of **Figure 1** or other similar systems. At step 201, method 200 receives audio data from a monitoring device. Step 201 caches a series of samples and determines the sample resolution with which samples are submitted for content identification. In particular, as described further below (see **Figure 4** and accompanying text), sample resolution

refers to how many samples in a given sequence of samples are processed for content identification. Step 201 also determines length, or "time window" of each sample.

[0030] At step 210, characteristics of the audio data are analyzed to attempt to identify the source of transmission or storage of the media played by an individual based on audio characteristics of that signal. For example, the process attempts to recognize particular types of encoding or compression, or identifies sound associated with screen refresh on a television or computer monitor, or recognizes compression or frequency range of FM or AM radio, or CD or DVD. If the storage or transmission medium is identified, the results of step 210 can be added to a play list and / or utilized in step 211 to identify channel (see below for further description of step 211).

[0031] At step 202, identification of a sample in a series of samples is attempted via initial test methods. In particular, step 202 determines whether the audio data in the tested sample matches data associated with the content ID corresponding to the most recently identified sample. Step 202 may also or instead test the sample against content IDs obtained using data from a media player log file associated with the audience member using the corresponding media monitor. Step 203 determines whether successful identification occurred at step 202. If yes, then the identification result is provided to step 206 and 207. If no, then step 204 searches for a content match against targeted content selected based at least in part upon additional audience data. Step 205 determines whether step 204 obtained an identification. If yes, then the identification result is provided to steps 206 and 207. If no, then step 208 searches for a content match against a larger portion of the content. With respect to steps 202, 204, and 208, there are two possible results: an identification has been made or no identification has been made. No identification at steps 202 and 204 leads to the further identification attempt at step 208. Whatever the result is at step 208 (identification or no identification) that result is passed to steps 207 and 206.

[0032] At step 206, an identification result is used to adjust sampling control and selection parameters for one or more subsequent samples. Parameters that might be adjusted include resolution, backtrack selection, sample time window,

or recognition algorithm selected. For example, if a sample has been identified successfully, and the identification indicates a match with the prior sample, the sampling resolution might be decreased from 1/5 to 1/10, meaning that, in a sequence of samples, nine samples rather than four are skipped before selecting the next sample to analyze for identification. As another example, if an identification result does not match the result of the prior sample identified, then step 206 might initiate a back track analysis and select an intervening sample that has not yet been analyzed. Step 201 would then pass the sample selected from backtracking to step 202 for attempted identification. As another example, resolution might be increased when recent identification results suggest an extended period of silence or absence of known content.

[0033] As yet another example, once media content for a limited series of samples has been identified, the time window size for each sample might be decreased from, for example, 5 seconds to 3 seconds. This would mean that samples submitted for attempted identification would be shorter in length. This can create efficiencies because once the content is identified, the process needs only to detect a change in content, and this can, in some cases, be accomplished utilizing a smaller amount of audio data, thereby preserving system resources.

[0034] Adjustment of sampling parameters is described further below in the context of **Figure 5** and accompanying text.

[0035] Continuing with the description of **Figure 2**, step 207 generates a raw play stream indicating a series of samples and corresponding identification results. Step 209 scrubs the raw play stream based upon sample sequence data (described further below in the context of **Figures 3-4** and accompanying text) and based upon audience data. The resulting clean play stream may be converted to a play list listing the content captured and indicating the order in which it was captured. Step 209 attempts to identify the channel by searching known channel data to find an apparent content sequence match to the play list. If the storage or transmission medium of the captured sample has been identified at step 210, that information may be made available for step 211 and allows step 211 to use that information to filter its search of channel data (e.g., only search channel data including CD channels, or only including radio broadcast channels, etc.). If step 211

successfully identifies the channel, information such as content sequence data for the identified channel may be used by step 212 to further scrub or rescrub the play stream, particularly with respect to any apparently incorrect content identifications that could not be corrected based upon sample sequence data as utilized in step 209.

[0036] **Figure 3** illustrates a process 300 for using and generating information such as that illustrated in **Figure 4** and **Figure 5**. Some of the functions accomplished by process 300 are similar to functions accomplished by steps 207, 209, 211, and 212 of **Figure 2**. Process 300 illustrates a more detailed example of an embodiment consistent with aspects of the present invention.

[0037] Referring to process 300, depending on available information, either a play stream is made available to step 301 or a play list is made available to step 302. Step 301 prepares a play stream for further processing necessary for channel matching by scrubbing (i.e. reviewing for missing or incorrect data) the play stream using non-channel data. Step 302 prepares a play list for further processing necessary for channel matching by scrubbing (i.e. reviewing for missing or incorrect data) the play list using non-channel data. With respect to steps 301 and 302, the non-channel data selected might be selected particularly for the purpose of better preparing the play stream or play list for a channel matching process. Step 303 receives either a raw (i.e. " not scrubbed") play stream or play list directly or receives a scrubbed play stream or play list from step 301 or 302. If necessary, step 303 converts received data to a format useful in matching to a channel (e.g. converts a play stream to a play list where a play list format is useful for channel matching, or converts a play stream or play list to a mathematical representation that is useful for channel matching).

[0038] Step 304 attempts to match the play stream or play list (or corresponding data format representing the play stream or play list) against known channel data to identify a channel (e.g., an album, samples of an album presented for marketing—e.g. on a web page—, radio broadcast, television broadcast, theater version of a movie, DVD version of a movie, etc.) associated with the elements of the play list or play stream. Step 306 determines whether a channel match was achieved. If yes, then step 305 uses channel data and non-channel data

to scrub or further scrub the play stream or play list for purposes of creating a clean play list. If the play list or play stream has already been scrubbed with non-channel data in either step 301 and 302, then the play stream or play list may not need to be further scrubbed with non-channel data at step 305. In that case, step 305 just uses channel data to further scrub the play stream or play list. However, it is possible that scrubbing the play list or play stream with non-channel data for purposes of creating data useful for channel matching will be somewhat different than doing so for purposes of creating a clean play list, thus non-channel data is referenced again in the illustration of claim 305.

[0039] If step 306 determines that a channel match was not achieved at step 304, then step 307 scrubs the play stream or play list with non-channel data to create a clean play list. Step 309 determines whether including deduced user actions on the clean play list is desired. If yes, then step 308 creates a clean play list including deduced user actions. If no, then step 310 creates the clean play list without including deduced user actions.

[0040] **Figure 4** illustrates Raw Play Stream 410 generated by a process such as step 207 of **Figure 2**; Clean Play Stream 450 and Clean Play List 490 generated by a scrubbing step such as step 209 of **Figure 2** or steps 301, 302, or 305 of **Figure 3**; Channel Data 470 and Channel Data 490. Referring to **Figure 4**, Raw Play Stream 410 itemizes a sequence of analyzed samples and relates that sequence to corresponding identification results in the content ID column. The content ID result indicates either a reference corresponding to a particular piece of content or indicates that no identification was made. The example in **Figure 4** assumes that no user play-altering activities took place and this example does not rely on content offset data in scrubbing the raw play stream to obtain a clean play list. However, note that in other examples, such as that of **Figure 5**, sample sequence data ("ssd") includes content offset data. For purposes of presenting and analyzing sample sequence data as described herein, the times in list 410 may be relative to an arbitrary value (e.g. "t_0") rather than representing an absolute time; however, in many instances, a log time will in fact indicate the actual time the sample started to be captured.

[0041] Sample sequence data may be used to "scrub" Raw Play Stream 410. By analyzing the sequence of data on Raw Play Stream, it is possible to locate and correct any identifications that are likely to be incorrect or to supply missing identifications where the system has not otherwise been able to provide an identification.

[0042] Sample sequence data can be used to derive portions of Clean Play Stream 450 from raw play list 410 in the following manner: Referring to Raw Play Stream 410, the content IDs associated with samples 1, 3, 4, 6, and 7 all indicate the same media content referenced as "song51." The content ID value associate with sample 2 indicates that no content has yet been successfully associated with that sample and the content ID value associated with sample 5 indicates "movie81." Given this pattern of sample sequence data, it is reasonable to assume that the person using the corresponding monitor listened to song51 through the time period associated with the audio data of samples 1-7, and thus, the "scrubbed" version of the play stream, i.e. Clean Play Stream 450, indicates song51 for each of samples 1-7.

[0043] Information about the sequence of content in a play stream can be used to generate a play list and identify a channel, and the identified channel data can also potentially be used to help further "scrub" a play stream. For example, the sequence of consumed content represented on Play Stream 450 is searched against known channel data (e.g. particular CD albums, broadcasts, or other particular storage or transmission media carrying a particular sequence of content). In this example, simplified for illustrative purposes, known channel data includes channel data 470, associated with channel ID "radio 35," and channel data 480, associated with channel ID "album12." Referring to channel data 470, each row relates a content ID to a start time and end time. In this example, start and end times are referenced with respect to an arbitrary start time value "C(0)." For some channels (e.g. CDs, DVDs, video games) only such arbitrary reference times will be available. For other channels (e.g. broadcasts, concerts, etc.), absolute time might be both available and useful. However, for the purpose of the analysis illustrated in this example, times that are relative only and not necessarily absolute are sufficient.

[0044] With respect to further "scrubbing" the Raw Play Stream 410, in this example, channel data may be used to correct the apparent misidentification of sample 29. Note that the sample sequence data alone in this example does not provide a clear basis for correcting sample 29. Sample 28 is identified as "ad49," sample 29 as "song81," and sample 30 as "song 35." However, given the sequence "song21, ad49, and song35" is associated with a known sequence of the radio broadcast referenced as "radio 35," there is a basis in channel data 470 for believing that the proper content ID for sample 29 is "song35" rather than "song81." Thus, Clean Play Stream 450 indicates a change relative to Raw Play Stream 410 with respect to the content ID for sample 29. Note that a clean play stream and clean play list are not necessarily generated sequentially. For example, to the extent a channel identification and associated channel data are necessary to "scrub" a raw play stream, portions of a clean play list may be determined as part of obtaining data necessary to make channel selection. In the present example, "radio 35" is identified based on a particular content sequence, and that information helps populate Clean Play Stream 450 with a corrected content ID value for sample 29 relative to the sample 29 content ID value on Raw Play Stream 410.

[0045] Audience data may also be used in the "scrubbing" process. For example, if "song81" is radically different from the user's known consumption habits and "song35" is within the user's known consumption habits, another basis might be provided for suspecting that "song35" rather than "song81" is the correct content ID for sample 29 of Play Stream 410.

[0046] It will be understood by those skilled in the art that in the context of data sets that might, in alternative examples, make up a "raw play stream," "a clean play stream," or a "clean play list," the particular organization, division, and content of the data may vary considerably from that illustrated in **Figure 4** (as well as that illustrated in **Figure 5** below) without departing from the spirit and scope of the present invention. To cite but one example, such play streams and/or play lists might include several data fields in addition to those illustrated. Moreover, the illustrated data sets might not be collected in the same table but, depending upon database architecture, might be spread out in different tables

and/or relational structures. Furthermore, the data sets similar to those illustrated might not be stored at all in a database but rather might be generated on the fly and then discarded as mere intermediate steps to generating a particular report that the system is asked to produce. These and other variations will be readily apparent to those skilled in the art. The examples shown are chosen primarily for usefulness in illustrating aspects of a particular embodiment. While they are useful in illustrating certain underlying principles of certain aspects of the present invention, they should not be considered, in and of themselves, to limit the scope of the invention.

[0047] **Figure 5** illustrates Clean Play Stream 510, Clean Play List 560, Channel Data 570, and Clean Play List 590 showing deduced play-altering actions. The illustrated data may be generated by systems and methods in accordance with an embodiment of the present invention such as, for example, system 100 of **Figure 1** method 200 of **Figure 2**, and method 300 of **Figure 3**. Aside from the traditional time shifting activity of, for example, recording a television broadcast and playing it at a later time, various play-altering activities may be undertaken by an audience member. For example a media player may be paused, reversed, fast forwarded, and some media players have modes in which skipping back or forward in played content can occur almost instantly, including within the smallest time division useful for a particular data set (e.g., less than five seconds, less than one second, etc.). Generally, these activities of manipulating the pace and order in which media is consumed will be referenced as audience play-altering actions or activities. These activities may be deduced, for example, during scrubbing step 209 of **Figure 2**, or, as illustrated more expressly, during step 308 of **Figure 3**.

[0048] Continuing with the description of **Figure 5**, Play Stream 510 presents a series of log times, content IDs, and content offsets. In the illustrated example, times given in the log time column begins with t_0 and ends with t_0+19. Each log time indicates a time at which capture of the analyzed sample began, where t_0 simply represents a beginning time for samples on Play Stream 510. Each content ID indicates an identifier of the content that has been identified as corresponding to the captured sample. In the example illustrated, "TV program 27" refers to a

TV program segment and "TV program 28" refers to another program segment of the same program. "Ad23" and "ad25," on the other hand, refer to separate advertisements. Each content offset value represents a time offset from the beginning of a particular piece of content. For example, row 8 of Play Stream 510 corresponds to a sample whose beginning is located 9 time units from the beginning of TV program 27, thus the content offset is referenced as (0)+9.

[0049] Play List 560 contains a row for each internally continuous media consumption event. The start log time and end log time for each such event are listed in each row. If an entire piece of content (e.g. a TV program segment, or an entire TV ad) is listened to without interruption, that would correspond to a row of Play List 560. On the other hand, if the data from Play Stream 510 suggests a discontinuity within consumption of a particular piece of content, such discontinuities form boundaries between consumption events that form rows of List 560. The meaning of these concepts may be clarified by discussing further details of the illustrated example.

[0050] Discontinuities in consumption of the identified media may be identified by comparing the progression of sample log times to progression of corresponding content offset times in Play Stream 510. For example, referring to rows 7 and 8 of play stream 510, log times progress from t_0+6 to t_0+7; however, the corresponding content offsets progress, with respect to the start of TV program 27, from (0)+3 to (0)+9. Had the media consumption from one sample to the next been continuous, one would expect that the second offset value (in row 8) would have been (0)+4 rather than (0)+9. Therefore, a boundary between media consumption events can be deduced. Thus, rows 3 and 4 of List 560 indicate two consumption events with respect to the same piece of media content (TV program 27). By contrast, row 1 and row 2 of Play Stream 510 are, on Play List 560, collapsed into a single row (row 1) because the content offset progression from row 1 to row 2 of Play Stream 510 suggests continuous consumption of the same piece of media content.

[0051] Referring to Play List 560, the "end log time" of one event also defines the "start log time" of the next event. In other examples, particularly if

continuous time is not assumed, a play list might be constructed using start log times that are different than the end log time of the previous consumption event.

[0052] Referring to Clean Play List With Deduced Actions 590, it can be seen that a play list can be constructed that supplements the information in Play List 560 with information about the apparent actions of the audience member. Rows 2, 4, 6, 8, and 11 of List 590 include such information about deduced actions.

[0053] To the extent such play-altering actions occur within the same piece of content, audience member actions may be deduced without content sequence data for a particular channel. For example, referring to rows 2, 3, 4, 5, and 6, of Play Stream 510, the content offset values of rows 2 and 6 indicate advancing for one time unit within TV program 27 while no content ID (or corresponding offset value) is available for rows 3-5. From this information, and the fact that log times of rows 3-5 together correspond to progression through three time units, it is reasonable to deduce that the audience member paused a media player for three time units from log time t_0+2 to log time t_0+5. That deduced action is recorded in row 2 of Play List 590.

[0054] On the other hand, in other contexts, it may be necessary to refer to content sequence data for a particular channel to be sufficiently confident in deducing the details of an audience member's play-altering activity. For example, referring to Play Stream 510, data in rows 15-17 indicate one or more consumption discontinuities in which a play-altering action appears to have crossed a content boundary. Row 15 indicates consumption of the beginning of ad23; row 16 indicates no identified content, and row 17 indicates consumption of ad24 from a point two time units after the beginning of that ad. From this information alone, it is difficult or impossible to determine how much play-altering activity occurred and whether any content pieces were skipped altogether. However, content sequence data for an identified channel may be used to supplement the information gap. Data 570 lists content sequence data for a channel identified as "TV C4." "TV C4" may be identified during a method portion such as step 211 of process 200 of **Figure 2** as previously described. Channel data may be searched that includes the content identified in Play Stream 510 or Play List 560. A channel whose content sequence matches or closely

matches content on such a stream or play list may be identified as the channel that delivered the consumed content. In this case, Play Stream 510 and Play List 560 include content associated with the following IDs: TV program 27, ad23, ad25, and TV program 28. Because channel data for "TV C4" indicates a sequence of: TV program 27, ad23, ad24, ad25, and TV program 28, for purposes of this example, it can reasonably be assumed that the media depicted on Stream 510, List 560, and List 590 was originally delivered to the relevant media player by channel "TV C4." In real world contexts, however, it is quite possible that more data would have to be obtained (e.g. a matching more entries on a play list entries against a longer series of content sequence data of a channel) in order to be reasonably confident that the channel has been correctly identified. The amount of data matched in the illustrated example has been chosen primarily for ease of illustration.

[0055] Sequence Data 570 for channel TV C4 indicates that ad23 as broadcast lasted three time units (see row 2), ad25 as broadcast lasted three time units (see row 4), and between ad23 and ad25, another ad, ad24, was broadcast and lasted three time units. From this information, and the information in either Play Stream 510 or Play list 560, it can be deduced that the audience member heard the very beginning of ad23, but then fast forwarded seven time units (during the span of 1 time unit based on the log time data) to just past the beginning of ad25. This deduced action is recorded in row 11 of List 590.

[0056] It should be noted that, to the extent actions take less than a single time unit, rows may be added to List 590 relative to List 560 to record such actions. For example, referring to row 4 of List 590, because no log time elapsed between the end of the event in row 3 and the beginning of the event in row 5, row 4 has been added showing the "skip forward 5 units." That the user "skipped" forward rather than "fast" forwarded can be deduced from the fact that while there is no content ID gap between rows 3 and 4 of List 560, there is a gap in the content offset times for those rows. Thus, though the log times and content ID alone suggest continuous consumption, the gap in offset times suggests a "skip" forward that took the same or less time than the length of a single time unit.

[0057] Those skilled in the art will recognize that the method aspects just described in the context of generating and using Stream 510, List 560, Data 570, and List With Deduced Actions 590 reflect just one example of how play-altering actions might be deduced using systems and methods consistent with those of the present invention. To cite but one example, rather than explicitly generate a play list, mathematical representations of play stream data and content sequence data may be used to identify discontinuities and deduce play-altering activities. To cite but one other example, play-altering might be deduced from a pre-generated play list including content offset data without needing to analyzing play stream data from which the play list was generated.

[0058] **Figure 6** illustrates timeline structure for data samples generated by system and methods such as module 121 of **Figure 1** and steps 201 and 206 of **Figure 2**.

[0059] As illustrated, sample set 600 reflects a division of audio data into sixteen samples, three of which are selected for analysis. The samples selected for recognition analysis are referenced generally as the "n_0^{th}," n_1^{th}," and "n_2^{th}" samples. Samples between the selected samples are not separately numbered, but are marked off between vertical lines along the horizontal length of timelines structure 600 as illustrated. Each sample has a sample time window length "i." Furthermore, the sample set has varying "resolutions" including r_0=1/5 between the n_0^{th} and n_1^{th} samples and r_1=1/10 between the n_1^{th} and the n_2^{th} samples. In other words, "resolution" here refers to the portion of samples being selected during a period of time. In the present example, a process portion such as steps 201 and 206 of process 200 of **Figure 2** has, based on the identification results of the n_0^{th} and n_1^{th} samples, adjusted the resolution from 1/5 to 1/10. This could occur, for example, as previously described, because the n_0^{th} and n_1^{th} samples match the same content ID and process 200 determines that the likelihood that the next selected sample using a resolution of 1/5 would also match justifies decreasing the resolution to 1/10 so that the next sample selected for analysis is the n_2^{th}. However, if the n_2^{th} sample does not match the n_1^{th} sample, then process 200 can make a backtrack decision and go back in the series of samples to select, for example, the $(n_1 +6)^{th}$ sample for content recognition analysis in order to

pinpoint more closely where in the play stream the content change occurred. The order in which samples are selected for analysis in this example is illustrated by arrows 1, 2, and 3 in **Figure 6**.

[0060] Although not illustrated in **Figure 6**, as previously described, steps 201 and 206 of method 200 can also determine based on identification results the time window length can be adjusted. In the context of Figure 6, this would correspond to changing the value of "i," the time window length of a particular sample.

[0061] **Figure 7** shows an example of a computer system 700 that may be used to execute instruction code contained in a computer program product 760 in accordance with an embodiment of the present invention. Computer program product 760 comprises executable code in an electronically readable medium that may instruct one or more computers such as computer system 700 to perform processing that implements the system 100 of **Figure 1** and/or accomplishes the exemplary method 200 of **Figures 2**. The electronically readable medium may be any medium that either stores or carries electronic signals (including signals referred to as electrical signals and signals referred to as electromagnetic signals) and may be accessed locally or remotely, for example via a network connection. The executable instruction code in an electronically readable medium directs the illustrated computer system 700 to carry out various exemplary tasks described herein. The executable code for directing the carrying out of tasks described herein would be typically realized in software. However, it will be appreciated by those skilled in the art, that computers might utilize code realized in hardware to perform many or all of the identified tasks without departing from the present invention. Those skilled in the art will understand that many variations on executable code may be found that implement exemplary methods within the spirit and the scope of the present invention.

[0062] The code or a copy of the code contained in computer program product 760 may be stored in memory 710 for execution by processor 720. Computer system 700 also includes I/O subsystem 730 and peripheral devices 740. I/O subsystem 730, peripheral devices 740, processor 720, and memory 710 are coupled via bus 750.

[0063] Those skilled in the art will appreciate computer system 700 illustrates just one example of a system in which a computer program product in accordance with an embodiment of the present invention may be implemented. To cite but one example of an alternative embodiment, execution of instructions contained in a computer program product in accordance with an embodiment of the present invention may be distributed over multiple computers, such as, for example, over the computers of a distributed computing network.

[0064] Although particular embodiments have been described in detail and certain variants have been noted, various other modifications to the embodiments described herein may be made without departing from the spirit and scope of the present invention. Thus, the invention is limited only by the appended claims.

CLAIMS

What is claimed is:

1. A system for detecting user exposure to media items, comprising:

a server, for receiving a plurality of reference media items from at least one media receiver;

at least one stream collection server, for receiving a representation of at least one target media item from at least one client device;

a stream store, coupled to the server and to the at least one stream collection server, for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item;

a correlator server, coupled to the stream store, for identifying one of the reference media items as corresponding to the target media item;

an output device, coupled to the correlator server, for generating output signaling user exposure to the identified reference media item; and

a location tracking server for detecting a location for the client device; wherein the correlator server correlates the detected location with a location of at least one geographically identifiable sponsor of a reference media item.

2. The system of claim 1, wherein the location tracking server detects the location via at least one selected from the group consisting of:

GPS tracking;

RFID tracking;

Bluetooth tracking.

3. A system for detecting user exposure to media items, comprising:

a server, for receiving a plurality of reference media items from at least one media receiver;

at least one stream collection server, for receiving a representation of at least one target media item from at least one client device;

a stream store, coupled to the server and to the at least one stream collection server, for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item;

a correlator server, coupled to the stream store, for identifying one of the reference media items as corresponding to the target media item; and

an output device, coupled to the correlator server, for generating output signaling user exposure to the identified reference media item; wherein the plurality of reference media items comprises at least one broadcast, and

wherein the representation of at least one target media item indicates user exposure at a time other than the time of the broadcast.

4. A system for detecting user exposure to media items, comprising:

a server, for receiving a plurality of reference media items from at least one media receiver;

at least one stream collection server, for receiving a representation of at least one target media item from at least one client device;

a stream store, coupled to the server and to the at least one stream collection server, for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item;

a correlator server, coupled to the stream store, for identifying one of the reference media items as corresponding to the target media item;

an output device, coupled to the correlator server, for generating output signaling user exposure to the identified reference media item; and

a purchasing tracking server, for receiving consumer purchasing information;

wherein the output device generates a report correlating user purchasing information with user exposure to the identified reference media item.

5. The system of claim 4, wherein the purchasing tracking server receives at least one indication of user use of a credit card.

6. A system for detecting user exposure to media items, comprising:

a server, for receiving a plurality of reference media items from at least one media receiver;

a plurality of stream collection servers for receiving a representation of at least one target media item from at least one client device;

a stream store, coupled to the server and to the stream collection servers, for storing a representation of at least a subset of the received reference media items and for storing a representation of the at least one target media item;

a correlator server, coupled to the stream store, for identifying one of the reference media items as corresponding to the target media item;

an output device, coupled to the correlator server, for generating output signaling user exposure to the identified reference media item; and

a stream collection server selector, for selecting, based on at least one of load and geographic proximity to the client device, one of the plurality of data signature stream collection servers to receive the representation of at least one target media item.

7. A method for detecting user exposure to media items, comprising:

receiving a plurality of reference media items from at least one media source;

for at least one client device:

selecting, based on at least one of load and geographic proximity to the client device, one of a plurality of data signature stream collection servers; and

at the selected data signature stream collection server, receiving, from the client device:

a representation of at least one target media item; and

an indication as to whether the client device is in the physical possession of a person at a time of exposure to the target media item; and

responsive to an indication that the client device is in the physical possession of a person at the time of exposure to the target media item:

identifying one of the reference media items as corresponding to the target media item; and generating output signaling user exposure to the identified reference media item.

8. The method of claim 7, further comprising:

responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item, ignoring the representation of the at least one target media item from the client device.

9. The method of claim 7, further comprising:

responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item:

identifying one of the reference media items as corresponding to the target media item; and

generating output signaling user exposure to the identified reference media item, wherein the output is flagged as having reduced reliability.

10. The method of claim 7, wherein the indication as to whether the client device is in the physical possession of a person is provided based on output of at least one sensor associated with the client device.

11. The method of claim 10, wherein the at least one sensor detects at least one selected from the group consisting of:

vibration of the client device;

key presses on the client device;

temperature of the client device; and

movement of the client device.

12. A system for detecting user exposure to media items, comprising:

a server, for receiving a plurality of reference media items from at least one media receiver;

at least one stream collection server, for, receiving, from at least one client device:

a representation of at least one target media item from at least one client device;

an indication as to whether the client device is in the physical possession of a person at a time of exposure to the target media item; and

a stream store, coupled to the server and to the at least one stream collection server, for:

storing a representation of at least a subset of the received reference media items; and

responsive to an indication that the client device is in the physical possession of a person at the time of exposure to the target media item, storing a representation of the target media item;

a correlator server, coupled to the stream store, for, for each stored representation of a target media item, identifying one of the reference media items as corresponding to the target media item; and

an output device, coupled to the correlator server, for, for each identified reference media item, generating output signaling user exposure to the identified reference media item.

13. The system of claim 12, wherein the stream store:

responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item, ignores the

representation of the target media item.

14. The system of claim 12, wherein, responsive to an indication that the client device is not in the physical possession of a person at the time of exposure to the target media item:

the stream store stores a representation of the target media item and an indication of reduced reliability of the stored representation;

the correlator server identifies one of the reference media items as corresponding to the target media item; and

the output device, generates output signaling user exposure to the identified reference media item and indicates reduced reliability of the indication of user exposure.

15. The system of claim 12, wherein the indication as to whether the client device is in the physical possession of a person is provided based on output of at least one sensor associated with the client device.

16. The system of claim 15, wherein the at least one sensor detects at least one selected from the group consisting of:

vibration of the client device;

key presses on the client device;

temperature of the client device; and

movement of the client device.

17. A system for measuring audience member exposure to media content, comprising:

an interface for receiving a plurality of known media content from at least one media broadcast;

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device;

a content recognition system, coupled to the interface and to the sample control processor, for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media;

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media;

a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content; and

an audience data processor for detecting a location of the audience member monitoring device; wherein the audience data processor relates the detected location to retail traffic of an advertiser associated with the known media content.

18. The system of claim 17, wherein the audience data processor detects the location via GPS tracking.

19. A system for measuring audience member exposure to media content, comprising:

an interface for receiving a plurality of known media content from at least one media broadcast;

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device;

a content recognition system, coupled to the interface and to the sample control processor, for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media;

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media; and

a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content;

wherein the plurality of known media content comprises at least one broadcast; and

wherein the representation of the monitored media indicates audience member exposure at a time other than the time of the broadcast.

20. A system for measuring audience member exposure to media content, comprising:

an interface for receiving a plurality of known media content from at least one media broadcast;

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device;

a content recognition system, coupled to the interface and to the sample control processor, for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media;

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media;

a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content; and

a retail traffic data system; wherein the report generator generates a report matching retail traffic and audience member exposure to known media content.

21. A system for measuring audience member exposure to media content, comprising:

an interface for receiving a plurality of known media content from at least one media broadcast;

a sample control processor for receiving from at least one audience member monitoring device:

a representation of monitored media from at least one audience member monitoring device;

data indicating that the monitoring device is in possession of an audience member at a time of exposure to the monitored media; and

a content recognition system, coupled to the interface and to the sample control processor, for:

storing a representation of at least a subset of the received known media content; and

storing a representation of the monitored media based on the monitoring device being in the possession of an audience member at the time of exposure to the monitored media;

wherein the content recognition system, for each stored representation of monitored media, identifies one of the known media content as corresponding to the monitored media; and

a report generator, coupled to the content recognition system, for, for each identified known media content, generating output signaling audience member exposure to the identified known media content.

22. The system of claim 21, wherein the data indicating the monitoring device is in the possession of an audience member is provided based on output of at least one sensor associated with the monitoring device.

23. The system of claim 22, wherein the at least one sensor detects at least one selected from the group consisting of:

key presses on a media player device coupled to the monitoring device; and

movement of the monitoring device.

24. A system for measuring audience member exposure to media content, comprising:

an interface for receiving a plurality of known media content from at least one media broadcast;

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device;

a content recognition system, coupled to the interface and to the sample control processor, for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media;

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media;

a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content; and

an audience data processor for detecting a location of the audience member monitoring device and relating the detected location to content meta data associated with the known media content.

25. A system for measuring audience member exposure to media content, comprising:

an interface for receiving a plurality of known media content from at least one media broadcast;

a sample control processor for receiving a representation of monitored media from at least one audience member monitoring device;

a content recognition system, coupled to the interface and to the sample control processor, for storing a representation of at least a subset of the known media content and for storing a representation of the monitored media;

wherein the content recognition system identifies one of the known media content as corresponding to the monitored media;

a report generator, coupled to the content recognition system, for generating output signaling audience member exposure to the identified known media content; and

an audience data processor;

wherein the report generator, coupled to the audience data processor, generates a report matching audience data to audience member exposure to known media content.

ABSTRACT OF THE DISCLOSURE

Media monitoring and measurement systems and methods are disclosed. Some embodiments of the present invention provide a media measurement system and method that utilizes audience data to enhance content identifications. Some embodiments analyze media player log data to enhance content identification. Other embodiments of the present invention analyze sample sequence data to enhance content identifications. Other embodiments analyze sequence data to enhance content identification and/or to establish channel identification. Yet other embodiments provide a system and method in which sample construction and selection parameters are adjusted based upon identification results. Yet other embodiments provide a method in which play-altering activity of an audience member is deduced from content offset values of identifications corresponding to captured samples. Yet other embodiments provide a monitoring and measurement system in which a media monitoring device is adapted to receive a wireless or non-wireless audio signal from a media player, the audio signal also being received wirelessly by headphones of a user of the monitoring device.

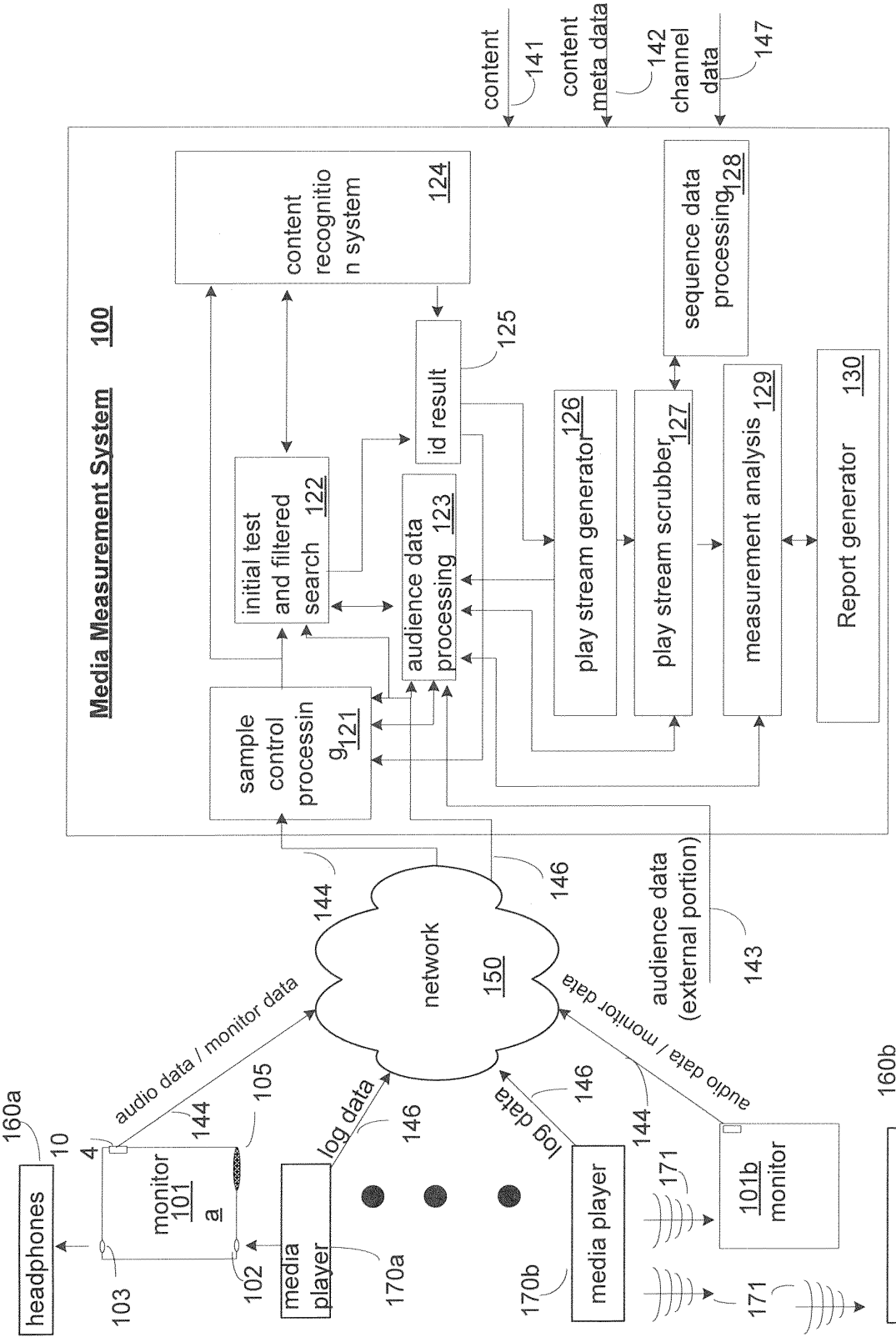

1000
Media Measurement System 100
content 141
content meta data 142
channel data 147
content recognition system 124
initial test and filtered search 122
audience data processing 123
id result 125
sample control processing 121
play stream generator 126
play stream scrubber 127
sequence data processing 128
measurement analysis 129
Report generator 130
network 150
144
146
audio data / monitor data
log data
audio data / monitor data
log data
audience data (external portion) 143
headphones 160a
10
4
monitor 101 a
105
103
102
media player 170a
media player 170b
171
101b monitor
171
headphones 160b

FIG. 1

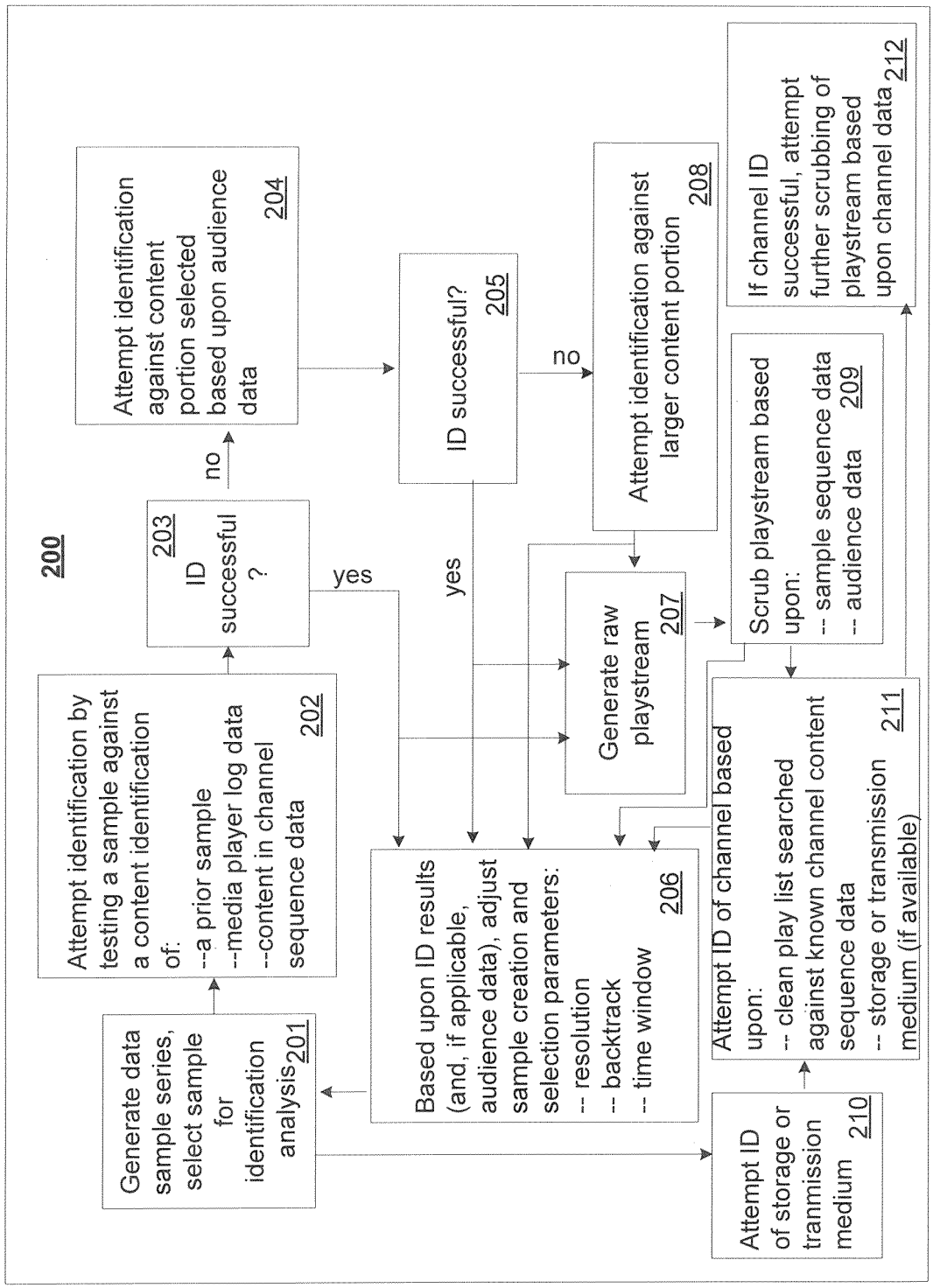

200
Generate data sample series, select sample for identification analysis 201
Attempt identification by testing a sample against a content identification of:
--a prior sample
--media player log data
--content in channel sequence data 202
203 ID successful ?
yes
no
Attempt identification against content portion selected based upon audience data 204
ID successful? 205
yes
no
Attempt identification against larger content portion 208
Based upon ID results (and, if applicable, audience data), adjust sample creation and selection parameters:
-- resolution
-- backtrack
-- time window 206
Generate raw playstream 207
Scrub playstream based upon:
-- sample sequence data
-- audience data 209
If channel ID successful, attempt further scrubbing of playstream based upon channel data 212
Attempt ID of storage or tranmission medium 210
Attempt ID of channel based upon:
-- clean play list searched against known channel content sequence data
-- storage or transmission medium (if available) 211

FIG. 2

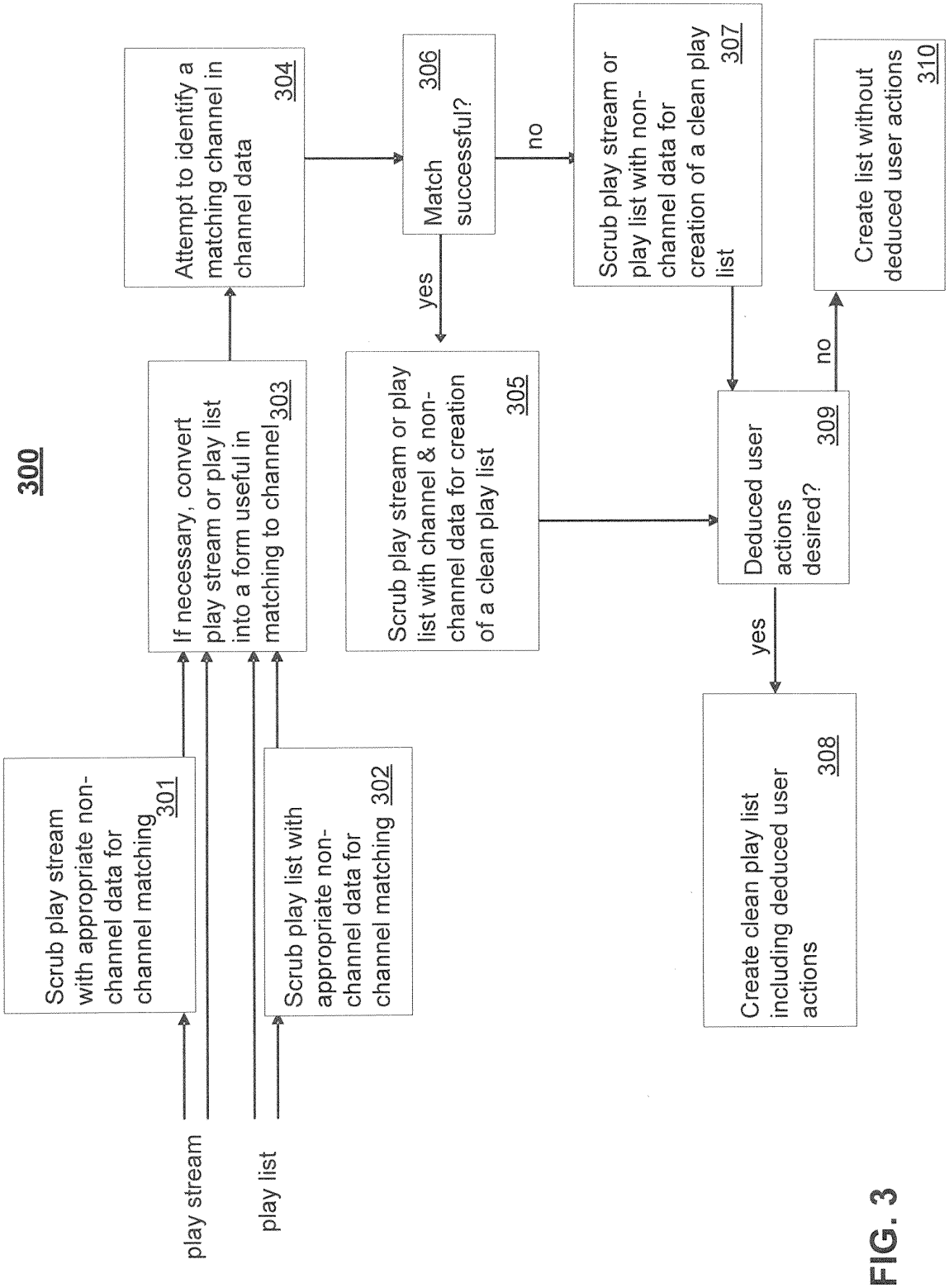

300
play stream
play list
Scrub play stream with appropriate non-channel data for channel matching 301
Scrub play list with appropriate non-channel data for channel matching 302
If necessary, convert play stream or play list into a form useful in matching to channel 303
Attempt to identify a matching channel in channel data 304
Match successful? 306
yes
no
Scrub play stream or play list with channel & non-channel data for creation of a clean play list 305
Scrub play stream or play list with non-channel data for creation of a clean play list 307
Deduced user actions desired? 309
yes
no
Create clean play list including deduced user actions 308
Create list without deduced user actions 310

FIG. 3

410

Raw Play Stream

row	log time	content ID
1	t_0	song 51
2	t_0+1	none
3	t_0 +2	song51
4	t_0+3	song51
5	t_0+4	movie 81
6	t_0+5	song51
7	t_0+6	song51
8	t_0+7	song72
9	t_0+8	song72
10	t_0+9	none
11	t_0+10	song72
12	t_0+11	song72
13	t_0+12	song72
14	t_0+13	song65
15	t_0+14	song65
16	t_0+15	TVprgm58
17	t_0+16	song65
18	t_0+17	song65
19	t_0+18	song65
20	t_0+19	song65
21	t_0+20	song21
22	t_0+21	song21
23	t_0+22	song21
24	t_0+23	song21
25	t_0+24	song21
26	t_0+25	song21
27	t_0+26	ad49
28	t_0+27	ad49
29	t_0+28	song81
30	t_0+29	song35

ssd

450

Clean Play Stream

row	log time	content ID
1	t_0	song 51
2	t_0+1	song51
3	t_0 +2	song51
4	t_0+3	song51
5	t_0+4	song51
6	t_0+5	song51
7	t_0+6	song51
8	t_0+7	song72
9	t_0+8	song72
10	t_0+9	song72
11	t_0+10	song72
12	t_0+11	song72
13	t_0+12	song72
14	t_0+13	song65
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20	t_0+19	song65
21	t_0+20	song21
22	t_0+21	song21
23	t_0+22	song21
24	t_0+23	song21
25	t_0+24	song21
26	t_0+25	song21
27	t_0+26	ad49
28	t_0+27	ad49
29	t_0+28	song35
30	t_0+29	song35

ssd = "sample sequence data"

470

Channel Data for "radio 35"

row	start time	end time	content ID
1	C(0)	C(0)+6	song21
2	C(0)+6	C(0)+8	ad49
3	C(0)+8	C(0)+13	song35

480

Channel Data for "album 12"

row	start time	end time	content ID
1	C(0)	C(0)+7	song51
2	C(0)+7	C(0)+13	song72
3	C(0)+13	C(0)+23	song65
4	C(0)+23	C(0)+30	song29

490

Clean Play List

row	start log time	end log time	content ID	Channel ID
1	t_0	t_0+7	song51	album12
2	t_0+7	t_0+13	song71	album12
3	t_0+13	t_0+20	song65	album12
4	t_0+20	t_0+26	song21	radio35
5	t_0+26	t_0+28	ad49	radio35
6	t_0+28	t_0+30	song34	radio35

FIG. 4

510

Clean Playstream

row	log time	content ID	content offset
1	t_0	TVprgm 27	(0)
2	t_0+1	TVprgm 27	(0)+1
3	t_0 +2	none	n/a
4	t_0+3	none	n/a
5	t_0+4	none	n/a
6	t_0+5	TVprgm 27	(0)+2
7	t_0+6	TVprgm 27	(0)+3
8	t_0+7	TVprgm27	(0)+9
9	t_0+8	TVprgm27	(0)+10
10	t_0+9	TVprgm27	(0)+9
11	t_0+10	TVprgm27	(0)+10
12	t_0+11	none	n/a
13	t_0+12	TVprgrm27	(0)+29
14	t_0+13	TVprgrm27	(0)+30
15	t_0+14	ad23	(0)
16	t_0+15	none	n/a
17	t_0+16	ad25	(0)+2
18	t_0+17	TVprgm28	(0)
19	t_0+18	TVprgm28	(0)+1
20	t_0+19	TVprgrm28	(0)+2

560

Clean Play List

row	start log time	end log time	content ID	content offset
1	t_0	t_0+2	TVprgrm27	(0)
2	t_0+2	t_0+5	none	n/a
3	t_0+5	t_0+7	TVprgrm27	(0)+2
4	t_0+7	t_0+9	TVprgrm27	(0)+9
5	t_0+9	t_0+11	TVprgrm27	(0)+9
6	t_0+11	t_0+12	none	n/a
7	t_0+12	t_0+14	TVprgrm27	(0)+29
8	t_0+14	t_0+15	ad23	(0)
9	t_0+15	t_0+16	none	n/a
10	t_0+16	t_0+17	ad25	(0)+2
11	t_0+17	t_0+20	TVprgrm28	(0)

570

Channel Data for TV C4

row	start time	end time	content ID
1	C(0)	C(0)+31	TVprgrm27
2	C(0)+31	C(0)+34	ad23
3	C(0)+34	C(0)+37	ad24
4	C(0)+37	C(0)+40	ad25
5	C(0)+40	C(0)+50	TVprgrm28

590

Clean Play List with Deduced Actions

row	log time	end log time	content ID and <deduced action>	content offset
1	t_0	t_0+2	TVprgrm27	(0)
2	t_0+2	t_0+5	<pause for 3 units>	n/a
3	t_0+5	t_0+7	TVprgrm27	(0)+2
4	t_0+7	t_0+7	<skip frwrd 5 units>	n/a
5	t_0+7	t_0+9	TVprgrm27	(0)+9
6	t_0+9	t_0+9	<skip bckwrd 2 units>	n/a
7	t_0+9	t_0+11	TVprgrm27	(0)+9
8	t_0+11	t_0+12	<fast frwrd 18 units>	n/a
9	t_0+12	t_0+14	TVprgrm27	(0)+29
10	t_0+14	t_0+15	ad23	(0)
11	t_0+15	t_0+16	<fast frwrd 7 units>	n/a
12	t_0+16	t_0+17	ad25	(0)+2
13	t_0+17	t_0+20	TVprgrm28	(0)

FIG. 5

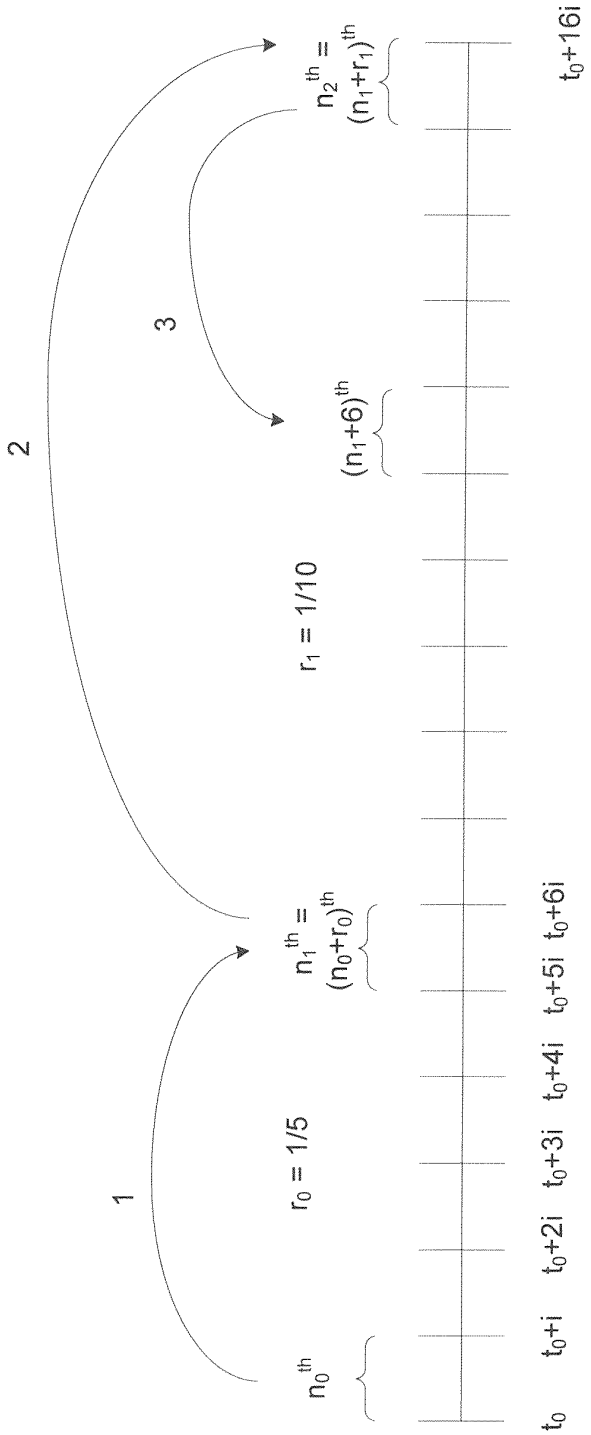

1
2
3
$r_0 = 1/5$
$r_1 = 1/10$
n_0^{th}
$n_1^{th} = (n_0+r_0)^{th}$
$n_2^{th} = (n_1+r_1)^{th}$
$(n_1+6)^{th}$
t_0
t_0+i
t_0+2i
t_0+3i
t_0+4i
t_0+5i
t_0+6i
t_0+16i
600

FIG. 6

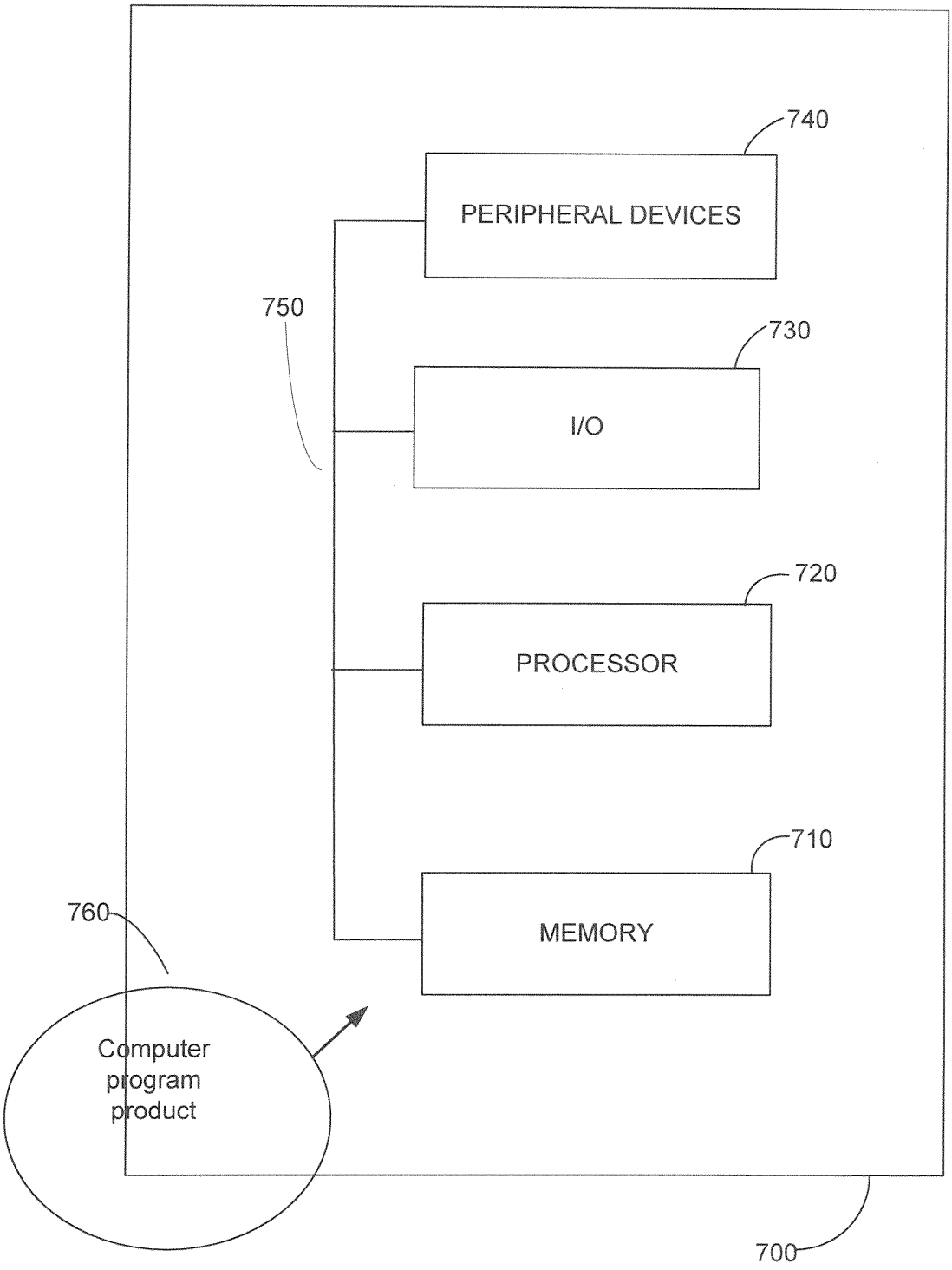

740
PERIPHERAL DEVICES
750
730
I/O
720
PROCESSOR
710
MEMORY
760
Computer program product
700

FIG. 7

Electronic Acknowledgement Receipt	
EFS ID:	8914808
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First Named Inventor/Applicant Name:	Jonathan S. Steuer
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Filer:	Michael John Mauriel/Victoria Wilson
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Attorney Docket Number:	10004-2000115
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Warnings:					
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4		100042000115Specification.pdf	250392 9d0637aa9cb8a4e5a912d8c0406f4da25291a4c2	yes	36
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	Specification		1	23	
	Claims		24	35	
	Abstract		36	36	
Warnings:					
Information:					
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Warnings:					
Information:					
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