



(11) **EP 1 417 584 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
02.09.2015 Bulletin 2015/36

(51) Int Cl.:
G10H 1/00 (2006.01) H04N 7/10 (2006.01)
G11B 27/22 (2006.01) G06F 13/00 (2006.01)

(21) Application number: **02756525.8**

(86) International application number:
PCT/US2002/022931

(22) Date of filing: **17.07.2002**

(87) International publication number:
WO 2003/009149 (30.01.2003 Gazette 2003/05)

(54) **PLAYLIST GENERATION METHOD AND APPARATUS**

PLAYLIST-ERZEUGUNGSVERFAHREN UND VORRICHTUNG

PROCEDE ET APPAREIL DE PRODUCTION D'UNE LISTE DE LECTURE

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SK TR**

EP-A- 0 731 446 US-A- 4 450 531
US-A- 5 437 050 US-A- 6 006 256
US-A- 6 011 758 US-A- 6 026 439
US-A- 6 088 455 US-A- 6 118 450
US-B1- 6 192 340

(30) Priority: **20.07.2001 US 910680**

(43) Date of publication of application:
12.05.2004 Bulletin 2004/20

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Description

[0001] The present disclosure relates to data communications, and, in particular, to a novel system and apparatus for the automatic generation of media playlists.

[0002] One application of the Internet that has received considerable attention is the ability to transmit or stream media content over the Internet. Once an audio or video work has been digitally encoded it may be both downloaded by users for play, or broadcast ("streamed") over the Internet. When works are streamed, they may be listened to or viewed by Internet users in a manner much like traditional radio and television stations.

[0003] Given the widespread use of digital media, audio works, or video works may need to be identified. The need for identification of works may arise in a variety of situations. For example, an artist may wish to verify royalty payments or generate their own Arbitron®-like ratings by identifying how often their works are being streamed or downloaded. Thus, playlists of media may need to be generated. The prior art has made efforts to create methods for identifying digital works and generating playlists.

[0004] As is known by those skilled in the art, a playlist is the documentation of the performance of one or more works at a particular time over a particular media.

[0005] Figure 1 shows a playlist generation system 100 of the prior art. The system 100 may include one or more remote detection modules 102 deployed at various locations throughout a broadcast area. Each detection module 102 may include an antenna 104 for receiving broadcast signals and providing the signals to an analysis and lookup module 106. The module 106 is typically configured to identify the content of the received signal by comparing its audio content against a database 108 of known reference signatures.

[0006] If a match is made, typically the module 102 will keep a record of all matches made during a predetermined period of time on the database 108. For example, the module 102 may keep a record of song titles detected during a 24-hour period.

[0007] The system 100 may further include a playlist server 110 having a processor 112 and database 114. The server 110 is typically configured to receive information such as the titles of identified songs from the one or more detection modules 102 through a network such as the Internet 109 and generate a playlist which may be stored on database 114.

[0008] The system 100 of the prior art in operation typically requires the identity of an unknown work to be determined by the individual detection modules. The playlist server 110 is typically only configured to receive and compile identities of works from the modules 102 into a playlist.

[0009] Further, the online Internet page of Relatable.com discloses on the 17.10.2000 a system for using TRM audio signatures for identifying a music catalogue. In this document, a unique digital audio fingerprint called

"TRM signature" is generated for each audio file using the first 30 seconds of audio data. The number of unique audio signatures created are stored in a database for later use in audio recognition by comparing audio signatures.

[0010] According to the present invention, there is provided a playlist generation system and a method for generating a playlist as defined in the appended claims.

[0011] The system may receive unknown works from networked sources or broadcast sources, or directly from the source prior to the work being provided to a network or broadcast source. The analysis modules and ID servers may be coupled over a network, such as the Internet.

[0012] The representations and identification may be based upon feature vectors, a spectral representation of the unknown work, the text output of a speech recognition system, musical score produced by a music transcription system, or a bit calculated key method, such as MD5 hash, as are known in the art

[0013] The system analysis modules may receive a plurality of streaming sources for analysis at a single location, or from a plurality of streaming sources for analysis at a plurality of access points of the network.

[0014] The system provides representations in approximately real time, and the system may generate a playlist of identified works. The ID server may generate a playlist of identified works received from different access points of the network in approximately real time.

[0015] Various methods for generating a playlist are also disclosed.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0016]

Figure 1 is a prior art diagram of a system.

Figure 2 is a block diagram of one aspect of a disclosed system including one or more analysis modules and ID servers.

Figure 3 is a block diagram of one aspect of an analysis module.

Figure 4 is a flowchart of one aspect of a disclosed system.

Figure 5 is a flowchart of one aspect of a disclosed system.

DETAILED DESCRIPTION

[0017] Persons of ordinary skill in the art will realize that the following description is illustrative only and not in any way limiting. Other modifications and improvements will readily suggest themselves to such skilled persons having the benefit of this disclosure.

[0018] This disclosure may relate to data communications. Various disclosed aspects may be embodied in various computer and machine-readable data structures. Furthermore, it is contemplated that data structures embodying the teachings of the disclosure may be transmit-

ted across computer and machine-readable media, and through communications systems by use of standard protocols such as those used to enable the Internet and other computer networking standards.

[0019] The disclosure may relate to machine-readable media on which are stored various aspects of the disclosure. It is contemplated that any media suitable for retrieving instructions is within the scope of the present disclosure. By way of example, such media may take the form of magnetic, optical, or semiconductor media.

[0020] Various aspects of the disclosure may be described through the use of flowcharts.

[0021] Often, a single instance of an aspect of the present disclosure may be shown. As is appreciated by those of ordinary skill in the art, however, the protocols, processes, and procedures described herein may be repeated continuously or as often as necessary to satisfy the needs described herein. Accordingly, the representation of various aspects of the present disclosure through the use of flowcharts should not be used to limit the scope of the present disclosure.

Exemplary structure

[0022] Figure 2 is a schematic diagram of one aspect of a disclosed playlist generation system 200. The system 200 may include at least one analysis module 202 for receiving an unknown work from a broadcast source 204 as is known in the art. The analysis module may include one or more conventional antennae 214 coupled to the analysis module 202 through an input port 210. The input port 210 may include a conventional receiver for the reception of desired broadcast signals. The input port 210 may also be configured to provide remote control functionality for allowing the remote control and configuration of the receiver, such as providing for remote tuning. The input port 210 may be further configured to digitize received signals in digital formats using protocols known in the art, such as PCM.

[0023] The analysis module 202 may also be configured to receive an unknown work from one or more networked sources 206. In one aspect of a disclosed system, the input port 210 of the analysis module 202 may be configured to monitor sources providing content in standard formats such as Real®, QuickTime®, Windows Media®, MP3®, and similar formats, using hardware and software as is known in the art.

[0024] In another aspect of a disclosed system, the input port 210 may be configured to directly receive audio or video through any of the various means known in the art, such as a microphone or video acquisition system. These unknown works may also be provided in standard formats such as MP3, Windows Media, and similar formats. Thus, the analysis module 202 may be configured to receive an unknown work prior to the unknown work being presented to the broadcast system or network source. It is envisioned that this presentation could occur almost simultaneously.

[0025] The input port 210 may be operatively coupled to a network 208 through which the source 206 may be accessed. The network 208 may comprise any packet- or frame-based network known in the art, such as the Internet. The input port 210 may also be configured to access the network 208 through any means known in the art, such as through traditional copper connections. Furthermore, the input port 210 may also be configured to access the network 208 using wireless connectivity methods as known in the art, including low-power broadband methods such as Bluetooth®, or cellular-based access methods such as those used to provide wireless connectivity to cellular phones and personal digital assistants (PDAs).

[0026] The analysis module 202 may also include an output port 212 for providing connectivity to the network 208. The output port 212 may comprise a separate unit within the analysis module 202 and may include hardware and software to provide the same functionality as the input port 210. Additionally, it is contemplated that the output port 212 may comprise substantially the same circuitry as the input port 210 in order to save space and cost.

[0027] Referring now to Figure 3, a conceptual block diagram of one aspect of a disclosed analysis module 202 is shown. The analysis module 202 may include a processor 302 for operating various aspects of the present disclosure. The processor 302 may be operatively disposed between the input port 210 and output port 212.

[0028] It is contemplated that any processor known in the art may be employed in the module 202, and the choice of a processor may depend on the application. For example, if the module 202 is embodied in a personal computer, the processor 202 may comprise a microprocessor capable of running conventional operating systems such as Microsoft Windows®, while if the module 202 is deployed in a mobile unit such as a PDA, the processor 202 may need only be capable of running an operating system such as Palm OS®, or other embedded systems such as may be present in a cell phone or other consumer device.

[0029] The module 202 may include ancillary hardware and software, such as conventional memory 304 and a conventional database 306 for the storage and retrieval of various aspects of the disclosed system and data.

[0030] The module 202 may be configured to generate a representation of an unknown work which may then be used by the system to identify the unknown work. It is contemplated that a wide variety of methods may be used by the analysis module 202 to generate the representation. The analysis module may be configured to generate a representation of the unknown work using the psychoacoustic properties of the audio content of the unknown work. Such methods are known in the art. For example, the analysis module may generate feature vectors as disclosed in US Patent #5,918,223 to Blum, et al., which is assigned to the same assignee of the present disclosure

[0031] Additionally, the module 202 may use audio or video spectral or wavelet representation techniques as are known in the art. For example, other representation forms may comprise the text output of a speech recognition system, text output of a close captioned transmission, or a musical score produced by a music transcription system. In another embodiment, the representation may comprise a bit calculated key using any of the techniques as are known in the art such as MD5 hash and CRC. It is contemplated that a wide variety of analysis methods may be employed singly or in combination advantageously in the present disclosure.

[0032] Referring back to FIG. 2, the system 200 may further include at least one identification (ID) server 220 for identifying an unknown work. The ID server 220 may identify an unknown work using a representation received from the analysis module 202 through network 208. Though FIG. 2 shows the ID server 220 coupled to the same network 208 as the analysis module 202, it is to be understood that the various components of the present disclosure may be coupled to different networks at different times.

[0033] The ID server 220 may comprise a computer suitable for running an operating system such as Microsoft Windows®, UNIX®, LINUX®, MAC OS®, and the like. The ID server 220 may include a conventional processor 222 for operation of the server. The ID server may further include associated hardware and software known in the art such as a conventional database 224 for storing embodiments of the disclosure or data.

[0034] It is contemplated that the ID server 220 may be configured to identify the unknown work using a variety of methods known in the art. The method for identification may correspond to the method(s) used to generate the representation within the analysis module. For example, the ID server 220 may be configured to perform identification using the methods disclosed in US Patent #5,918,223 to Blum, et al, if the representation were generated using corresponding methods.

[0035] Another example would be the pure spectral representations as are known in the art. It is envisioned that other representations such as wavelets may be used. The invention could also identify the unknown work from the speech recognized text compared against a database of song lyrics using any of a variety of methods known to those skilled in the art.

[0036] Yet another example would be any of a number of search techniques as are known in the art when the representation is a bit calculated key.

[0037] The system may also identify the unknown work by searching a collection of musical works for musical note sequences that correspond to the musical score in the representation.

[0038] In another configuration the system may use a combination of identification techniques, each of which correspond to a representation of the unknown work. By using several identification techniques, the chance of a mis-identification may be greatly reduced.

[0039] Though the analysis module and ID server are shown as being located separately, it is contemplated that they also may be co-located in a single server. For example, it is contemplated that the analysis module and ID server may each be embodied in a single board computer wherein the analysis module and ID server are housed in a single unit and operatively coupled through a common backplane.

10 Exemplary operation

[0040] Figure 4 is a flowchart of one aspect of a disclosed method for automatically generating a playlist. The process begins in act 400, where at least one unknown is received by an analysis module. The analysis module may comprise hardware and software substantially as shown and described above.

[0041] Additionally, one or more of the analysis modules may be configured to receive a plurality of streaming sources simultaneously for analysis. It is contemplated that the analysis modules may be located and configured to receive and analyze a wide variety of content, including analog radio or video, digital streaming audio or video, or any other media.

[0042] In act 402, the analysis module then creates a representation of the received unknown work as shown and described above. The representation may be created by the analysis module by extracting psychoacoustic properties from the received unknown work as described above.

[0043] In act 404, the representations created by the one or more analysis modules may be provided to an ID server. The ID server may comprise hardware and software as described above. It is contemplated that the ID server may comprise a single server, multiple servers networked at a single location, or multiple servers located at different locations.

[0044] It is contemplated that the various analysis modules may provide representations to one or more ID servers in a wide variety of manners. For example, all of the analysis modules present in a system may provide representations in real-time. Or, different analysis modules may be configured to provide representations at different intervals depending on the needs of the end user. The analysis modules may transmit representations every sixty seconds, hourly, or as often as is needed.

[0045] In some cases where network connectivity is challenging, the representations may be batched up and sent to the ID server(s) once a day or less. In particularly harsh or secretive conditions, the representations may be stored within the analysis modules until the modules could be physically retrieved and operatively coupled to an ID server at another physical location.

[0046] It is contemplated that an out-of-band event may be used to trigger the transmission of representations. For example, such a trigger may comprise the initialization of a connection to a network, or the activation of media playing software or hardware.

[0047] Figure 5 is a flowchart of a further disclosed aspect of a disclosed method. The process begins with act 500, where an ID server receives at least one representation of an unknown work. The representations may be received from analysis modules as described above.

[0048] In act 502, the ID server identifies the unknown work based upon the representation. This identification may be performed using the methods as described above. The identification may include such information as the song title, artist, label, or any other information as is known in the art that may be associated with the work. The identification information might contain information such as the name of the advertiser or a descriptive notation of an FCC broadcaster identification segment.

[0049] Once an identification of the unknown work is made, it is contemplated that a wide variety of further acts may be performed. For example, the identifications made by the ID server may be used to construct or maintain a playlist database. Such a playlist may be stored on the ID server, or on a distant server. As will be appreciated by those skilled in the art, if representations are provided to the ID server in real-time (or near real-time depending on the equipment or network used), a playlist may be generated in corresponding real-time. Thus, a playlist may be generated in real-time from inputs provided from distant geographic locations or multiple sources that contains a comprehensive playlist of every identified media segment.

[0050] Additionally, the identification may be transmitted back to the analysis module which generated the representation. This may be advantageous where it is desired to generate a playlist for the particular analysis module's location or user. Thus, the ID server may be configured to provide an identification back to the source analysis module.

[0051] The identity of the received work may also be used for the maintenance of the system. Typically, copies of received works are stored on local drives for audit purposes. Since the intermediate representation files may be larger in size than the identities, it may be desirable to configure the analysis module to purge intermediate files for identified works to recover drive space. It is contemplated that the ID server may be configured to transmit the identity of received works back to the generating analysis module, and the corresponding representation files may then be deleted from local drives by the analysis module, thereby recovering valuable capacity.

[0052] Furthermore, it is contemplated that the ID server or analysis module may be configured to send information regarding identified works to third parties, such as third-party servers. Additionally, the ID server or analysis module may be configured to provide an electronic notification to third parties of identifications made by the ID server. Examples of electronic notifications may include email, HTTP POST transactions, or other electronic communication as is known in the art. As is known by those skilled in the art, these electronic notifications may be used to initiate an action based on their content. For

example, such notifications may allow the playlist to be accessed in real-time or as desired.

[0053] It is contemplated that the ID server may be configured to provide customized playlists containing information tailored to a customer's individual needs. For example, a customer may wish to be notified whenever a certain work is broadcast, or whether a particular work is broadcast on a particular media outlet. Customers may wish to have complete playlists provided to them periodically at desired intervals that may include statistics known in the art. By using the system as disclosed herein, such requests may be satisfied automatically in real-time, or at whatever interval may be desired. It is to be understood that any of the aspects of the present disclosure may be performed in real time or as often as desired.

[0054] It is contemplated that the ED server may examine the representations of all segments that were not identified in the process described above, and determine that some sub-segments were actually performances of a single work. Furthermore, this examination may extract a plurality of other characteristics of the original broadcast such as the amount of musical content, amount of speech content, a transcription based on speech recognition, the beat of any music present, etc. These characteristics of the un-identified segments can then be used to classify the un-identified unknown representations. For instance, a sub-segment that has been performed many times may be correlated with a high amount of musical content and a certain minimum length of playtime to indicate that a new song has been detected. Correlating other values and characteristics could indicate that a new advertisement has been detected. In some cases a corresponding segment of the original broadcast signal could be retrieved and played for a human to perform an identification.

[0055] While embodiments and applications have been shown and described, it would be apparent to those skilled in the art that many more modifications and improvements than mentioned above are possible without departing from the inventive concepts herein.

Claims

1. A playlist generation system comprising:

at least one analysis module (202) for receiving and analyzing a streaming source that contains media content including a plurality of unknown works and generating representations of segments of the media content, wherein the analysis module is configured to generate representations from segments of the media content that include unknown works, and each representation includes a calculation of a psychoacoustic property of the segment from which the representation is generated;
wherein the playlist generation system further

- comprises an identification server (220) for receiving said representations from said at least one analysis module, determining identities of said representations of segments of the media content, and determining identities of the unknown works included in the media content based on the identities of the representations, **characterized in that** the identification server is further adapted for examining representations of all unidentified segments, for extracting a plurality of additional characteristics of the unidentified segments, and for classifying unidentified unknown representations of segments of the media content based on the extracted additional characteristics of the segments; and **in that** the playlist generation system further comprises a playlist database maintained by the identification server, the playlist database adapted for containing a comprehensive playlist of unknown works in the media content from the streaming source, the comprehensive playlist including identities of the plurality of unknown works that have been identified.
2. The system of claim 1, wherein said representations comprise feature vectors of said media content.
 3. The system of claim 1, wherein said representations comprise spectral representations of said media content.
 4. The system of claim 1, wherein said representations comprise a text output of a speech recognition system applied to the media content.
 5. The system of claim 1, wherein said representations comprise a musical score output of a music transcription system applied to the media content.
 6. The system of claim 1, wherein said representations comprise bit calculated keys generated from said media content.
 7. The system of claim 1, wherein said identification server is configured to identify said unknown works using feature vectors generated from said media content.
 8. The system of claim 1, wherein said identification server is configured to identify said unknown work using spectral representations of said media content.
 9. The system of claim 1, wherein said identification server is configured to identify said representations using a text output of a speech recognition system applied to said media content.
 10. The system of claim 1, wherein said identification server is configured to identify said representations using a musical score output of a music transcription system being applied to said media content.
 11. The system of claim 1, wherein said identification server is configured to identify said representations using bit calculated keys generated from said media content.
 12. The system of claim 1, wherein said at least one analysis module is further configured to receive a plurality of streaming sources for analysis at a single location
 13. The system of claim 1, wherein said at least one analysis module is further configured to receive a plurality of streaming sources for analysis at a plurality of different access points of the network.
 14. The system of claim 1, wherein said at least one analysis module is configured to provide said representations to said identification server at a predetermined time interval.
 15. The system of claim 14, wherein said at least one analysis module is configured to provide said representations to said identification server in approximately real time.
 16. The system of claim 14, wherein said at least one analysis module is configured to provide said representations to said identification server based on an out-of-band event.
 17. The system of claim 1, wherein said identification server is further configured to provide the identities of said unknown works back to at least one source analysis module.
 18. The system of claim 1, wherein said identification server is further configured to provide the identities of said unknown works back to said at least source analysis module that received said unknown work in approximately real time.
 19. The system of claim 1, wherein said at least one analysis module is further configured to purge said representations once said identities are received.
 20. The system of claim 19, wherein said at least one analysis module is further configured to purge said representations in approximately real time responsive to said identities being received.
 21. A method for automatically generating a playlist comprising:

- receiving, by at least one analysis module (202), a streaming source that contains media content including a plurality of unknown works;
 generating, by said at least one analysis module, representations of segments of the media content, wherein each representation is generated from a segment of the media content that includes at least one unknown work, and each representation includes a calculation of a psychoacoustic property of the segment;
 sending, by said at least one analysis module, said representation to an identification server (202), the identification server determining identities of said representations of segments of the media content and determining identities of the unknown works included in the media content based on the identities of the representations;
characterized in that the identification server is further examining representations of all unidentified segments, extracting a plurality of additional characteristics of the unidentified segments, and classifying unidentified unknown representations of segments of the media content based on the additional characteristics of the segments, and maintaining a playlist database, the playlist database containing a comprehensive playlist of the unknown works in the media content from the streaming source, wherein the comprehensive playlist includes identities of the plurality of unknown works that have been identified.
22. The method of claim 21, wherein said representations comprise feature vectors of said media content.
23. The method of claim 21, wherein said representations comprise spectral representations of said media content.
24. The method of claim 21, wherein said representations comprise a text output of a speech recognition system applied to said media content.
25. The method of claim 21, wherein said representations comprise a musical score output of a music transcription system applied to said media content.
26. The method of claim 21, wherein said representations comprise bit calculated keys of said media content.
27. The method of claim 21, wherein said act of identifying is performed using feature vectors generated from said media content of said unknown work.
28. The method of claim 21, wherein said identification server to identify the representations using spectral representations of said media content.

29. The method of claim 21, wherein said identification server to identify the representations using a text output of a speech recognition system applied to said media content.
30. The method of claim 21, wherein said identification server to identify the representations using a musical score output of a music transcription system applied to said media content.
31. The method of claim 21, wherein said identification server to identify the representations using bit calculated keys of said media content.

Patentansprüche

1. Playlist-Erzeugungssystem, das Folgendes umfasst:

wenigstens ein Analysemodul (202) zum Empfangen und Analysieren einer Streaming-Quelle, die Media-Inhalt mit mehreren unbekanntem Werken enthält, und Erzeugen von Darstellungen von Segmenten des Media-Inhalts, wobei das Analysemodul zum Erzeugen von Darstellungen von Segmenten des Media-Inhalts konfiguriert ist, die unbekanntem Werke enthalten, und jede Darstellung eine Berechnung einer psychoakustischen Eigenschaft des Segments beinhaltet, von dem die Darstellung erzeugt wird;

wobei das Playlist-Erzeugungssystem ferner einen Identifikationsserver (220) zum Empfangen der genannten Darstellung von dem genannten wenigstens einen Analysemodul, zum Ermitteln von Identitäten der genannten Darstellungen von Segmenten des Media-Inhalts und zum Ermitteln von Identitäten der in dem Media-Inhalt enthaltenen unbekanntem Werke auf der Basis der Identitäten der Darstellungen umfasst, **dadurch gekennzeichnet, dass** der Identifikationsserver ferner zum Untersuchen von Darstellungen aller unidentifizierten Segmente, zum Extrahieren mehrerer zusätzlicher Charakteristiken der unidentifizierten Segmente und zum Klassifizieren von unidentifizierten unbekanntem Darstellungen von Segmenten des Media-Inhalts auf der Basis der extrahierten zusätzlichen Charakteristiken der Segmente ausgelegt ist; und

dadurch, dass das Playlist-Erzeugungssystem ferner eine von dem Identifikationsserver geführte Playlist-Datenbank umfasst, wobei die Playlist-Datenbank zum Aufnehmen einer umfassenden Playlist von unbekanntem Werken in dem Media-Inhalt von der Streaming-Quelle ausgelegt ist, wobei die umfassende Playlist

- Identitäten der mehreren unbekanntem Werke beinhaltet, die identifiziert wurden.
2. System nach Anspruch 1, wobei die genannten Darstellungen Merkmalsvektoren des genannten Media-Inhalts umfassen. 5
 3. System nach Anspruch 1, wobei die genannten Darstellungen spektrale Darstellungen des genannten Media-Inhalts umfassen. 10
 4. System nach Anspruch 1, wobei die genannten Darstellungen eine Textausgabe eines auf den Media-Inhalt angewandten Spracherkennungssystems umfassen. 15
 5. System nach Anspruch 1, wobei die genannten Darstellungen eine Partiturausgabe eines auf den Media-Inhalt angewandten Musiktranskriptionssystems umfassen. 20
 6. System nach Anspruch 1, wobei die genannten Darstellungen von dem genannten Media-Inhalt erzeugte bitberechnete Schlüssel umfassen. 25
 7. System nach Anspruch 1, wobei der genannte Identifikationsserver zum Identifizieren der genannten unbekanntem Werke anhand von von dem genannten Media-Inhalt erzeugten Merkmalsvektoren konfiguriert ist. 30
 8. System nach Anspruch 1, wobei der genannte Identifikationsserver zum Identifizieren des genannten unbekanntem Werks anhand von Spektraldarstellungen des genannten Media-Inhalts konfiguriert ist. 35
 9. System nach Anspruch 1, wobei der genannte Identifikationsserver zum Identifizieren der genannten Darstellungen anhand einer Textausgabe eines auf den genannten Media-Inhalt angewandten Spracherkennungssystems konfiguriert ist. 40
 10. System nach Anspruch 1, wobei der genannte Identifikationsserver zum Identifizieren der genannten Darstellungen anhand einer Partiturausgabe eines auf den genannten Media-Inhalt angewandten Musiktranskriptionssystems konfiguriert ist. 45
 11. System nach Anspruch 1, wobei der genannte Identifikationsserver zum Identifizieren der genannten Darstellungen anhand von von dem genannten Media-Inhalt erzeugten bitberechneten Schlüsseln konfiguriert ist. 50
 12. System nach Anspruch 1, wobei das genannte wenigstens eine Analysemodul ferner zum Empfangen von mehreren Streaming-Quellen zur Analyse an einem einzigen Ort konfiguriert ist. 55
 13. System nach Anspruch 1, wobei das genannte wenigstens eine Analysemodul ferner zum Empfangen von mehreren Streaming-Quellen zur Analyse an mehreren verschiedenen Zugangspunkten des Netzwerks konfiguriert ist.
 14. System nach Anspruch 1, wobei das genannte wenigstens eine Analysemodul zum Übertragen der genannten Darstellungen zu dem genannten Identifikationsserver in einem vorbestimmten Zeitintervall konfiguriert ist.
 15. System nach Anspruch 14, wobei das genannte wenigstens eine Analysemodul zum Übertragen der genannten Darstellungen zu dem genannten Identifikationsserver etwa in Echtzeit konfiguriert ist.
 16. System nach Anspruch 14, wobei das genannte wenigstens eine Analysemodul zum Übertragen der genannten Darstellungen zu dem genannten Identifikationsserver auf der Basis eines Out-of-Band-Ereignisses konfiguriert ist.
 17. System nach Anspruch 1, wobei der genannte Identifikationsserver ferner zum Übertragen der Identitäten der genannten unbekanntem Werke zurück zu wenigstens einem Quellenanalysemodul konfiguriert ist.
 18. System nach Anspruch 1, wobei der genannte Identifikationsserver ferner zum Übertragen der Identitäten der genannten unbekanntem Werke zurück zu dem genannten wenigstens Quellenanalysemodul konfiguriert ist, das das genannte unbekanntem Werk etwa in Echtzeit empfangen hat.
 19. System nach Anspruch 1, wobei das genannte wenigstens eine Analysemodul ferner zum Löschen der genannten Darstellungen nach dem Empfang der genannten Identitäten konfiguriert ist.
 20. System nach Anspruch 19, wobei das genannte wenigstens eine Analysemodul ferner zum Löschen der genannten Darstellungen etwa in Echtzeit als Reaktion auf den Empfang der genannten Identitäten konfiguriert ist.
 21. Verfahren zum automatischen Erzeugen einer Playlist, das Folgendes beinhaltet:
 - Empfangen, durch wenigstens ein Analysemodul (202), einer Streaming-Quelle, die Media-Inhalt mit mehreren unbekanntem Werken enthält;
 - Erzeugen, durch das genannte wenigstens eine Analysemodul, von Darstellungen von Segmenten des Media-Inhalts, wobei jede Darstellung von einem Segment des Media-Inhalts erzeugt

- wird, das wenigstens ein unbekanntes Werk enthält, und jede Darstellung eine Berechnung einer psychoakustischen Eigenschaft des Segments beinhaltet;
- Senden, durch das genannte wenigstens eine Analysemodul, der genannten Darstellung zu einem Identifikationsserver (202), wobei der Identifikationsserver Identitäten der genannten Darstellungen von Segmenten des Media-Inhalts und Identitäten der in dem Media-Inhalt enthaltenen unbekanntes Werke auf der Basis der Identitäten der Darstellungen ermittelt;
- dadurch gekennzeichnet, dass** der Identifikationsserver ferner Darstellungen aller unidentifizierten Segmente untersucht, mehrere zusätzliche Charakteristiken der unidentifizierten Segmente extrahiert und unidentifizierte unbekanntes Darstellungen von Segmenten des Media-Inhalts auf der Basis der zusätzlichen Charakteristiken der Segmente klassifiziert und eine Playlist-Datenbank führt, wobei die Playlist-Datenbank eine umfassende Playlist der unbekanntes Werke in dem Media-Inhalt von der Streaming-Quelle enthält, wobei die umfassende Playlist Identitäten der mehreren unbekanntes Werke beinhaltet, die identifiziert wurden.
22. Verfahren nach Anspruch 21, wobei die genannten Darstellungen Merkmalsvektoren des genannten Media-Inhalts umfassen.
23. Verfahren nach Anspruch 21, wobei die genannten Darstellungen spektrale Darstellungen des genannten Media-Inhalts umfassen.
24. Verfahren nach Anspruch 21, wobei die genannten Darstellungen eine Textausgabe eines auf den genannten Media-Inhalt angewandten Spracherkennungssystems umfassen.
25. Verfahren nach Anspruch 21, wobei die genannten Darstellungen eine Partiturausgabe eines auf den genannten Media-Inhalt angewandten Musiktranskriptionssystems umfassen.
26. Verfahren nach Anspruch 21, wobei die genannten Darstellungen bitberechnete Schlüssel des genannten Media-Inhalts umfassen.
27. Verfahren nach Anspruch 21, wobei die genannte Tätigkeit des Identifizierens anhand von Merkmalsvektoren erfolgt, die von dem genannten Media-Inhalt des genannten unbekanntes Werks erzeugt werden.
28. Verfahren nach Anspruch 21, wobei der genannte Identifikationsserver zum Identifizieren der Darstellungen anhand von spektralen Darstellungen des

genannten Media-Inhalts dient.

29. Verfahren nach Anspruch 21, wobei der genannte Identifikationsserver zum Identifizieren der Darstellungen anhand einer Textausgabe eines auf den genannten Media-Inhalt angewandten Spracherkennungssystems dient.

30. Verfahren nach Anspruch 21, wobei der genannte Identifikationsserver zum Identifizieren der Darstellungen mit einer Partiturausgabe eines auf den genannten Media-Inhalt angewandten Musiktranskriptionssystems dient.

31. Verfahren nach Anspruch 21, wobei der genannte Identifikationsserver zum Identifizieren der Darstellungen anhand von bitberechneten Schlüsseln des genannten Media-Inhalts dient.

Revendications

1. Un système de génération de listes d'écoute comprenant :

au moins un module d'analyse (202) destiné à la réception et à l'analyse d'une source de diffusion en continu qui contient des contenus multimédias comprenant une pluralité d'oeuvres inconnues et à la génération de représentations de segments des contenus multimédias, où le module d'analyse est configuré de façon à générer des représentations à partir de segments des contenus multimédias qui comprennent des oeuvres inconnues, et chaque représentation comprend un calcul d'une propriété psychoacoustique du segment à partir duquel la représentation est générée,

où le système de génération de listes d'écoute comprend en outre un serveur d'identification (220) destiné à la réception desdites représentations à partir dudit au moins un module d'analyse, à la détermination d'identités desdites représentations de segments des contenus multimédias, et la détermination d'identités des oeuvres inconnues incluses dans les contenus multimédias en fonction des identités des représentations, **caractérisé en ce que** le serveur d'identification est adapté en outre de façon à examiner les représentations de tous les segments non identifiés, de façon à extraire une pluralité de caractéristiques additionnelles des segments non identifiés, et à classer des représentations inconnues non identifiées de segments des contenus multimédias en fonction des caractéristiques additionnelles extraites des segments, et

en ce que le système de génération de listes

- d'écoute comprend en outre une base de données de listes d'écoute entretenue par le serveur d'identification, la base de données de listes d'écoute étant adaptée de façon à contenir une liste d'écoute complète d'oeuvres inconnues dans les contenus multimédias provenant de la source de diffusion en continu, la liste d'écoute complète comprenant des identités de la pluralité d'oeuvres inconnues qui ont été identifiées.
2. Le système selon la Revendication 1, où lesdites représentations comprennent des vecteurs de caractéristiques desdits contenus multimédias.
 3. Le système selon la Revendication 1, où lesdites représentations comprennent des représentations spectrales desdits contenus multimédias.
 4. Le système selon la Revendication 1, où lesdites représentations comprennent un texte produit par un système de reconnaissance vocale appliqué aux contenus multimédias.
 5. Le système selon la Revendication 1, où lesdites représentations comprennent une partition musicale produite par un système de transcription musicale appliqué aux contenus multimédias.
 6. Le système selon la Revendication 1, où lesdites représentations comprennent des clés calculées en bits générées à partir desdits contenus multimédias.
 7. Le système selon la Revendication 1, où ledit serveur d'identification est configuré de façon à identifier lesdites oeuvres inconnues au moyen des vecteurs de caractéristiques générés à partir desdits contenus multimédias.
 8. Le système selon la Revendication 1, où ledit serveur d'identification est configuré de façon à identifier ladite oeuvre inconnue au moyen de représentations spectrales desdits contenus multimédias.
 9. Le système selon la Revendication 1, où ledit serveur d'identification est configuré de façon à identifier lesdites représentations au moyen d'un texte produit par un système de reconnaissance vocale appliqué auxdits contenus multimédias.
 10. Le système selon la Revendication 1, où ledit serveur d'identification est configuré de façon à identifier lesdites représentations au moyen d'une partition musicale produite par un système de transcription musicale qui est appliqué auxdits contenus multimédias.
 11. Le système selon la Revendication 1, où ledit serveur d'identification est configuré de façon à identifier lesdites représentations au moyen de clés calculées en bits générées à partir desdits contenus multimédias.
 12. Le système selon la Revendication 1 où ledit au moins un module d'analyse est configuré en outre de façon à recevoir une pluralité de sources de diffusion en continu pour une analyse au niveau d'un emplacement unique.
 13. Le système selon la Revendication 1, où ledit au moins un module d'analyse est configuré en outre de façon à recevoir une pluralité de sources de diffusion en continu pour une analyse au niveau d'une pluralité de points d'accès différents du réseau.
 14. Le système selon la Revendication 1, où ledit au moins un module d'analyse est configuré de façon à fournir lesdites représentations audit serveur d'identification à un intervalle temporel prédéterminé.
 15. Le système selon la Revendication 14, où ledit au moins un module d'analyse est configuré de façon à fournir lesdites représentations audit serveur d'identification approximativement en temps réel.
 16. Le système selon la Revendication 14, où ledit au moins un module d'analyse est configuré de façon à fournir lesdites représentations audit serveur d'identification en fonction d'un événement hors bande.
 17. Le système selon la Revendication 1, où ledit serveur d'identification est configuré en outre de façon à fournir les identités desdites oeuvres inconnues en retour à au moins un module d'analyse de source.
 18. Le système selon la Revendication 1, où ledit serveur d'identification est configuré en outre de façon à fournir les identités desdites oeuvres inconnues en retour audit au moins module d'analyse de source qui a reçu ladite oeuvre inconnue approximativement en temps réel.
 19. Le système selon la Revendication 1 où ledit au moins un module d'analyse est configuré en outre de façon à purger lesdites représentations une fois que lesdites identités ont été reçues.
 20. Le système selon la Revendication 19, où ledit au moins un module d'analyse est configuré en outre de façon à purger lesdites représentations approximativement en temps réel en réponse à la réception desdites identités.
 21. Un procédé de génération automatique d'une liste d'écoute comprenant :

- la réception, par au moins un module d'analyse (202), d'une source de diffusion en continu qui contient des contenus multimédias comprenant une pluralité d'oeuvres inconnues, la génération, par ledit au moins un module d'analyse, de représentations de segments des contenus multimédias, où chaque représentation est générée à partir d'un segment des contenus multimédias qui comprend au moins une oeuvre inconnue, et chaque représentation comprend un calcul d'une propriété psychoacoustique du segment, l'envoi, par ledit au moins un module d'analyse, de ladite représentation à un serveur d'identification (202), le serveur d'identification déterminant des identités desdites représentations de segments des contenus multimédias et déterminant des identités des oeuvres inconnues incluses dans les contenus multimédias en fonction des identités des représentations, **caractérisé en ce que** le serveur d'identification examine en outre des représentations de tous les segments non identifiés, extrait une pluralité de caractéristiques additionnelles des segments non identifiés, et classe des représentations inconnues non identifiées de segments des contenus multimédias en fonction des caractéristiques additionnelles des segments, et entretient une base de données de listes d'écoute, la base de données de listes d'écoute contenant une liste d'écoute complète des oeuvres inconnues dans les contenus multimédias provenant de la source de diffusion en continu, où la liste d'écoute complète comprend des identités de la pluralité d'oeuvres inconnues qui ont été identifiées.
22. Le procédé selon la Revendication 21, où lesdites représentations comprennent des vecteurs de caractéristiques desdits contenus multimédias.
23. Le procédé selon la Revendication 21, où lesdites représentations comprennent des représentations spectrales desdits contenus multimédias.
24. Le procédé selon la Revendication 21, où lesdites représentations comprennent un texte produit par un système de reconnaissance vocale appliqué auxdits contenus multimédias.
25. Le procédé selon la Revendication 21, où lesdites représentations comprenant une partition musicale produite par un système de transcription musicale appliqué auxdits contenus multimédias.
26. Le procédé selon la Revendication 21, où lesdites représentations comprennent des clés calculées en bits desdits contenus multimédias.
27. Le procédé selon la Revendication 21, où ladite opération d'identification est exécutée au moyen de vecteurs de caractéristiques générés à partir desdits contenus multimédias de ladite oeuvre inconnue.
28. Le procédé selon la Revendication 21, où ledit serveur d'identification pour identifier les représentations utilise des représentations spectrales desdits contenus multimédias.
29. Le procédé selon la Revendication 21, où ledit serveur d'identification pour identifier les représentations utilise un texte produit par un système de reconnaissance vocale appliqué auxdits contenus multimédias.
30. Le procédé selon la Revendication 21, où ledit serveur d'identification pour identifier les représentations utilise une partition musicale produite par un système de transcription musicale appliqué auxdits contenus multimédias.
31. Le procédé selon la Revendication 21, où ledit serveur d'identification pour identifier les représentations utilise des clés calculées en bits desdits contenus multimédias.

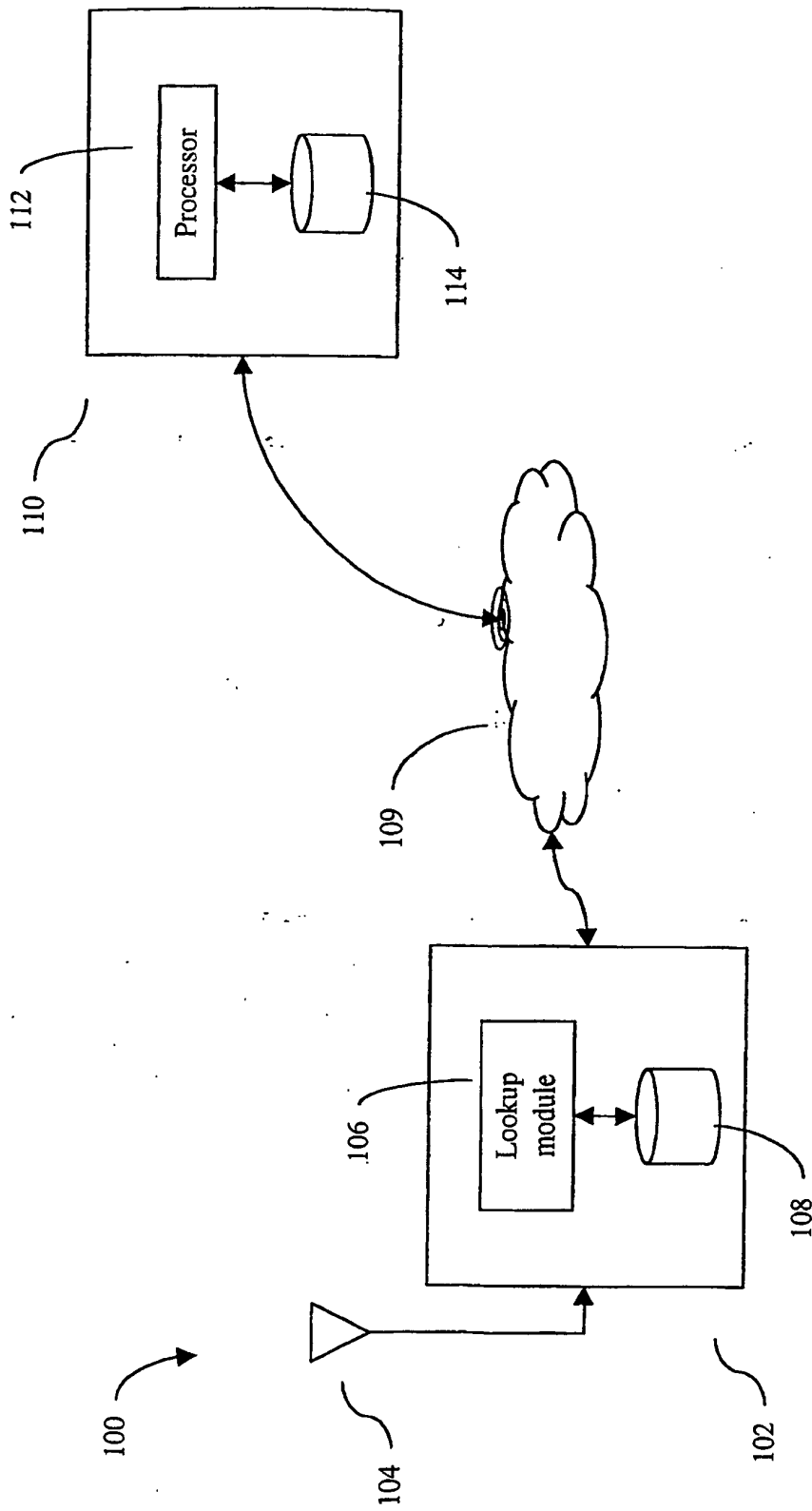


FIG. 1
Prior Art

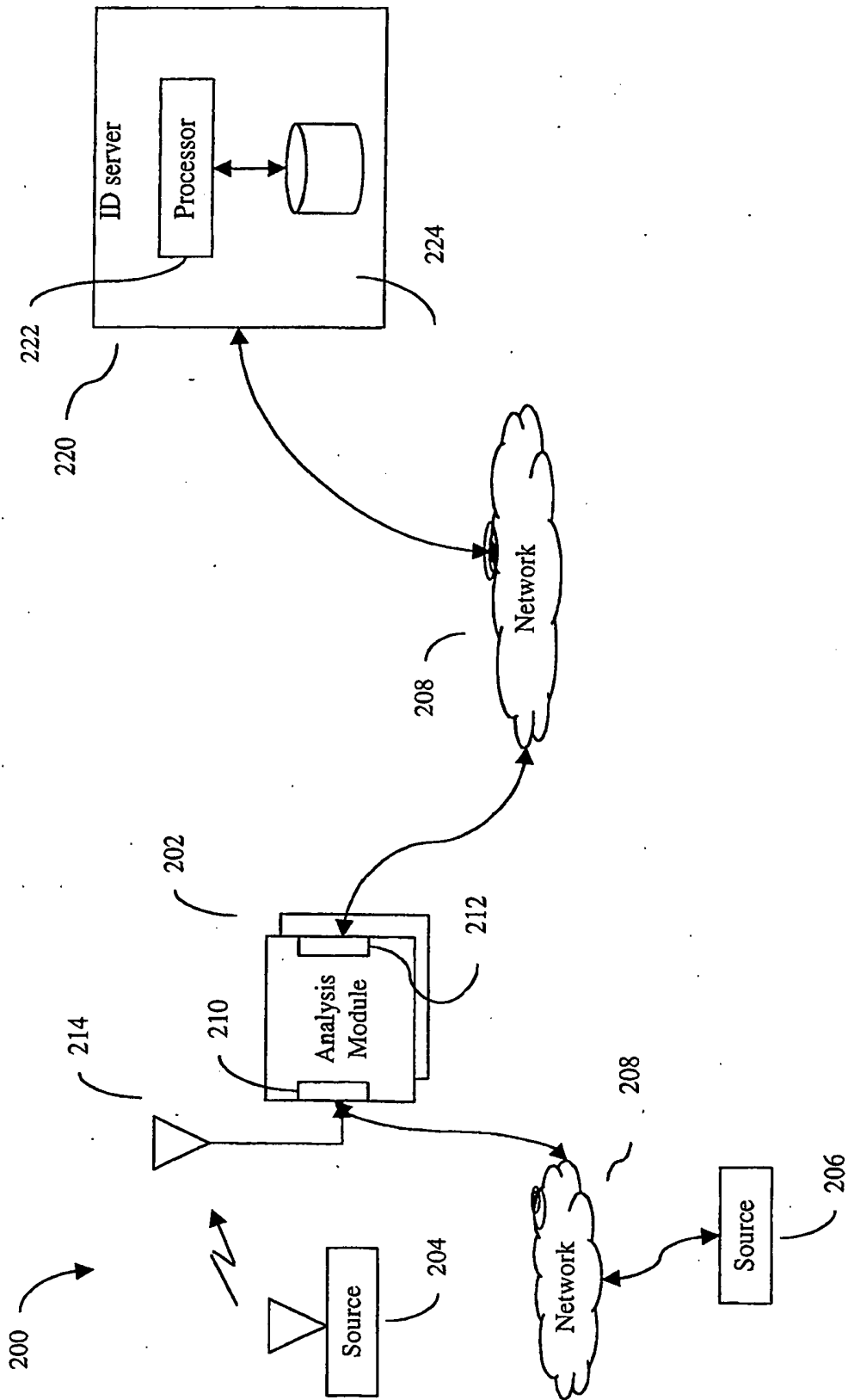


FIG. 2

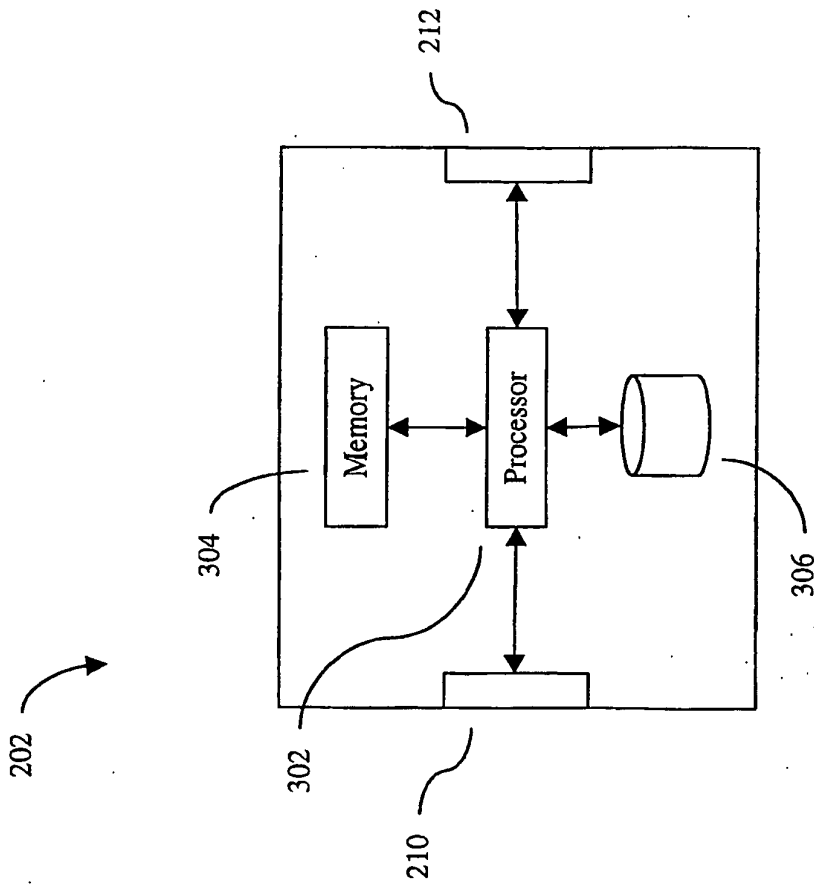


FIG. 3

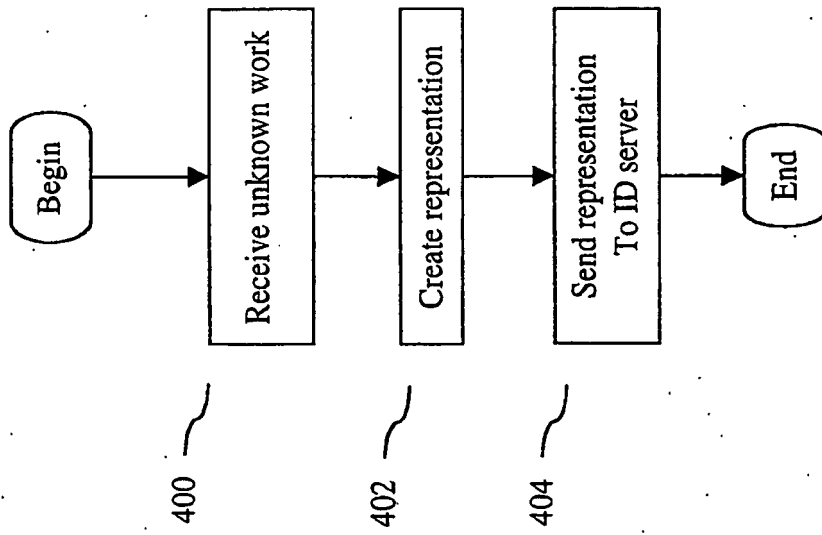


FIG. 4

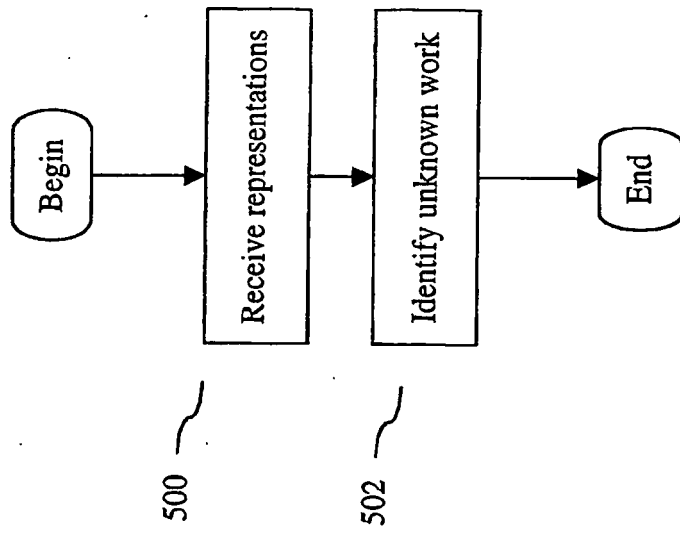


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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