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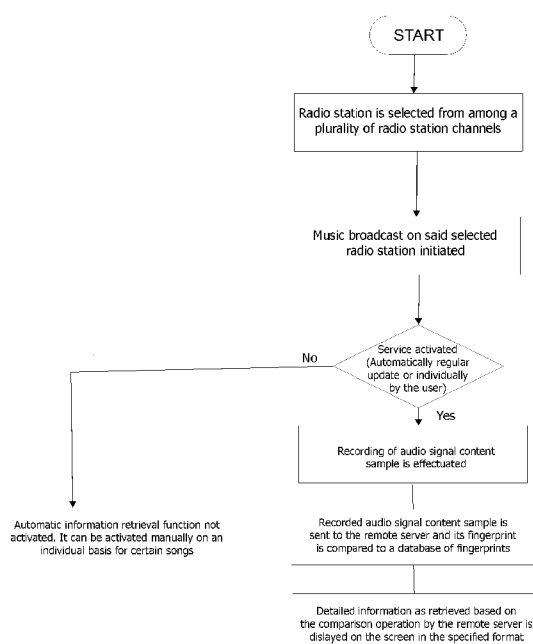
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(54) Title: IMAGE DISPLAY DEVICE RADIO CHANNEL CONTENT INFORMATION RETRIEVING SYSTEM

Fig. 1



(57) Abstract: The present invention relates to an image display device capable of retrieving radio channel program content information from a remote server to be delivered to the users. The present invention more specifically relates to an image display device receiving a plurality of broadcast program contents including audio signal contents provided by radio stations, said image display device comprising an electronic control unit.



Description**IMAGE DISPLAY DEVICE RADIO CHANNEL CONTENT INFORMATION
RETRIEVING SYSTEM**

- [0001] The present invention relates to an image display device capable of retrieving radio channel program content information from a remote server to be delivered to the users.
- [0002] Digital and interactive TV systems provide a comprehensive amount of TV channels and programs leading to the general outcome that although a vast number of programs can be presented, user-interaction is limited in the sense that only the program content being directly visible and/or audible serves as a direct source of information and no secondary or auxiliary information relevant to the context of the directly displayed content can be retrieved and delivered to the users. Assuming that a TV service may have hundreds of channels, there might be many occasions where a user is interested in obtaining a piece of information relevant to the directly presented context of the program being viewed but since no such opportunity is available, he/she is only able to use alternative methods and means for obtaining the information of interest.
- [0003] Accordingly, individual program contents can be processed in order for obtaining secondary or auxiliary information not directly presented in the program being viewed and such secondary or auxiliary information can be offered to the users.
- [0004] Among others, one of the prior art disclosures in the technical field of the present invention can be referred to as US2011219398, which defines a system of delivering a personalized media item to a user of an interactive television. The system comprises a television terminal, a computing device and a remote control device. The computing device further comprises a set top box. The computing device may be connected to a server through a communication network. The system stores a personal profile for each of its users. The user's identity is determined after a user switches on the television. Personalized text messages for selected media items are displayed as scrolling tickers on the television display screen. The media items may include advertisement messages, headlines of news and

selected stock prices. One of the tickers may be selected by the user employing the remote control device to display the next level of details using an enlarged display space or using the full television screen.

- [0005] The present invention provides a system and a method by which an image display device is operated such that users are automatically offered radio channel program content information not directly presented in the program being viewed.
- [0006] The present invention therefore provides a system and method by which an image display device is operable to automatically provide radio channel program content information relevant to the specific program content to be retrieved and delivered to the users as provided by the characterizing features defined in Claim 1.
- [0007] Primary object of the present invention is to provide a system and method by which an image display device automatically delivers radio channel program content information.
- [0008] The present invention proposes a
- [0009] Accompanying drawings are given solely for the purpose of exemplifying a system and method by which an image display device is operable, whose advantages over prior art were outlined above and will be explained in brief hereinafter.
- [0010] The drawings are not meant to delimit the scope of protection as identified in the claims nor should they be referred to alone in an effort to interpret the scope identified in said claims without recourse to the technical disclosure in the description of the present invention.
- [0011] Fig. 1 demonstrates a general diagram according to which the image display device of the invention executes the method of operation according to the present invention.
- [0012] The present invention proposes an image display device enabling a user to reach relevant program content information while viewing a radio channel. As is known, audio broadcasting can be done via cable radio, local wire television networks and satellite. More particularly, the present invention provides that an image display device automatically retrieves a certain piece of information in association with the radio program content

such as a specific song that is broadcast on the radio channel.

[0013] As is known, a plurality of channels is broadcasted in a multitude of categories. It is further known that digital broadcasting services provide information in regards to the genre of the programs being watched. An electronic program guide provides program-specific information on the electronic program guide pages. The genre information may typically define a certain number of categories characterizing the content of a program. A content identifier therefore describes the contextual category of the digital program so as to let the users obtain information as to the classification of an event or a program. Therefore, a significant amount of data in the form of metadata information containing channel names, broadcasting program names, types and broadcasting time interval descriptions is receivable from the broadcasting service providers by way of using the electronic program guide (EPG).

[0014] In the case of radio channel broadcast by the service provider, certain information such as song name, artist name, or genre can be available. It is to be noted that EPG information might not always be complete or in the case of other radio stations not broadcast by the service provider (such as FM stations or Internet radio with no song-specific descriptive information), the users may need to browse such information not directly obtainable from the program content itself.

[0015] According to the present invention, the secondary or auxiliary information is directly received from a remote server as will be delineated hereinafter. An electronic control unit of the image display device initially automatically records a predetermined duration audio sample of the currently broadcast song on the radio station and temporarily stores the same on a memory unit. The image display device being provided with a network interface card (NIC), the electronic control unit automatically then connects to a remote server to transfer said recorded sample to the remote server. The remote server can be a predefined web resource with an audio fingerprint database. A remote server software module analyses the song using conventional song recognition algorithms known as Automatic Content Recognition (ACR), where time, amplitude, and frequency of small

segments of the song are used to generate a 3D-spectrogram, and peaks of high intensity are identified. The retrieved fingerprint is then compared to a hashtag database of song fingerprints. The remote server software module subsequently creates an identification look-up table containing specific information such as song name, artist name and genre. The look-up table and a cover image to be used as a background image are transferred to the image display device performing the query. The retrieved information and image are reconstructed in the form of a picture-in-picture window or in any other suitable form. The picture-in-picture window is formed at a predetermined location, depending on the length of the textual information or the preference of the user

- [0016] In a variation of the present invention, the image display device may generate machine readable codes such as barcode, two-dimensional or matrix code as in the case of Quick Response (QR) codes containing specific information as to the specific audio content, such machine readable codes dynamically changing to accompany said specific audio content.
- [0017] The user can therefore reach the relevant information scanning the machine readable codes by his mobile terminal. The machine readable codes may also contain links to external websites as included by the remote server software module for providing more detailed information.
- [0018] The machine readable codes may be discontinuously displayed on the TV screen in a non-intrusive manner, i.e. interfering with the screen content in a minimal level. The machine readable codes are displayed on the screen in a manner to be overlaid on an actual screen content so as to be updated periodically as long as necessary, i.e. at times when a new song is detected. Preferably regular samples are sent to the remote server at predetermined intervals and machine readable codes are generated only when the currently playing song is changed.
- [0019] According to a variation, the auxiliary information retrieving function can be initiated by the users anytime by selecting the corresponding menu option or pressing a corresponding button so as to access the resource or generate the machine readable code. To this end, the image display

device of the invention may operate in a so-called non-automatic mode in which case the information retrieving function will be launched only in response to the calling of an information retrieving function by means of a button being actuatable on the TV front panel or by means of a remote control.

- [0020] In a variation, the content-specific information is displayed on the screen in the form of subtitles. The information is submitted by subtitles in the form of a horizontal band moving on the lower part of the screen.
- [0021] Alternatively, the content-specific information can be sent to a specified e-mail address, displayed on a home network device such as a predefined portable device or saved on a connected storage device such as a USB drive.
- [0022] In a nutshell, the present invention proposes an image display device receiving a plurality of broadcast program contents including audio signal contents provided by radio stations, said image display device comprising an electronic control unit.
- [0023] In one embodiment of the invention, said electronic control unit is configured to record a predetermined duration audio signal content sample of a currently playing audio signal content and transferring said recorded audio signal content sample to a remote server.
- [0024] In a further embodiment of the invention, said image display device is configured to receive textual information in association with said recorded audio signal content from said remote server.
- [0025] In a further embodiment of the invention, said electronic control unit is configured to display said textual information in real-time during playing of audio signal content to which said audio signal content sample belongs.
- [0026] In a further embodiment of the invention, said textual information received from said remote server is formed as an identification look-up table containing information in the form of song name, artist name and genre.
- [0027] In a further embodiment of the invention, said look-up table is displayed in the form of a picture-in-picture window. This configuration is advantageous as its location can be predetermined in a non-intrusive manner, not interfering with other used portions of the screen.

- [0028] In a further embodiment of the invention, said textual information is displayed in machine readable format.
- [0029] In a further embodiment of the invention, said electronic control unit generates a machine-readable code containing said textual information.
- [0030] In a further embodiment of the invention, said machine-readable codes include electronic barcode, two-dimensional or matrix code as in the case of Quick Response (QR) codes.
- [0031] In a further embodiment of the invention, audio signal content samples are periodically sent to said remote server and said machine-readable codes are updated in a dynamically changing manner in case two subsequent machine-readable codes are not identical to each other.
- [0032] In a further embodiment of the invention, said machine readable codes contain web addresses in addition to said textual information.
- [0033] In a further embodiment of the invention, said machine chine readable codes are displayed on the image display device screen in a discontinuous manner.
- [0034] In a further embodiment of the invention, said textual information is displayed in subtitle format.
- [0035] In a further embodiment of the invention, auxiliary information retrieving function is directly launchable by selecting a corresponding menu option or pressing a corresponding button.
- [0036] In a further embodiment of the invention, said function is called by means of a remote control button.
- [0037] In a further embodiment of the invention, said textual information is automatically sent to a specified e-mail address.
- [0038] In a further embodiment of the invention, said textual information is automatically displayed on a home network device.
- [0039] In a further embodiment of the invention, said textual information is automatically saved on a storage device.
- [0040] In this regard, the invention ensures that a user is dynamically offered a second source of information relevant to the directly provided information on the screen of an image display device and will therefore be provided with an opportunity to reach the information of interest relevant to the

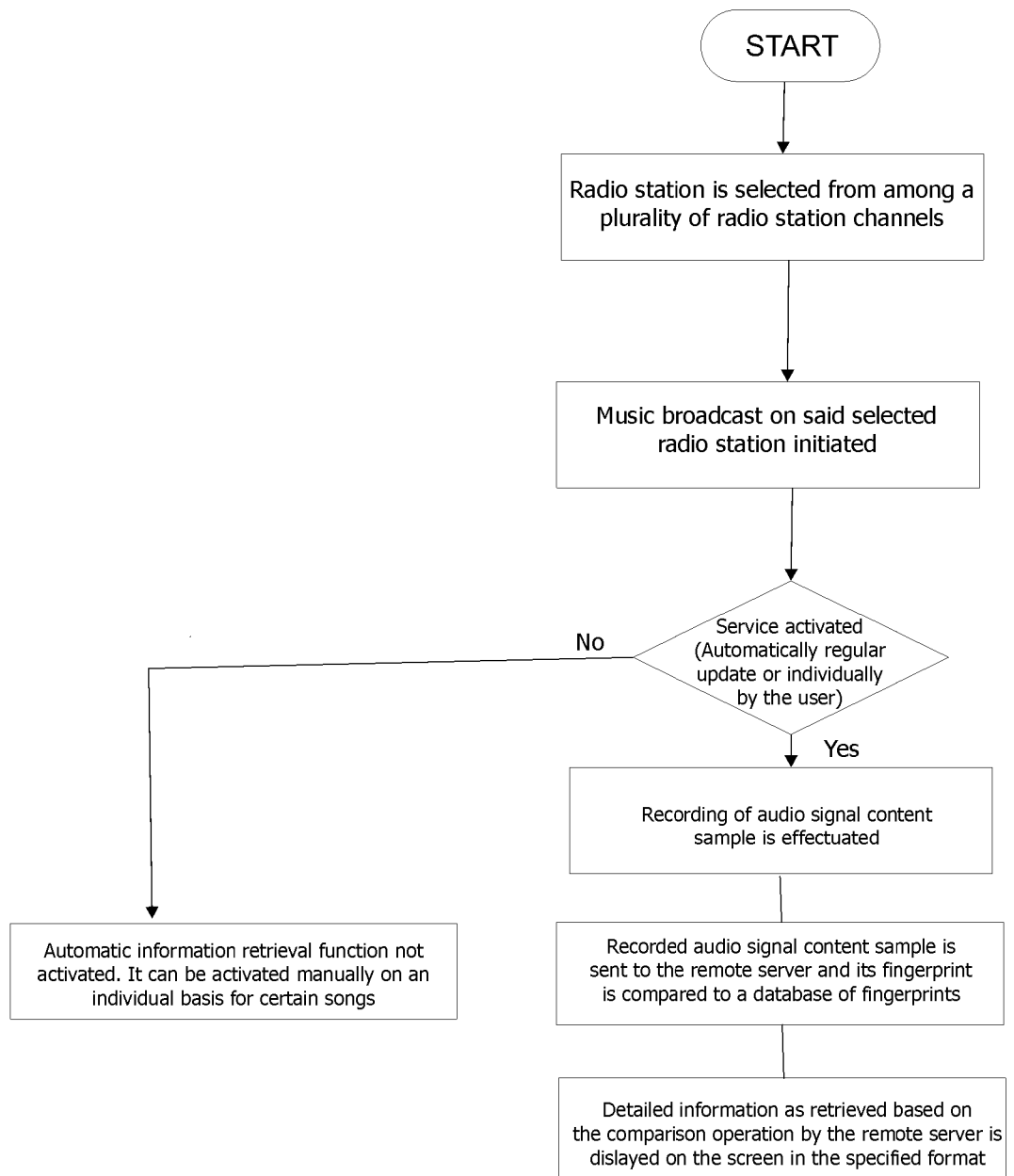
directly presented content.

Claims

1. An image display device receiving a plurality of broadcast program contents including audio signal contents provided by radio stations, said image display device comprising an electronic control unit **characterized in that**; said electronic control unit is configured to record a predetermined duration audio signal content sample of a currently playing audio signal content and transferring said recorded audio signal content sample to a remote server, said image display device is configured to receive textual information in association with said recorded audio signal content from said remote server and, said electronic control unit is configured to display said textual information in real-time during playing of audio signal content to which said audio signal content sample belongs.
2. An image display device as in Claim 1, **characterized in that** said textual information received from said remote server is formed as an identification look-up table containing information in the form of at least song name, artist name and genre.
3. An image display device as in Claim 2, **characterized in that** said look-up table is displayed in the form of a picture-in-picture window.
4. An image display device as in Claim 1, **characterized in that** said textual information is displayed in machine readable format.
5. An image display device as in Claim 4, **characterized in that** said electronic control unit generates a machine-readable code containing said textual information.
6. An image display device as in Claim 5, **characterized in that** said machine-readable codes include electronic barcode, two-dimensional or matrix code as in the case of Quick Response (QR) codes.
7. An image display device as in Claim 5, **characterized in that** audio signal content samples are periodically sent to said remote server and said machine-readable codes are updated in a dynamically changing manner in case two subsequent machine-readable codes are not identical to each other.
8. An image display device as in Claim 4, **characterized in that** said machine readable codes contain web addresses in addition to said textual information.

9. An image display device as in Claim 4, **characterized in that** said machine chine readable codes are displayed on the image display device screen in a discontinuous manner.
10. An image display device as in Claim 1, **characterized in that** said textual information is displayed in subtitle format.
11. An image display device as in Claim 1, Claims, **characterized in that** textual information retrieving function is directly launchable by selecting a corresponding menu option or pressing a corresponding button.
12. An image display device as in Claim 11, **characterized in that** said function is called by means of a remote control button.
13. An image display device as in Claim 1, **characterized in that** said textual information is automatically sent to a specified e-mail address.
14. An image display device as in Claim 1, **characterized in that** said textual information is automatically displayed on a home network device.
15. An image display device as in Claim 1, **characterized in that** said textual information is automatically saved on a storage device.

Fig. 1



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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2015/301718 A1 (TROLLOPE INGRID MCAULAY [GB] ET AL) 22 October 2015 (2015-10-22) paragraph [0045] - paragraph [0073] paragraph [0080] - paragraph [0082] paragraph [0089] -----	1-15
X	EP 2 388 721 A1 (GOOGLE INC [US]) 23 November 2011 (2011-11-23) paragraph [0004] paragraph [0025] - paragraph [0036] paragraph [0065] - paragraph [0066] -----	1,7
A	US 2012/272279 A1 (LIM YOUNG-HWAN [KR] ET AL) 25 October 2012 (2012-10-25) paragraph [0026] - paragraph [0049] paragraph [0058] -----	4-9



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Information on patent family members

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