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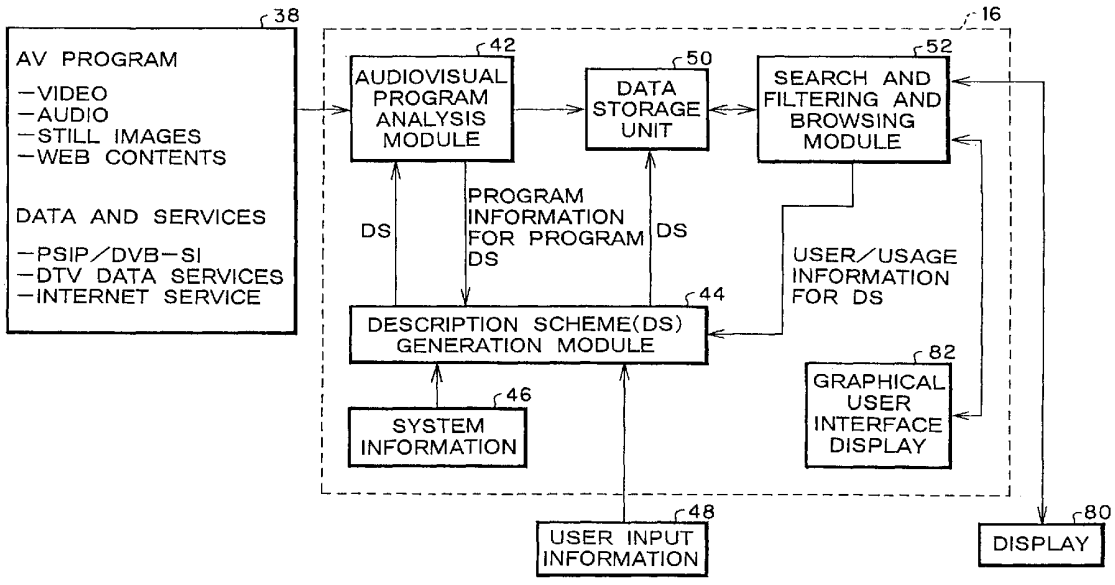
(54) Audivisual information management system

(57) A system, may include, at least one of audio, image, and a video comprising a plurality of frames. A usage preferences description (500), describing preferences of a user with respect to the use of at least one of the audio, image, and video, where the description normally includes multiple preferences. In one aspect, a protection attribute with respect to at least one of the preferences indicates whether one of the preferences is considered public or private. Other aspects of the user preferences description (500) include other attributes, alone or in combination.

FIG.2



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a system for managing audiovisual information, and in particular to a system for audiovisual information browsing, filtering, searching, archiving, and personalization.

[0002] Video cassette recorders (VCRs) may record video programs in response to pressing a record button or may be programmed to record video programs based on the time of day. However, the viewer must program the VCR based on information from a television guide to identify relevant programs to record. After recording, the viewer scans through the entire video tape to select relevant portions of the program for viewing using the functionality provided by the VCR, such as fast forward and fast reverse. Unfortunately, the searching and viewing is based on a linear search, which may require significant time to locate the desired portions of the program(s) and fast forward to the desired portion of the tape. In addition, it is time consuming to program the VCR in light of the television guide to record desired programs. Also, unless the viewer recognizes the programs from the television guide as desirable it is unlikely that the viewer will select such programs to be recorded.

[0003] RePlayTV and TiVo have developed hard disk based systems that receive, record, and play television broadcasts in a manner similar to a VCR. The systems may be programmed with the viewer's viewing preferences. The systems use a telephone line interface to receive scheduling information similar to that available from a television guide. Based upon the system programming and the scheduling information, the system automatically records programs that may be of potential interest to the viewer. Unfortunately, viewing the recorded programs occurs in a linear manner and may require substantial time. In addition, each system must be programmed for an individual's preference, likely in a different manner.

[0004] Freeman et al., U.S. Patent No. 5,861,881, disclose an interactive computer system where subscribers can receive individualized content.

[0005] With all the aforementioned systems, each individual viewer is required to program the device according to his particular viewing preferences. Unfortunately, each different type of device has different capabilities and limitations which limit the selections of the viewer. In addition, each device includes a different interface which the viewer may be unfamiliar with. Further, if the operator's manual is inadvertently misplaced it may be difficult for the viewer to efficiently program the device.

BRIEF SUMMARY OF THE INVENTION

[0006] The present invention overcomes the aforementioned drawbacks of the prior art by providing a method of using a system, which may include, at least one of audio, image, and a video comprising a plurality of frames. A usage preferences description, describing preferences of a user with respect to the use of at least one of the audio, image, and video, where the description normally includes multiple preferences. In one aspect, a protection attribute with respect to at least one of the preferences indicates whether one of the preferences is considered public or private. Other aspects of the user preferences description include other attributes, alone or in combination.

[0007] The foregoing and other objectives, features and advantages of the invention will be more readily understood upon consideration of the following detailed description of the invention, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0008] FIG. 1 is an exemplary embodiment of a program, a system, and a user, with associated description schemes, of an audiovisual system of the present invention.

[0009] FIG. 2 is an exemplary embodiment of the audiovisual system, including an analysis module, of FIG. 1.

[0010] FIG. 3 is an exemplary embodiment of the analysis module of FIG. 2.

[0011] FIG. 4 is an illustration of a thumbnail view (category) for the audiovisual system.

[0012] FIG. 5 is an illustration of a thumbnail view (channel) for the audiovisual system.

[0013] FIG. 6 is an illustration of a text view (channel) for the audiovisual system.

[0014] FIG. 7 is an illustration of a frame view for the audiovisual system.

[0015] FIG. 8 is an illustration of a shot view for the audiovisual system.

[0016] FIG. 9 is an illustration of a key frame view the audiovisual system.

[0017] FIG. 10 is an illustration of a highlight view for the audiovisual system.

[0018] FIG. 11 is an illustration of an event view for the audiovisual system.

[0019] FIG. 12 is an illustration of a character/object view for the audiovisual system.

[0020] FIG. 13 is an alternative embodiment of a program description scheme including a syntactic structure de-

scription scheme, a semantic structure description scheme, a visualization description scheme, and a meta information description scheme.

[0021] FIG. 14 is an exemplary embodiment of the visualization description scheme of FIG. 13.

[0022] FIG. 15 is an exemplary embodiment of the meta information description scheme of FIG. 13.

[0023] FIG. 16 is an exemplary embodiment of a segment description scheme for the syntactic structure description scheme of FIG. 13.

[0024] FIG. 17 is an exemplary embodiment of a region description scheme for the syntactic structure description scheme of FIG. 13.

[0025] FIG. 18 is an exemplary embodiment of a segment/region relation description scheme for the syntactic structure description scheme of FIG. 13.

[0026] FIG. 19 is an exemplary embodiment of an event description scheme for the semantic structure description scheme of FIG. 13.

[0027] FIG. 20 is an exemplary embodiment of an object description scheme for the semantic structure description scheme of FIG. 13.

[0028] FIG. 21 is an exemplary embodiment of an event/object relation graph description scheme for the syntactic structure description scheme of FIG. 13.

[0029] FIG. 22 is an exemplary embodiment of a user preference description scheme.

[0030] FIG. 23 is an exemplary embodiment of the interrelationship between a usage history description scheme, an agent, and the usage preference description scheme of FIG. 22.

[0031] FIG. 24 is an exemplary embodiment of the interrelationship between audio and/or video programs together with their descriptors, user identification, and the usage preference description scheme of FIG. 22.

[0032] FIG. 25 is an exemplary embodiment of a usage preference description scheme of FIG. 22.

[0033] FIG. 26 is an exemplary embodiment of the interrelationship between the usage description schemes and an MPEG-7 description schemes.

[0034] FIG. 27 is an exemplary embodiment of a usage history description scheme of FIG. 22.

[0035] FIG. 28 is an exemplary system incorporating the user history description scheme.

[0036] FIG. 29 is an exemplary user preferences description scheme.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0037] Many households today have many sources of audio and video information, such as multiple television sets, multiple VCR's, a home stereo, a home entertainment center, cable television, satellite television, internet broadcasts, world wide web, data services, specialized Internet services, portable radio devices, and a stereo in each of their vehicles. For each of these devices, a different interface is normally used to obtain, select, record, and play the video and/or audio content. For example, a VCR permits the selection of the recording times but the user has to correlate the television guide with the desired recording times. Another example is the user selecting a preferred set of preselected radio stations for his home stereo and also presumably selecting the same set of preselected stations for each of the user's vehicles. If another household member desires a different set of preselected stereo selections, the programming of each audio device would need to be reprogrammed at substantial inconvenience.

[0038] The present inventors came to the realization that users of visual information and listeners to audio information, such as for example radio, audio tapes, video tapes, movies, and news, desire to be entertained and informed in more than merely one uniform manner. In other words, the audiovisual information presented to a particular user should be in a format and include content suited to their particular viewing preferences. In addition, the format should be dependent on the content of the particular audiovisual information. The amount of information presented to a user or a listener should be limited to only the amount of detail desired by the particular user at the particular time. For example with the ever increasing demands on the user's time, the user may desire to watch only 10 minutes of or merely the highlights of a basketball game. In addition, the present inventors came to the realization that the necessity of programming multiple audio and visual devices with their particular viewing preferences is a burdensome task, especially when presented with unfamiliar recording devices when traveling. When traveling, users desire to easily configure unfamiliar devices, such as audiovisual devices in a hotel room, with their viewing and listening preferences in a efficient manner.

[0039] The present inventors came to the further realization that a convenient technique of merely recording the desired audio and video information is not sufficient because the presentation of the information should be in a manner that is time efficient, especially in light of the limited time frequently available for the presentation of such information. In addition, the user should be able to access only that portion of all of the available information that the user is interested in, while skipping the remainder of the information.

[0040] A user is not capable of watching or otherwise listening to the vast potential amount of information available through all, or even a small portion of, the sources of audio and video information. In addition, with the increasing information potentially available, the user is not likely even aware of the potential content of information that he may

be interested in. In light of the vast amount of audio, image, and video information, the present inventors came to the realization that a system that records and presents to the user audio and video information based upon the user's prior viewing and listening habits, preferences, and personal characteristics, generally referred to as user information, is desirable. In addition, the system may present such information based on the capabilities of the system devices. This permits the system to record desirable information and to customize itself automatically to the user and/or listener. It is to be understood that user, viewer, and/or listener terms may be used interchangeability for any type of content. Also, the user information should be portable between and usable by different devices so that other devices may likewise be configured automatically to the particular user's preferences upon receiving the viewing information.

[0041] In light of the foregoing realizations and motivations, the present inventors analyzed a typical audio and video presentation environment to determine the significant portions of the typical audiovisual environment. First, referring to FIG. 1 the video, image, and/or audio information 10 is provided or otherwise made available to a user and/or a (device) system. Second, the video, image, and/or audio information is presented to the user from the system 12 (device), such as a television set or a radio. Third, the user interacts both with the system (device) 12 to view the information 10 in a desirable manner and has preferences to define which audio, image, and/or video information is obtained in accordance with the user information 14. After the proper identification of the different major aspects of an audiovisual system the present inventors then realized that information is needed to describe the informational content of each portion of the audiovisual system 16.

[0042] With three portions of the audiovisual presentation system 16 identified, the functionality of each portion is identified together with its interrelationship to the other portions. To define the necessary interrelationships, a set of description schemes containing data describing each portion is defined. The description schemes include data that is auxiliary to the programs 10, the system 12, and the user 14, to store a set of information, ranging from human readable text to encoded data, that can be used in enabling browsing, filtering, searching, archiving, and personalization. By providing a separate description scheme describing the program(s) 10, the user 14, and the system 12, the three portions (program, user, and system) may be combined together to provide an interactivity not previously achievable. In addition, different programs 10, different users 14, and different systems 12 may be combined together in any combination, while still maintaining full compatibility and functionality. It is to be understood that the description scheme may contain the data itself or include links to the data, as desired.

[0043] A program description scheme 18 related to the video, still image, and/or audio information 10 preferably includes two sets of information, namely, program views and program profiles. The program views define logical structures of the frames of a video that define how the video frames are potentially to be viewed suitable for efficient browsing. For example the program views may contain a set of fields that contain data for the identification of key frames, segment definitions between shots, highlight definitions, video summary definitions, different lengths of highlights, thumbnail set of frames, individual shots or scenes, representative frame of the video, grouping of different events, and a close-up view. The program view descriptions may contain thumbnail, slide, key frame, highlights, and close-up views so that users can filter and search not only at the program level but also within a particular program. The description scheme also enables users to access information in varying detail amounts by supporting, for example, a key frame view as a part of a program view providing multiple levels of summary ranging from coarse to fine. The program profiles define distinctive characteristics of the content of the program, such as actors, stars, rating, director, release date, time stamps, keyword identification, trigger profile, still profile, event profile, character profile, object profile, color profile, texture profile, shape profile, motion profile, and categories. The program profiles are especially suitable to facilitate filtering and searching of the audio and video information. The description scheme enables users to have the provision of discovering interesting programs that they may be unaware of by providing a user description scheme. The user description scheme provides information to a software agent that in turn performs a search and filtering on behalf of the user by possibly using the system description scheme and the program description scheme information. It is to be understood that in one of the embodiments of the invention merely the program description scheme is included.

[0044] Program views contained in the program description scheme are a feature that supports a functionality such as close-up view. In the close-up view, a certain image object, e.g., a famous basketball player such as Michael Jordan, can be viewed up close by playing back a close-up sequence that is separate from the original program. An alternative view can be incorporated in a straightforward manner. Character profile on the other hand may contain spatio-temporal position and size of a rectangular region around the character of interest. This region can be enlarged by the presentation engine, or the presentation engine may darken outside the region to focus the user's attention to the characters spanning a certain number of frames. Information within the program description scheme may contain data about the initial size or location of the region, movement of the region from one frame to another, and duration and terms of the number of frames featuring the region. The character profile also provides provision for including text annotation and audio annotation about the character as well as web page information, and any other suitable information. Such character profiles may include the audio annotation which is separate from and in addition to the associated audio track of the video.

[0045] The program description scheme may likewise contain similar information regarding audio (such as radio

broadcasts) and images (such as analog or digital photographs or a frame of a video).

[0046] The user description scheme 20 preferably includes the user's personal preferences, and information regarding the user's viewing history such as for example browsing history, filtering history, searching history, and device setting history. The user's personal preferences includes information regarding particular programs and categorizations of programs that the user prefers to view. The user description scheme may also include personal information about the particular user, such as demographic and geographic information, e.g. zip code and age. The explicit definition of the particular programs or attributes related thereto permits the system 16 to select those programs from the information contained within the available program description schemes 18 that may be of interest to the user. Frequently, the user does not desire to learn to program the device nor desire to explicitly program the device. In addition, the user description scheme 20 may not be sufficiently robust to include explicit definitions describing all desirable programs for a particular user. In such a case, the capability of the user description scheme 20 to adapt to the viewing habits of the user to accommodate different viewing characteristics not explicitly provided for or otherwise difficult to describe is useful. In such a case, the user description scheme 20 may be augmented or any technique can be used to compare the information contained in the user description scheme 20 to the available information contained in the program description scheme 18 to make selections. The user description scheme provides a technique for holding user preferences ranging from program categories to program views, as well as usage history. User description scheme information is persistent but can be updated by the user or by an intelligent software agent on behalf of the user at any arbitrary time. It may also be disabled by the user, at any time, if the user decides to do so. In addition, the user description scheme is modular and portable so that users can carry or port it from one device to another, such as with a handheld electronic device or smart card or transported over a network connecting multiple devices. When user description scheme is standardized among different manufacturers or products, user preferences become portable. For example, a user can personalize the television receiver in a hotel room permitting users to access information they prefer at any time and anywhere. In a sense, the user description scheme is persistent and timeless based. In addition, selected information within the program description scheme may be encrypted since at least part of the information may be deemed to be private (e.g., demographics). A user description scheme may be associated with an audiovisual program broadcast and compared with a particular user's description scheme of the receiver to readily determine whether or not the program's intended audience profile matches that of the user. It is to be understood that in one of the embodiments of the invention merely the user description scheme is included.

[0047] The system description scheme 22 preferably manages the individual programs and other data. The management may include maintaining lists of programs, categories, channels, users, videos, audio, and images. The management may include the capabilities of a device for providing the audio, video, and/or images. Such capabilities may include, for example, screen size, stereo, AC3, DTS, color, black/white, etc. The management may also include relationships between any one or more of the user, the audio, and the images in relation to one or more of a program description scheme(s) and a user description scheme(s). In a similar manner the management may include relationships between one or more of the program description scheme(s) and user description scheme(s). It is to be understood that in one of the embodiments of the invention merely the system description scheme is included.

[0048] The descriptors of the program description scheme and the user description scheme should overlap, at least partially, so that potential desirability of the program can be determined by comparing descriptors representative of the same information. For example, the program and user description scheme may include the same set of categories and actors. The program description scheme has no knowledge of the user description scheme, and vice versa, so that each description scheme is not dependant on the other for its existence. It is not necessary for the description schemes to be fully populated. It is also beneficial not to include the program description scheme with the user description scheme because there will likely be thousands of programs with associated description schemes which if combined with the user description scheme would result in a unnecessarily large user description scheme. It is desirable to maintain the user description scheme small so that it is more readily portable. Accordingly, a system including only the program description scheme and the user description scheme would be beneficial.

[0049] The user description scheme and the system description scheme should include at least partially overlapping fields. With overlapping fields the system can capture the desired information, which would otherwise not be recognized as desirable. The system description scheme preferably includes a list of users and available programs. Based on the master list of available programs, and associated program description scheme, the system can match the desired programs. It is also beneficial not to include the system description scheme with the user description scheme because there will likely be thousands of programs stored in the system description schemes which if combined with the user description scheme would result in a unnecessarily large user description scheme. It is desirable to maintain the user description scheme small so that it is more readily portable. For example, the user description scheme may include radio station preselected frequencies and/or types of stations, while the system description scheme includes the available stations for radio stations in particular cities. When traveling to a different city the user description scheme together with the system description scheme will permit reprogramming the radio stations. Accordingly, a system including only the system description scheme and the user description scheme would be beneficial.

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