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(54) Title: AUTOMATED PLAYLIST GENERATION

(57) Abstract: A digital media player. The digital media player includes storage to store media content and a user interface to provide information to a user. The information includes at least one task associated with the media content. The media player also includes a control to allow the user to select at least one task and a processor to perform a task selected by the user.

AUTOMATED PLAYLIST GENERATION

CROSS REFERENCE TO RELATED APPLICATION

This application claims priority to U.S. Patent Application Serial No. 10/208,456 filed on July 29, 2002, the entire teaching of which is incorporated herein by reference.

BACKGROUND

1. Field

This disclosure related to digital media devices, more particularly to digital media devices with stored content.

2. Background

Digital media devices include many different types of audio and visual devices that can access and 'play' digital media. Digital audio players, such as those using MP3 (Motion Picture Experts Group, Audio Layer 3) or Windows Media Audio™, formats access digital content and produce sound. Portable digital video disc (DVD) players access audio and video data from a DVD or a stored file and produce video with sound. Generally, these devices have internal storage in which the content is stored, removable media such as discs, or a mixture of both.

These devices have large quantities of storage, even in the portable configurations. They allow a user to have access to many difference types of content. For example, a digital music player may have hundreds of different tracks, covering different types of music, from opera to pop. Similarly, there may be several different artists, albums, labels, or other categories of music.

For the user, accessing a particular piece of information has largely been a labor-intensive operation with minimal assistance. Typical existing solutions cause the user to single-step through tracks or possibly pick from a list. Even in PC-based applications that let users pre-select music to be loaded on the device the selection process can be time consuming. An 'advanced' solution might allow looking at a list based on a category.

The end result is that the user spends far more time interfacing with the player than is desired. The idea of these types of devices, especially the portable devices, is for the user to enjoy the content, not spend time selecting it. The primary purpose of the device is to play music to the user. When confronted with a significant amount of content to choose from, the user often simply wants to hear music, not fumble about trying to pick and choose what to hear.

The continued popularity of radio and the tendency for people with hundreds of CD's to only listen to what is in a 5-disk changer are good examples of where convenience wins over variety. Therefore, a more programmatic solution to managing digital content for users would be useful.

SUMMARY

An embodiment of the invention is a digital media player. The digital media player includes storage to store media content and a user interface to provide information to a user. The information includes at least one task associated with the media content. The media player also includes a control to allow the user to select at least one task and a processor to perform a task selected by the user.

Another embodiment of the invention is a method of selecting music files based upon predetermined tasks, one of which is selected by the user. The method includes receiving a user input that identifies a predefined task. The method then accesses

information associated with media content files and selects those media content files that fall within the predetermined task criteria. The selected media files are then presented to the user, in one embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention may be best understood by reading the disclosure with reference to the drawings, wherein:

Figure 1 shows one example of a digital media player, in accordance with an embodiment of the invention.

Figure 2 shows one embodiment of a method of selecting media content files, in accordance with an embodiment of the invention.

Figure 3 shows one embodiment of a method of selecting media content files based upon an automated task, in accordance with an embodiment of the invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Digital media players, such as audio or video players, are often designed with portability in mind. However, even portable models have plenty of storage and processing power. Application of this power and storage can be used to improve the user's interaction with the player. The user can select predefined tasks and with very few inputs select a list of media files to be played, increasing the playtime while decreasing the selection time. This list of media files to be played may be referred to as a playlist, with no limitation on the types of media files being played, or the immediacy of it being played.

An example of digital media player 10 is shown in Figure 1. The digital media player has a front panel with a control 12 and a user interface display 14. As will be discussed later, the user interface may also include or have as an alternative, an audio user

interface, such as an audio output 16. The user interface is used to transmit options to the user, such as audibly over a speaker or visually on the display. The user interface may also be used to present the media content to the user, or a combination of the two may be used. For example, the display screen may be used to present options to the user, functioning as a user interface, and the speaker may be used to present media to the user. In this example, the player would present the media content, in this case music or other audible content, to the user through the speaker. The device could use a user interface such as headphones, but it could also be connected to a home stereo to record the playlist on tape or audio CD and might not actually be "heard" from the device. The media player also includes a storage 20 in which the media content files and information associated with the media content files is stored, and a processor 18 that receives user inputs, provides information to the user through the user interface and accesses the store according to the user inputs. In accessing the store, the processor may access the media content files or may just access the information associated with the content files to develop the list of media content files.

Figure 2 shows an embodiment of a method to select media files, in accordance with the invention. The user selects one of a set of predetermined tasks at 30. The player then accesses information associated with the media content files at 32. The information accessed depends upon the predetermined task selected, as will be discussed in more detail below. The associated information includes, but is not limited to the original time, the recording time, played time and the number of times played. The media files are then selected based upon the predetermined search criteria set out in the predetermined task. Presentation of the media files to the user at 36 may be an optional step. The application

of the invention may result in a deferred list that is permanently stored on the device, or used as a seed for another operation.

The predetermined task may have several search criteria and may be automated or require a minimal number of user inputs. The following discussion of several of the predetermined tasks and search criteria is only intended to provide examples and is in no way to limit the scope of the invention.

As shown in Figure 2, some of the search criteria determined by the selection of a predetermined task include the original time, that is the time the media content file was originally created. In contrast, the recording time is the time that the user actually recorded or transferred the file to the device. The played time is the last time the media file was played, and the number of times played is somewhat self-explanatory. Other search criteria may include principals, where the principal may be a singer, composer, songwriter, or musical group for a music file, for example, or an actor, director, producer or screenwriter for a video file. Again these are only examples and are not intended to be exclusive or exhaustive lists of options.

Using the recording time, for example, the user can select a predetermined task of 'new music' or 'new movies'. This would allow the user to hear or see movies that they have recently acquired, where the recording date would be used. The length of the 'new' period could be input by the user, or even selected off a pull down menu, such as 'week', 'month', 'three month' time periods. The search criteria would then cause the player to access the information associated with the content files and produce a list of content files that had been acquired in the last month, for example. The files having a recording time during a time period between the current time stamp and the current time stamp minus the selected interval would be accessed.

The played time tracks the last time and date a file was played. For ease of discussion the term 'time' as used here will include time, date or both. The user then could decide to access the files that have not been played in a certain amount of time. "Play me files I haven't experienced in the last 6 months," would result in the processor searching the associated information for files that have a playing time before a certain date. The certain date would be the current time stamp minus 6 months, in this example.

In addition to a particular date used as the threshold, the user could select dates that fall within a range. For example, the user may want to hear all tracks, or watch all clips, that originated in a particular year, such as 1984. The user may select this task and designate the time period as an additional input. The player would then access the associated information, searching for all files with an original date within that range and create the list.

Similar to selecting files from a particular period, the user may designate one or more principals. As discussed above, the user may designate a music group, a songwriter, a director, an actor, etc., as well as combinations of principals. For example, the user could designate all clips featuring Tom Hanks and Meg Ryan.

The player will track and store the number of times a particular file has been played. If the player were to sort the files by the number of times played, the user or the player could designate a number of times above which the file would be designated as a 'favorite.' Alternatively, the player or the user could designate a predetermined number of files such as the top 40, or other number, of most-frequently accessed files.

More sophisticated measures may be used as well. For example, a weighting may be assigned to the number of times played, where the weighting may take into account the proximity of the most recent time the file was played when compared with the current

time. For example, a user may have played a music file over a hundred times more than any other file, but the last time it was played was three months ago. Obviously, this is not the current 'favorite' file of the user, but a strict number of times played analysis would lead to that conclusion. Many other possibilities for weighting and manipulating the data for the 'favorites' list exist.

In addition to these, several other search criteria could be set up in predetermined tasks. Similarly, the player could present combinations of these and other criteria. For example, 'play all the music of the 1960's that I have not listened to in the last six months,' or 'show me all the clips of Tom Hanks that do not include Meg Ryan.' All of these examples discussed above provide the user with some control, while reducing the selection time required by the user. It is also possible to reduce the selection time by the user with implementation of more automated search criteria.

For example, the user could just select a feature that allows the player to make the selections. In essence the feature would provide an algorithmic representation of a radio disc jockey or movie jockey. The player would select a mix of familiar files, which may include files related to the tastes of the user, and some mostly random files to provide an interesting mix. One possible implementation uses the 'favorites' list as a seed for a list of automatically generated selections.

An embodiment of an automated playlist generation method is shown in Figure 4. At 40, the original seed list of favorites is determined, in whatever manner the user or the player desires. A predetermined number of entries for the new list may be decided upon at 42, but this process is optional. The entries in the seed list are then expanded upon, by one of several techniques, examples of which are given below. The expanded list is then presented to the user, again either as a deferred list or a list for immediate play at 46.

The player may perform the expansion of the entries based upon its own preprogramming or based upon a one-time user input. Several options for expansion exist. The player could examine some top number of favorite files and add one to the playlist. The player could select one of the favorites and find another file from the same album, or program or DVD, and add it to the list. Similarly, the player could select another file based upon the genre, or the same principal. The player could add time periods, such as a file selection based upon one of the above criteria that has not been played in the last day or week or month. A completely random file selection could be added to the list. All of these approaches could be implemented separately on a predetermined number of favorite files, or they could all be implemented in one playlist, with each subsequent file be operated on by a different expansion technique.

In this manner, the user's interaction with the player for selecting files would be minimal and the user's interaction with the player for experiencing and enjoying the files would be increased. Additionally, without the need for the user to navigate huge lists of files and menus, the user interface display screen could be reduced, thereby reducing the power consumption and the size of the player or the part of the screen for the user interface. In the case of music players, the size may even be eliminated and the system switched over to a voice interface, with the user interacting with the player through voice commands.

While digital media players in general, and portable digital media players in particular, benefit from application of this invention, it may be applicable to other types of media players. The invention could be applied to removable media, such as multiple-disc CD changers. As storage capacity increases and it becomes possible to hold thousands of hours of 3D and video data, these same techniques may be applied.

Thus, although there has been described to this point a particular embodiment for a method and apparatus for automated playlist generation, it is not intended that such specific references be considered as limitations upon the scope of this invention except in-so-far as set forth in the following claims.

WHAT IS CLAIMED IS:

1. A digital media player, comprising:
 - a storage to store media content;
 - a user interface to provide information to a user, wherein that information includes at
5 least one task associated with the media content;
 - a control to allow the user to select at least one task; and
 - a processor to perform a task selected by the user.
2. The digital media player of claim 1, wherein the task performed by the processor further
10 comprises comparing a current time stamp with recording time stamps associated with the
media content.
3. The digital media player of claim 1, wherein the task performed by the processor further
comprises comparing a current time stamp with played time stamps associated with the
media content.
4. The digital media player of claim 1, wherein the task performed by the processor further
15 comprises comparing an originating time stamp associated with a time period specified by
the user.
5. The digital media player of claim 1, wherein the task performed by the processor further
comprises creating a mix of content for the user.
6. The digital media player of claim 1, wherein the user interface further comprises a screen
20 display.
7. The digital media player of claim 1, wherein the user interface further comprises an audio
interface.
8. The digital music player of claim 1, wherein the control further comprises at least one
push button.
- 25 9. A method of selecting media content files to a user, the method comprising:
 - receiving a user input indicating a predetermined selection criteria;

accessing information associated with a store of media content files; and
selecting media content files based upon the correspondence between the
predetermined selection criteria and the information associated with a store of media
content files.

- 5 10. The method of claim 9, wherein the predetermined selection criteria further comprises
recording time stamps associated with the media content files, wherein the recording time
stamps indicate content files acquired after a certain time stamp.
11. The method of claim 9, wherein the predetermined selection criteria further comprises a
played time stamp associated with the media content files, wherein the played time
10 stamps indicate files played before a current time stamp.
12. The method of claim 9, wherein the predetermined selection criteria further comprises an
original time stamp associated with the media content files, wherein the original time
stamp indicates that the media content file originated within a predetermined range of
time stamps.
- 15 13. The method of claim 9, wherein the predetermined selection criteria further comprises a
number of times played, wherein the number of times played is higher than a threshold of
times played.
14. The method of claim 9, wherein the predetermined selection criteria is an automated
selection criteria.
- 20 15. A method of automatically selecting media content files, the method comprising:
selecting a predetermined number of most-frequently accessed media content files to
form a selection list;
adding at least one additional file to the selection list; and
presenting the selection list to a user.
- 25 16. The method of claim 15, wherein adding at least one additional file to the selection list
further comprises adding a file from a list of frequently accessed media content files,

wherein the list of frequently accessed media content files has more entries than a list comprises of the most-frequently accessed media content files.

17. The method of claim 15, wherein adding at least one additional file to the selection list further comprises adding a file from a collection of files that includes a file already on the selection list.
18. The method of claim 15, wherein adding at least one additional file to the selection list further comprises adding a file from a same genre as a file on the selection list.
19. The method of claim 15, wherein adding at least one additional file to the selection list further comprises adding a file with a same principle as a file on the selection list.
20. The method of claim 19, wherein adding a file with the same principle as a file on the selection list further comprises adding a file with the same principle that has not been accessed in a predetermined amount of time.
21. The method of claim 15, wherein adding a file to the selection list further comprises selecting another file of a same type of media content at random.
22. A digital media player, comprising:
- a means for storing media content;
 - a means for providing information to a user, wherein that information includes at least one task associated with the media content;
 - a means for allowing the user to select at least one task; and
 - a means for performing a task selected by the user.
23. The digital media player of claim 1, wherein the means for providing information to a user further comprises a screen display.
24. The digital media player of claim 1, wherein the means for providing information to a user further comprises a voice interface.
25. The digital music player of claim 1, wherein the means for allowing the user to select at least one task further comprises at least one push button.

26. An article containing machine-readable code that, when executed, causes a machine to:
receive a user input indicating a predetermined selection criteria;
access information associated with a store of media content files; and
select media content files based upon the correspondence between the predetermined
5 selection criteria and the information associated with a store of media content files.
27. The article of claim 26, wherein the predetermined selection criteria further comprises
recording time stamps associated with the media content files, wherein the recording time
stamps indicate content files acquired after a certain time stamp.
28. The article of claim 26, wherein the predetermined selection criteria further comprises a
10 played time stamp associated with the media content files, wherein the played time
stamps indicate files played before a current time stamp.
29. The article of claim 26, wherein the predetermined selection criteria further comprises an
original time stamp associated with the media content files, wherein the original time
stamp indicates that the media content file originated within a predetermined range of
15 time stamps.
30. The article of claim 26, wherein the predetermined selection criteria further comprises
31. The article of claim 26, wherein the predetermined selection criteria is an automated
selection criteria.
32. An article containing machine-readable code that, when executed, causes the machine to:
20 select a predetermined number of most-frequently accessed media content files to
from a selection list;
add at least one additional file to the selection list; and
present the selection list to a user.
33. The article of claim 32, wherein adding at least one additional file to the selection list
25 further comprises adding a file from a list of frequently accessed media content files,

wherein the list of frequently accessed media content files has more entries than a list comprises of the most-frequently accessed media content files.

34. The article of claim 32, wherein adding at least one additional file to the selection list further comprises adding a file from a collection of files that includes a file already on the
5 selection list.
35. The article of claim 32, wherein adding at least one additional file to the selection list further comprises adding a file from a same genre as a file on the selection list.
36. The article of claim 32, wherein adding at least one additional file to the selection list further comprises adding a file with a same principle as a file on the selection list.
- 10 37. The article of claim 32, wherein adding a file to the selection list further comprises selecting another file of a same type of media content at random.

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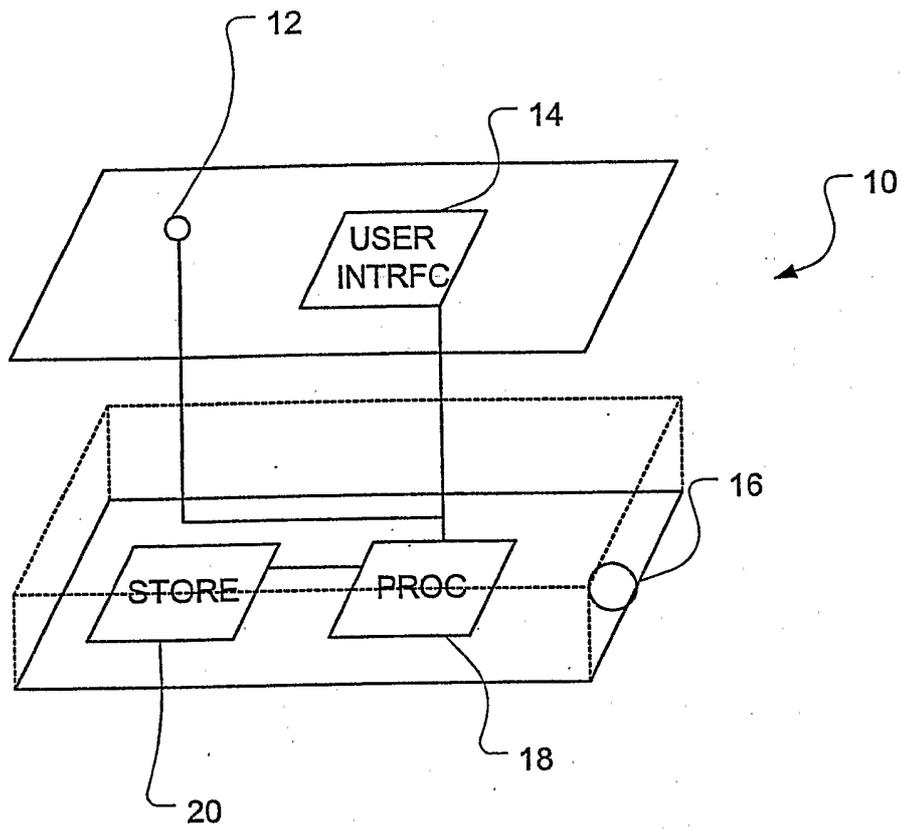


Figure 1

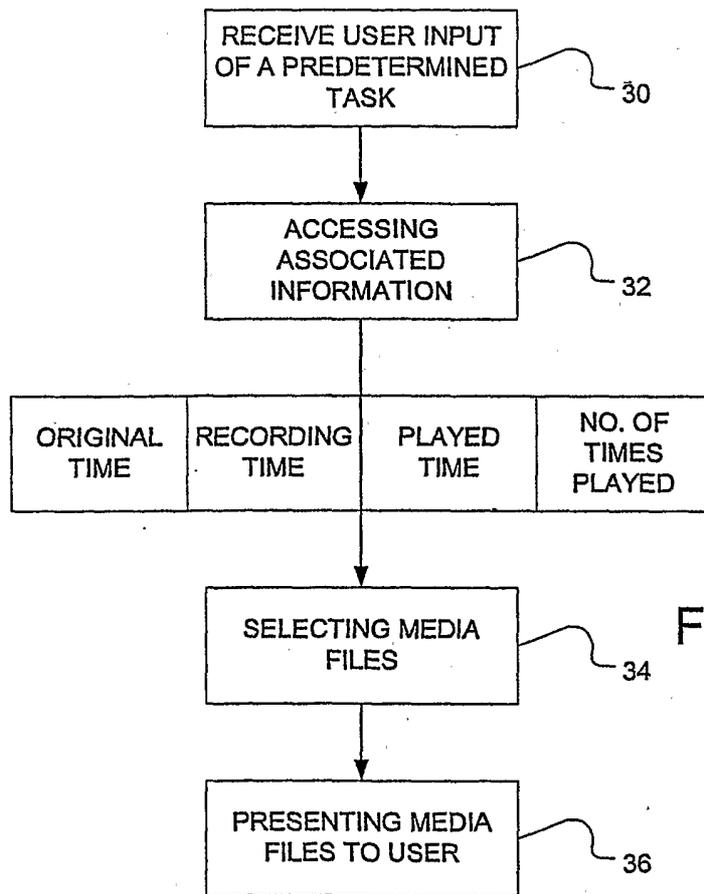


Figure 2

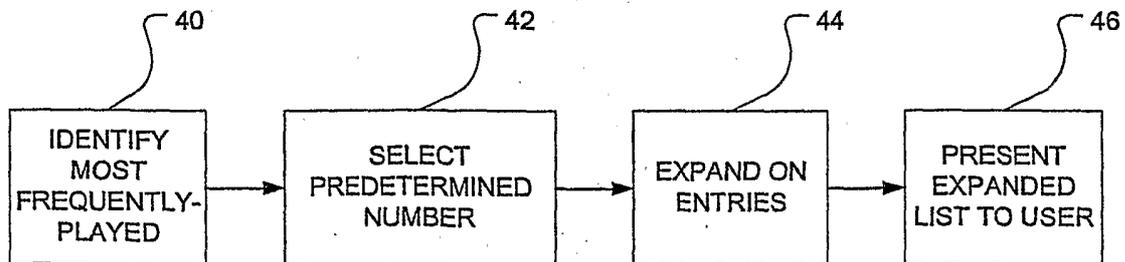


Figure 3