Description

INFORMATION STORAGE MEDIUM CONTAINING INTERACTIVE GRAPHIC STREAM, AND REPRODUCING APPARATUS AND METHOD THEREOF

Technical Field

[1] The present invention relates to interactive data, and more particularly, to an information storage medium containing an interactive graphic stream used in controlling reproduction of multimedia contents, and a reproducing apparatus and method thereof.

Background Art

[2] In order to control multimedia contents provided to a user, a menu to manage the multimedia contents is provided together with the multimedia contents to the user. Through this menu, contents producers provide a variety of options of managing the multimedia contents to the user. The user is provided with functions such as playing of a movie by chapters and viewing of bonus tracks, in addition to simple reproduction of audiovisual (AV) streams, such as playing movies.

[3] A menu to manage the multimedia contents includes text information. Here, text information refers to information solely formed of text. In other words, text information is information written in different languages, including Korean, English, and Japanese, about the multimedia contents. A contents producer who produces and provides multimedia contents to the user produces menus in a variety of languages and stores the contents in a storage medium so that the contents can be sold to people in various languages. In the conventional DVD, data forming this menu are produced and stored separately for each language. This is to simplify controlling the data in a DVD reproducing apparatus.

[4] FIG. 1 is a diagram showing menu streams for respective languages stored in a language unit of a conventional DVD. Here, a menu stream is a stream in which a menu that is produced and includes audio, video, sub-picture, and highlight information is multiplexed as one stream.

[5] Referring to FIG. 1, it can be seen that a menu stream 130 is prepared separately for each language.

[6] FIG. 2 is a block diagram of a reproducing apparatus in which a DVD reproducing apparatus selects a language according to predetermined system parameters and reproduces a menu stream written in the selected language.

[7] Referring to FIG. 2, the DVD reproducing apparatus selects a menu corresponding

to a language set by a user in advance according to a predetermined rule. Preset language information is stored in a system parameter storage unit 210. A menu language selection unit 220 reads, for example, a menu language code stored in system parameter #0 (SPRM0), and selects a menu stream having the same value as the menu language code, by selecting one among the menu streams described above while referring to FIG. 1. A decoder 230 reproduces the selected menu stream.

[8] If menus are thus prepared for respective languages, storage space is seriously wasted because non-text information such as video data, which consumes a large amount of space and does not have a language limitation, is included in menus prepared for the respective languages. In addition, there is a problem in that it is impossible to change a language while video data is being reproduced. Also, because a method of selecting a menu is predetermined, the menu cannot be selected by criteria other than languages.

Disclosure of Invention

Technical Solution

[9] The present invention provides an information storage medium containing an interactive graphic stream in which language information can be changed only by navigation commands and cannot be changed by a user's operations.

[10] The present invention also provides an apparatus and method by which among menu streams obtained by multiplexing text information written in a variety of languages and data commonly used by respective languages, one stream is selected and reproduced.

Advantageous Effects

[11] According to the present invention, text information written in a variety of languages and data shared by those languages are multiplexed and stored in one menu stream such that data is not redundantly stored and less storage space is wasted.

Description of Drawings

[12] FIG. 1 is a diagram showing menu streams for respective languages stored in a language unit of a DVD;

[13] FIG. 2 is a block diagram of a reproducing apparatus in which a DVD reproducing apparatus selects a language according to predetermined system parameters and reproduces a menu stream written in the selected language;

[14] FIG. 3 is a diagram showing that among menu streams written in respective languages, a menu stream corresponding to a value stored in a register is reproduced according to an embodiment of the present invention;

[15] FIG. 4 is a block diagram of a reproducing apparatus of a menu stream according to an embodiment of the present invention;

[16] FIG. 5 is a flowchart of a method of selecting one menu stream according to an embodiment of the present invention; and

[17] FIG. 6 is a schematic diagram showing the operations of the reproducing apparatus of FIG. 4 when a menu stream is included in a movieclip.

Best Mode

[18] According to an aspect of the present invention, there is provided an information storage medium including audiovisual (AV) data, navigation data that is a set of navigation commands related to reproduction of the AV data, and an interactive graphic stream which controls reproduction of the AV data, wherein language information of the interactive graphic stream can be changed only by the navigation commands and cannot be changed by a user's operations.

[19] Additional aspects and/or advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

[20] According to another aspect of the present invention, there is provided a multimedia data reproducing apparatus including a memory which stores attribute information including language information of an interactive graphic stream controlling reproduction of the multimedia data; a processor which, according to the language information, loads and executes a program to select an interactive graphic stream written in the language of the language information; and a decoder which receives and decodes the selected interactive graphic stream.

[21] According to another aspect of the present invention, there is provided a multimedia data reproducing method including reading attribute information containing language information of an interactive graphic stream controlling reproduction of the multimedia data; according to the language information, loading and executing a program to select an interactive graphic stream written in the language of the language information; and receiving and decoding the selected interactive graphic stream.

[22] According to another aspect of the present invention, there is provided a computer readable recording medium having embodied thereon a computer program for executing the method in a computer.

Mode for Invention

[23] Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like

reference numerals refer to the like elements throughout. The embodiments are described below to explain the present invention by referring to the figures.

[24] FIG. 3 shows that among menu streams written in respective languages, a menu stream corresponding to a value stored in a system register is reproduced.

[25] Here, a menu stream is user interaction data used to control reproduction of multimedia data and is referred to as an interactive graphic stream. The interactive graphic stream can be changed only by navigation commands related to reproduction of multimedia data and cannot be changed by a user's operation. A navigation command has a plurality of navigation registers, and among the navigation registers, there is a player status register (PSR) indicating the status of the reproducing apparatus. The player status register will be explained later referring to table 1.

[26] Assuming, for example, that a value initially stored in the system register is 2, a menu stream written in English is reproduced. If reproduction of one playitem is finished, a subsequent playitem should be reproduced. However, there may be no playitem written in English; thus, in this case, after a playitem written in Korean is reproduced, a playitem written in English may be reproduced as shown in case 1 310, or after the Korean playitem is skipped, the English playitem may be directly reproduced as shown in case 2 320. Thus, while a menu stream written in a predetermined language is reproduced, in order to reproduce a menu stream written in a different language, a process in which a value stored in a predetermined register is read and is compared with an ID value corresponding to the language of the menu stream is performed.

[27] FIG. 4 is a block diagram of a reproducing apparatus of a menu stream. Referring to FIG. 4, if the power is first supplied to the reproducing apparatus 400 or a user executes a menu selection program, a processor 420 loads and executes a program 440. By using information preset in system registers 410, the program 440 selects one menu among a plurality of menus written in a variety of languages. A decoder 430 receives and decodes the menu data written in a language corresponding to the selected menu. The system register 410 may be implemented as a plurality of shift registers, a memory or other kinds of storage.

[28] There are many methods used to select one menu among menus in a variety of languages. Text information corresponding to menu language information preset by a user or by a reproducing apparatus manufacturer can be selected. Alternatively, menus for adults and for children can be separately reproduced using preset view class information referred to as a parental level. Additionally, when no menu language is

specified by a user, a predetermined menu based on a subtitle or audio language is reproduced and presented to the user. There is still another method in which by utilizing a general purpose register, a menu corresponding to a value stored in the register is reproduced.

[29] Table 1 shows contents of a player status register (PSR):

[30]

Value	Name	Description
0	Interactive Graphics	Interactive Graphics Stream Number
1	Audio	Audio Stream Number
2	Presentation Graphics	Presentation Graphics Stream Number
3	Angle	Angle Number
4	Title	Title Number
5	Chapter	Chapter Number
6	PlayList	PlayList Number
7	PlayItem	PlayItem Number
8	Presentation Time	Presentation Time in 90Khz
9	Timer	Navigation Timer
10	Selected Button	Button Number in Selected State
11	-	reserved
12	-	reserved
13	Parental	Parental Level
14	Video Configuration	Player Configuration for Video
15	Audio Configuration	Player Configuration for Audio
16	Audio Language	Language Code for Audio

17	Subtitle Language	Language Code for Presentation Graphics
18	Menu Language	Language Code for Menu Description
19	Interactive Graphics Language	Language Code for Interactive Graphics
20	-	Reserved
...	...	...
63	-	Reserved

[31] Referring to Table 1, it can be seen that language information and other information described above are recorded in a plurality of player status registers. For example, menu language information is recorded in register PSR 18, which is read first. If the value in the register corresponds to Korean (ko), a register PSR 0 is set to 0, and if the value corresponds to English (en), the register PSR 0 is set to 1. Then, a playlist is played. It is predetermined that a Korean menu stream or an English menu stream is reproduced depending upon whether the value of register PSR 0 is 0 or 1.

[32] Referring to FIG. 4, it can be seen that a menu stream comprises a shared stream such as audio and video, and an interactive stream comprising text information written in a variety of languages. The text information written in a variety of languages may be comprised of text data and graphic data. FIG. 4 shows a case where this text information is included in the menu stream. For example, the shared stream is stored only once and navigation commands in each menu stream call predetermined portions of the shared stream as needed during reproduction of the menu stream.

[33] If one language is selected by a user or by the reproducing apparatus manufacturer, the processor 420 transfers information regarding the selected language to the decoder 430, and the decoder 430 selects one menu stream among a plurality of multiplexed menu streams and decodes the menu stream. At this time, the data of the menu stream may have a variety of different formats, such as text and graphic formats, and usually has a graphic format.

[34] FIG. 5 is a flowchart of a method of selecting one among a plurality of menu streams.

[35] FIG. 5 shows a case where when power is supplied or a user command is provided, a program selects one menu stream and reproduces the stream, and a case where a

movie is being reproduced, a program multiplexed with a movie stream selects one menu stream and reproduces the menu stream.

[36] In a menu language register, the ID of a menu stream is stored. First, the ID of a menu stream written in the same language as the menu language is stored in a predetermined register in operation S510. That is, the program finds ID information of a menu stream corresponding to a language stored in a menu language register, and stores it in a predetermined register storing the number of the menu stream currently being reproduced. If there is no menu stream corresponding to the language, 0 is stored as a default value in the predetermined register.

[37] After the stream ID is stored in the predetermined register, a command to reproduce a movieclip is received in operation S520. At this time, the movieclip may be a menu or movie contents formed with moving pictures. Before the movieclip is reproduced, it is confirmed again that the predetermined register value set by the program is valid in operation S530. In order to perform the confirmation, it is determined whether or not the value stored in the register is included in the menu stream number multiplexed in the selected movieclip. If the value is included, it is determined that the value is valid and the value already stored is maintained. If the value is not included, it is determined that the value is invalid and the value is replaced by a default value 0, and 0 is stored in the predetermined register. If there is a movieclip corresponding to the value stored in the register, the movieclip is decoded and reproduced in operation S540. When the movieclip is reproduced, if a command to select another language is received in operation S550, the process returns to the operation S530 in which an error is checked.

[38] FIG. 6 is a schematic diagram showing the operations of a reproducing apparatus when a menu stream is included in a movieclip. Referring to FIG. 6, it can be seen that a program prepared in advance by a contents provider is included in a predetermined part of a movie stream. While executing this program, a processor 620 determines a menu stream by using the program itself, system register values 610 stored in the reproducing apparatus, a user's inputs, etc. The menu stream thus selected is decoded by a decoder 630 together with other streams such as audio and video streams and text information corresponding to the selected language.

[39] The present invention may be embodied in a code, which can be read by a computer, on a computer readable recording medium. The computer readable recording medium includes all kinds of recording apparatuses on which computer readable data is stored. The computer readable recording media includes storage ROMs, RAMs, CD-ROMs, magnetic tapes, floppy disks, optical data storage devices,

and also includes carrier waves (e.g., transmission over the Internet). Also, the computer readable recording media can be shared among computer systems connected through a network and can store and execute a computer readable code in a distributed mode.

[40] Although a few embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in this embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

Claims

[1] 1. An information storage medium, comprising:
audiovisual (AV) data;
navigation data that is a set of navigation commands related to reproduction of the AV data; and
an interactive graphic stream which controls reproduction of the AV data,
wherein language information of the interactive graphic stream is changeable only by the navigation commands and not changeable by a user's operations.

[2] 2. The information storage medium of claim 1, wherein the interactive graphic stream is a menu stream used in reproducing the AV data.

[3] 3. A multimedia data reproducing apparatus, comprising:
a memory which stores attribute information including language information of an interactive graphic stream controlling reproduction of the multimedia data;
a processor which, according to the language information, loads and executes a program to select an interactive graphic stream written in the language of the language information; and
a decoder which receives and decodes the selected interactive graphic stream.

[4] 4. The reproducing apparatus of claim 3, wherein the interactive graphic stream is a menu stream that is not changeable by a user's operation.

[5] 5. The reproducing apparatus of claim 3, wherein the attribute information includes menu language information, viewer class information, sub-title language information, and audio language information.

[6] 6. The reproducing apparatus of claim 3, wherein the program is included in the interactive graphic stream.

[7] 7. The reproducing apparatus of claim 3, wherein the interactive graphic stream has text information for each language and shares information irrelevant to language with other interactive graphic streams.

[8] 8. The reproducing apparatus of claim 7, wherein the text information is stored in the form of text data or graphic data.

[9] 9. A multimedia data reproducing method, comprising:
reading attribute information containing language information of interactive graphic streams controlling reproduction of the multimedia data;
according to the language information, loading and executing a program to select one of the interactive graphic streams written in a language corresponding to the

language information; and

receiving and decoding the selected interactive graphic stream.

[10] 10. The reproducing method of claim 9, wherein the selected interactive graphic stream is a menu stream that is not changeable by a user's operation.

[11] 11. The reproducing method of claim 9, wherein the attribute information comprises menu language information, viewer class information, sub-title language information and audio language information.

[12] 12. The reproducing method of claim 9, wherein the interactive graphic stream has text information for each language and shares information irrelevant to language with other interactive graphic streams.

[13] 13. An information storage medium storing multimedia data, comprising:

a plurality of menu streams which comprise navigation data and each correspond to a different language;

shared audiovisual (AV) data which the navigation data controls reproduction of the shared AV data independent of the menu stream language; and

a plurality of interactive text information each corresponding to a different language and which the navigation data controls reproduction of the interactive text information based on the language of each corresponding menu stream.

[14] 14. The information storage medium of claim 13, further comprising program commands which control which of the plurality of menu streams is to be reproduced.

[15] 15. The information storage medium of claim 13, wherein storage space of the information storage medium is optimized by sharing the AV data among the plurality of menu streams.

[16] 16. The information storage medium of claim 13, wherein the plurality of menu streams are multiplexed with respective corresponding interactive text information.

[17] 17. A information storage medium reproducing apparatus reproducing an information storage medium, comprising:

a system register which stores language information;

a processor which selects a menu stream based on the stored language information from the information storage medium; and

a decoder which decodes the selected menu stream, wherein the menu stream controls reproduction of non-language specific audiovisual information and text information corresponding to the stored language information from the in-

formation storage medium.

[18] 18. The reproducing apparatus of claim 17, wherein the processor selects the menu stream based on a menu language in the stored language information and the processor executes program commands corresponding to the menu language which selects the corresponding menu stream to be reproduced.

[19] 19. A method of reproducing multimedia data from an information storage medium, comprising:
reading menu language information from a player status register on the information storage medium;
selecting a menu stream based on the read menu language information;
executing the selected menu stream; and
reproducing non language specific audio visual data from the information storage medium together with the selected menu stream.

[20] 20. The method of claim 19, further comprising:
receiving a language selection command during the reproducing the non language specific audio visual data and the selected menu stream; and
changing from the selected menu stream to a different language menu stream based on the received language selection command.

[21] 21. The method of claim 19, further comprising:
comparing the read menu language information to a language identification in the selected menu stream to check for an error.

[22] 22. A computer readable recording medium recording a program that executes a method of reproducing multimedia data from an information storage medium , wherein the method comprises:
reading attribute information containing language information of an interactive graphic stream controlling reproduction of the multimedia data;
according to the language information, loading and executing a program to select an interactive graphic stream written in the language of the language information; and
receiving and decoding the selected interactive graphic stream.

[23] 23. A computer readable recording medium recording a program that executes a method of reproducing multimedia data from an information storage medium , wherein the method comprises:
reading menu language information from a player status register on the information storage medium;

selecting a menu stream based on the read menu language information;
executing the selected menu stream; and
reproducing non language specific audio visual data from the information storage medium together with the selected menu stream.

[24] 24. A method of storing multimedia data on an information storage medium, comprising:
multiplexing a menu stream comprising a plurality of text information corresponding to different languages and shared data which is common to each of the different languages;
storing the multiplexed menu stream on the information storage medium in an efficient manner which does not redundantly store the shared data.