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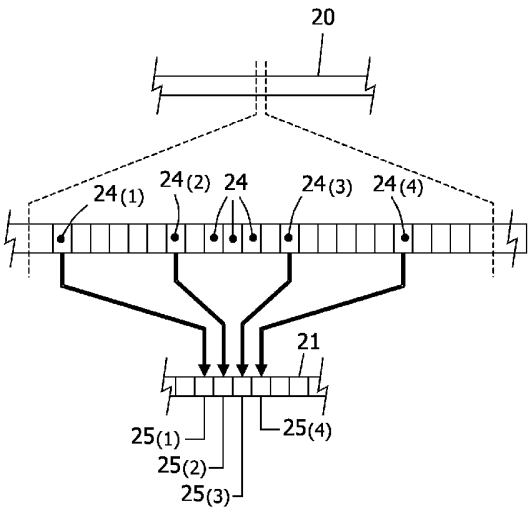
(54) **Title:** METHOD AND DEVICE FOR SEARCHING A VIDEO MOVIE AT A VARIABLE SPEED USING AN ADDITIONAL FILE CONTAINING SCREEN SHOTS



(57) **Abstract:** A machine-readable information carrier (2) contains: - at least one video file (20) with a video movie; - a summary file (21) associated with the video file (20), the summary file (21) containing a collection of single images (25(i)) copied from source images (24(i)) of the video file (20); - associated with the video file (20), a machine-executable interface application for controlling a reader device's access to said summary file (21) and said video file (20); wherein the interface application (22) is capable of scanning the images of the summary file (21) and generating a video output signal (SV) for displaying the images of the summary file (21) on a display device (4A); and wherein the interface application (22) is capable of reading the video file (20) and generating a video output signal (SV) for displaying the images of the video movie on the display device (4A).

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Method and device for searching a video movie at a variable speed using an additional file containing screen shots

FIELD OF THE INVENTION

The present invention relates in general to a method for presenting a video movie contained in an information carrier, especially information stored on an optical disc. The present invention further relates to an information carrier with at least one video movie contained therein.

BACKGROUND OF THE INVENTION

In the following, the phrase "information carrier" will be used as a general phrase indicating an entity which is capable of carrying information and of being accessed by a reading device. In a specific case, the information carrier will be an optical disc, and the reading device will be an optical disc drive; the invention will hereinafter be explained in further detail for this case. It is noted, however, that the use of the invention is not restricted to optical discs. For instance, the information carrier may also involve a network, such as the Internet, comprising a memory containing information, and the reading device may involve a personal computer linked to this network, whether by a wired link or a wireless link.

As is known to those skilled in the art, an optical storage disc comprises at least one track, either in the form of a continuous spiral or in the form of multiple concentric circles, where information can be stored in the form of a data pattern. Optical discs may be of a read-only type, where information is recorded during manufacture, which information can only be read by a user. The optical storage disc may also be of a writable type, where information can be stored by a user. For reading information from the disc, an optical disc drive comprises rotating means for receiving and rotating an optical disc and optical scanning means for generating an optical beam, typically a laser beam, for scanning the storage track with said laser beam. Since the technology of optical discs in general, the way in which information can be stored in an optical disc, and the way in which information can be read from an optical disc are commonly known, it is not necessary here to describe this technology in more detail.

It is known to store a video movie on an optical disc. A user's optical disc drive is able to read the information stored on disc and to generate video and audio streams

suitable for display on a suitable display apparatus such as a PC monitor, a television screen, etc. Techniques for coding video signals, reading the coded signals from disc, decoding the read signals, and generating a video stream are known, and it is not necessary here to explain such techniques.

In the art, a video movie is typically stored as a single file, the information being written contiguously. When a user selects this file for display, the disc drive starts reading at the beginning of the file and follows the track till the end of the file. A problem arises when the user wants to view a specific scene or wants to view the movie not from the beginning but starting at a specific scene, for instance because the user has already seen a first portion of the movie and now wants to see the remainder. Furthermore, there is a need to allow a user to obtain a quick overview of (a portion of) a movie.

In a typical prior art approach, for going to a specific scene, the user must input information about the starting location of the specific scene, for instance a time code; whereupon the disc drive jumps to the scene indicated by this time code and starts playing. The user, viewing the display, may realize that he has jumped too far, or not far enough, and orders an additional jump, backward or forward, over a certain amount of playing time. This process is repeated until the desired scene is reached. It should be evident that this process is rather cumbersome, especially in cases where the user is not familiar with the movie and does not easily recognize whether the scene he is looking for is located further back or further ahead.

In addition, the prior art provides a fast scan facility (forward or backward), also denoted seek play. A problem here is that the obtainable scanning speed is relatively limited, and/or it is very difficult to recognize the scenes being scanned.

A main objective of the present invention is to provide a new method of presenting video information to the user, making it easy for the user to scan through a video movie.

SUMMARY OF THE INVENTION

According to an important aspect of the present invention, the information carrier carries a second video file, which will be denoted "summary" file, which is associated with the video movie, and which contains a collection of still images from the video movie. According to a preferred important aspect of the present invention, the information carrier carries at least one application. It is noted that the BD-J standard (or BD-J specification), which is still under development, allows Java applications to be stored on disc, but the

invention is not restricted to Java applications: the principles of the present invention can be practiced irrespective of the language of the applications.

A reader designed to support the application in accordance with the present invention will recognize the presence of the application, read the application, and store it into its memory. The application may be self-starting or it may alternatively only start running after receiving a user command.

It is also possible that a reader has the application residing in its memory. In such a case the application can be activated without the reader needing to check for the presence of the application and needing to read the application from the information carrier.

Once running, the application acts as an interface between the user and the video files. The application allows the user easy navigation through the still images of the summary file. The user may wish to view the still images successively, thus imitating a high-speed scan. It is also possible that the application allows the user to browse through the still images at a variable speed, giving the user the feel of "tuning" to a certain image. Once the user has found an image of interest, he can enter a command resulting in the application playing the original video movie, starting at the location corresponding to said image of interest.

In a reader which does not support the application to take control, or if the user does not start the application, the user does not have the benefit of the possibility of browsing through the summary file, but he still can play the main video movie as usual.

It is possible that each movie has its own dedicated interface application, and that different movies have different interface applications. In fact, each movie distributor may develop its own applications for interfacing the contents of its own discs. However, it is also possible that an information carrier carries two or more video movies and one common interface application.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other aspects, features, and advantages of the present invention will be further explained in the following description of a preferred embodiment with reference to the drawings, in which same reference numerals indicate same or similar parts, and in which:

Figure 1A is a block diagram schematically illustrating a reproduction system;

Figure 1B is a block diagram schematically illustrating another type of reproduction system;

Figure 2 is a diagram schematically illustrating the storage of movies on a disc;

Figure 3 is a diagram schematically illustrating the creation of a summary file with copy images;

Figure 4 is a diagram schematically illustrating a screen display in accordance with the present invention;

Figures 5A and 5B are block diagrams schematically illustrating an aspect of the operation of a disc drive in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1A schematically shows a reproduction system 1 for reproducing a movie stored on a storage medium or information carrier 2. In the following explanation, it will be assumed that the information carrier is an optical disc, but the present invention can also be implemented with different types of information carrier. Since optical discs are known per se, it is not necessary here to explain in great detail how information can be stored on and read from an optical disc.

In a particular example, the optical disc may be a Blu-Ray Disc, especially a disc according to the BD-J format or standard.

The reproduction system 1 comprises a reader 3, in this example an optical disc drive, for reading information from the disc 2 and for generating a video output signal SV for an image display device 4A, for instance a monitor or a television screen or the like, of a display apparatus 4. It is noted that a movie also comprises audio, so the drive 3 will also generate an audio output signal SA for one or more loudspeakers 4B of the display apparatus 4.

Figure 1B illustrates an alternative reproduction system 1A, where the disc drive 3 is replaced by a receiver 3A capable of receiving a transmission signal carrying the data representing a movie. The transmission signal may be a signal traveling through air and picked up by an antenna, as illustrated, but the transmission signal may alternatively travel by cable or some other type of conductor. In such an embodiment, the data received will be stored in a memory associated with the receiver 3A, and the actual playback will be from this memory, which may be considered as an equivalent of the disc 2. In the following, however, the explanation will refer to Figure 1A.

The disc drive 3 comprises a data processing device 6, typically implemented at least partly in software. This data processing device 6 receives and processes the incoming data read from disc to generate the display signal SV, SA.

The reproduction system 1 further comprises an input device such as a remote control 8 or some other suitable type of input device. If the reproduction system 1 is implemented as a PC or laptop, for example, the input device may comprise a keyboard and/or a mouse (not shown) of such a PC or laptop. Such an input device enables a user to give commands to the disc drive.

Figure 2 schematically shows the storage space 12 of the disc 2 as a longitudinal ribbon for the sake of convenience. The storage space 12 contains at least one main video file containing a video movie 20, having a start address 31 and an end address 32. The ribbon-shaped representation of the movie 20 represents the collection of frames (and audio) to be presented on the display apparatus 4. It is noted that techniques for coding video movies and storing such movies on disc and techniques for reconstructing a video display signal on the basis of data read from a disc are known per se, so it is not necessary here to explain them in further detail.

Associated with this video movie 20, the storage space 12 contains a summary file 21 with still images (screen shots), as will be explained later. The summary file 21 has a start address 33 and an end address 34. The storage space 12 contains an interface application 22 that is also associated with this video movie 20. The interface application 22 has a start address 35 and an end address 36.

In the example illustrated, the summary file 21 is located immediately before the video movie 20, so that the end address 34 of the summary file 21 corresponds to the start address 31 of the video movie 20, but this is not essential. In alternative embodiments, there may be storage space open between the summary file 21 and the video movie 20, or the summary file 21 may be located after the video movie 20.

In the example illustrated, furthermore, the interface application 22 is located immediately before the summary file 21, so that the end address 36 of the interface application 22 corresponds to the start address 33 of the summary file 21, but this is not essential. In alternative embodiments, there may be storage space open between the interface application 22 and the summary file 21, or the interface application 22 may be located between the summary file 21 and the video movie 20, or even after the video movie 20.

Figure 3 is an exploded view of a portion of the video movie 20, illustrating that the video movie 20 comprises a series of consecutive images 24. Figure 3 also illustrates

how the summary file 21 is constructed. The summary file 21 contains a collection of a copy 25(1) of a first image 24(1) from the video movie 20, a copy 25(2) of a second image 24(2) located at some distance from the first image 24(1), a copy 25(3) of a third image 24(3) located at some distance from the second image 24(2), etc. It is noted that the summary file 21 does not contain audio information. Thus, all in all, the summary file 21 is substantially smaller than the corresponding main video file 20.

In the following, the images 25(i) of the summary file 21 will be denoted copy images, while the corresponding images 24(i) of the corresponding main video file 20 will be denoted source images. For the sake of clarity, only those images of the main video file 20 which have a copy in the summary file 21 will be called source images.

The main video file 20 may contain the images in a coded and compressed manner in order to save storage space. A particularly suitably coding scheme is the MPEG scheme, which is well known to those skilled in this art and need not be explained here. Images may be coded as I-frames, P-frames, and B-frames. The summary file 21 preferably contains only I-frames.

In a possible embodiment, the summary file 21 may contain copies of all I-frames of the corresponding main video file 20, i.e. all I-frames of the main video file 20 are source images. Then, in a case where GOPs have a size of 12 pictures, the distance between successive source images 24(i) of the main video file 20 typically corresponds to about 0.5 s playtime. However, since the primary function of the summary file 21 is to allow a user easy and fast browsing through the movie of the corresponding main video file 20, the distance between successive source images 24(i) of the main video file 20 is preferably greater than 0.5 s; in which case not all I-frames of the corresponding main video file 20 are used as source images. The time distance between source images is a trade-off between the size of the summary file 21 on the one hand and the desired level of accuracy in pinpointing a certain scene on the other hand. The smaller the time distance between source images, the higher this accuracy but also the larger the size of the summary file 21. In practice, a suitable distance between source images may be set in a range from, for example, 3 to 30 s.

It is noted that the distance between successive source images 24(i) of the main video file 20 does not necessarily need to be the same for all pairs of successive source images 24(i) and 24(i+1). It may be convenient, for example, if the source images are representative of the first images of the scenes each time.

In a suitable example, where the main video file 20 is a long movie having a length of two and a half hours, and where the distance between successive source images

24(i) of the main video file 20 corresponds to 3 s of playing time, the summary file 21 will contain only no more than 3000 images.

An important advantage of having a file with selected single images is that the reader device (disc drive) can easily and quickly access any one of these images, without needing to read and decode part of the video file and without needing to perform jumps in the video file. It is also possible that the disc drive reads the entire summary file and stores it into a cache memory, in which case the disc drive has an even better and faster access.

The application is capable of operating in an image scanning mode and in a video play mode. In the video play mode, the basic video file 20 is played in conventional manner. Of course, special play modes such as fast forward play, reverse play, etc., are possible, as usual. In the image scanning mode, images are taken from the summary file 21 for display at the display device 4A. The user can influence the speed at which the images in the summary file 21 are scanned. This speed may be varied from zero (still image, i.e. constant display of the same image) to a high value of, for example, 25 per second. It may be very difficult at such a high speed, however, for the user to recognize moving images. It may be more convenient to have a standard display time of, for example, 0.2 s and to obtain high speed scanning by skipping images, as will be explained later.

The present invention also provides a very convenient, user-friendly method of navigating through the images of the summary file 21. In an embodiment, navigating through the images of the summary file 21 may appear like fast play, in which case the application continuously scans the images from the summary file for display, while the user mainly influences the scanning speed only. Navigating commands may be given in that the user presses keys of a remote control 8, or of a keyboard (not shown) if the reader device is implemented as a personal computer or the like.

In a preferred embodiment, navigating through the images of the summary file 21 appears like tuning to a desired image, similar to tuning a radio receiver to a radio station. In this preferred embodiment, the application 22 provides a graphical interface for, on the one hand, visualizing the summary file 21 and, on the other hand, allowing the user to give navigating commands. The graphical interface may visualize the collection of images of the summary file 21 as a strip 40, as shown in Figure 4. The strip 40 is preferably longitudinal, as shown, but alternatively the strip 40 may be circular. The length of the strip 40 indicates the length of the corresponding video movie 20. A pointer icon 42, in this example having the shape of an arrow, is imaged alongside the strip 40 in a position corresponding to the image currently being displayed. Thus the position of the pointer icon 42 with respect to the strip 40

gives the user a feeling of "I am here now "; which is why this pointer icon will also be indicated by the phrase "NOW pointer".

The individual images of the summary file 21 may be indicated along the length of the strip 40, as indicated at 41. The numbering shown may indicate the number i of the source images 24(i), but it is also possible that the indication along the length of the strip 40 indicates a time code. In that case an image having a position at numeral 30 may correspond to an image after a playing time of 30 min in the video movie.

When the user is scanning the images of the summary file 21, the application is designed to move the NOW pointer icon 42 along the strip 40, such that its actual position always corresponds to the actual image currently being displayed. The speed of the moving NOW pointer icon 42 with respect to the strip 40 gives the user an indication of the scanning speed. It is alternatively possible for the strip 40 to move with respect to the pointer. In that case it may be convenient if only a portion of the strip 40 is visible on the display screen. The effect of a moving strip 40 can already be obtained if only the indications 41 are moving.

As mentioned, the user can give navigation commands by using left/right arrow keys of a keyboard or by using left/right command keys of a remote control, depending on the hardware configuration. The application may also be designed to display command icons such as left/right arrows 43A, 44A, which can be used as command inputs for the application by "clicking" on these icons.

There are several possibilities for varying the scanning speed. The application may detect the duration that a command key is pressed or a command icon is clicked, and to scan the strip 40 at a speed proportional to this duration.

The reader device 3 may comprise a keyboard or remote control having pressure-sensitive keys. In such a case the application not only receives an input signal indicating the key being pressed but also receives an input signal indicating the pressure being exerted on such key. The application may then be designed to take the key pressure as an input signal indicating the required scanning speed: the higher the pressure, the higher the scanning speed.

It is also possible that the application 22 is designed to display further command icons 43B, 44B, for example having the shape of an arrow larger than the command icons 43A, 44A, which, when clicked by the user, result in a higher scanning speed.

It is also possible that the application 22 is designed to allow the user to manipulate the scanning speed by mouse icon position control. The application generates a

mouse icon (not shown) for display on the display device 4A. The screen position of this mouse icon can be set by the user using a mouse device (not shown), as is known per se. The application 22 is responsive to the screen position of the mouse icon with respect to a predefined reference position. This reference position may be the center of the screen, but preferably this reference position is the position of the NOW pointer icon 42. If the mouse icon coincides with the NOW pointer icon 42, the scanning speed is zero, i.e. the current image from the summary file 22 is displayed continuously. If the mouse icon is moved to a position between the NOW pointer icon 42 and the end of the strip 40 (this will typically be to the right of the NOW pointer icon 42), the images 25 in the summary file 22 are scanned in the forward direction. If the mouse icon is moved to a position between the NOW pointer icon 42 and the beginning of the strip 40 (this will typically be to the left of the NOW pointer icon 42), the images 25 in the summary file 22 are scanned in the reverse direction. In both cases the scanning speed is proportional to the distance (measured along the length of the strip 40) between the mouse icon and the NOW pointer icon 42.

Alternatively or additionally, the application may be designed to display a tuning knob or wheel 45 at the display device 4A, and the application 22 may be designed to allow the user to manipulate the scanning speed by rotating this tuning knob. When the tuning knob 45 is stationary, the scanning speed is zero, i.e. the current image from the summary file 22 is displayed continuously. When the tuning knob 45 is turned clockwise, the images 25 in the summary file 22 are scanned in the forward direction. When the tuning knob 45 is turned anti-clockwise, the images 25 in the summary file 22 are scanned in the reverse direction. In both cases the scanning speed may be proportional to the speed at which the knob 45 is rotated. Alternatively, the scanning speed may be proportional to the angular position of the knob with respect to a reference position.

It is also possible that the application 22 is designed to allow the user to select a certain copy image 25 directly from the summary file 21, i.e. to place the pointer 42 directly at a desired location. For example, the application 22 may be designed to allow the user to use a mouse device for clicking the NOW pointer icon 42 and dragging the NOW pointer icon 42 along the strip 40. During such a dragging procedure the display screen may show a frozen image, but it is also possible that the application is designed to show images always corresponding to the current position of the NOW pointer icon 42 with respect to the strip 40, in which case the scanning speed will be proportional to the dragging speed. This allows the user to displace the display quickly to a desired portion of the movie. In the drawing of Figure 4, for example, the NOW pointer icon 42 is located at mark 70 (playing time 70 min),

and the user may wish to have the display at playing time 20 min (mark 20). The user may jump to this time location by clicking the NOW pointer icon 42 and dragging the NOW pointer icon 42 to the left.

It is even possible that the application 22 is designed to allow the user to click on a certain position within the strip 40 and to take this as a jump command for jumping to the image 25 having a time position corresponding to the position clicked within the strip 40. In the drawing of Figure 4, for example, where the NOW pointer icon 42 is located at mark 70 (playing time 70 min), the user wishing to have the display at playing time 20 min (mark 20), the user may simply click on a position corresponding to mark 20.

It is also possible that the display device is a touch-screen, the application being responsive to screen touching, so that the user is allowed to set the scanning speed or to select a new image by touching the screen at suitable locations, similar to the mouse click commands described above.

In all of the above cases, the combination of strip 40 and NOW pointer icon 42 has to the user the appearance of a tuning scale of a tuner, and manipulating the position of the NOW pointer icon 42 gives the user the impression of tuning along the tuning scale. An important advantage of this kind of control interface is that it is very intuitive for the user, so that the user will learn to operate the apparatus very quickly.

The use of the present invention will now be described with reference to Figures 5A-5B, which are schematic diagrams comparable to Figure 1. After receiving a user command indicating that the user wishes to see a certain title 20, the disc drive investigates whether this title 20 has an interface application 22 associated therewith. Finding that this is indeed the case, the disc drive 3 reads the interface application 22 and stores this interface application 22 into its memory 5, as illustrated in Figure 5A, whereupon the interface application 22 is activated.

Alternatively, an interface application residing in a memory of the disc drive is activated.

It is assumed that the user is playing the video title (the application is operating in the video play mode) and that the user wants to utilize the scan utility. The user then enters a scan command, and in response the application 22 makes a transition to the image scanning mode, taking as the current copy image 25 for display that copy image that corresponds to the source image closest to the video image 24 that was being watched when the user gave his scan command.

In the scanning mode, the application 22 generates a graphical output signal S for imaging the strip 40, the markings 41, the pointer 42, and the control icons 43, 44, 45, as illustrated in Figure 5B. Furthermore, the application 22 takes images from the summary file 21, one by one, and displays these images on the display device, controlled by user commands, as explained above. Varying of the scanning speed between zero and a maximum value may be implemented by a variation of the display duration, or by skipping of images, or both. The application always adapts the position of the pointer icon 42 so as to correspond to the current image being displayed.

It is assumed by way of example that the display is currently at image 25(i). When the user gives a scan forward command, for example by pressing a forward feed key or icon 43A, the images from the summary file 21 are scanned at a normal speed, each image being displayed, for example, for 0.2 s. So, after 0.2 s image 25(i+1) is displayed until time 0.4 s, then image 25(i+2) is displayed until time 0.6 s, and so on. In an example where the time distance between source images is equal to 3 seconds, 1 second of scanning corresponds to 15 seconds of playtime (scan ratio 15).

When the user gives a command for increased speed, the display duration may be shortened, for example to 0.1 s. If the user wishes to increase the scan speed even further, it is possible to reduce the display duration even further, but in view of the fact that the subsequent display images have a relatively large time distance, the display would be very difficult to follow for the user. It is therefore preferred now to skip images. For example, after 0.1 s image 25(i+2) is displayed until time 0.2 s, then image 25(i+4) is displayed until time 0.3 s, and so on. In the same example, one second of scanning now corresponds to 60 seconds of playtime (scan ratio 60). Scanning an entire two-and-a-half-hour movie in this way will only take 2.5 minutes.

Finally, a display image 25(x) is reached from which the user wishes to watch the original video movie 20. The user may give a command to this effect, for example by pressing a "play" button on his remote control. In response, the application makes a transition to the video play mode, jumps to the source image 24(x) in the video file 20 corresponding to this specific display image 25(x), and starts normal playback of the video movie from this source image 24(x).

In order to allow the application in a transition from the image scanning mode to the video play mode or in a transition from the video play mode to the image scanning mode to jump to the address in the storage space 12 where the start of the correct source image 24(x) or copy image 25, respectively, is located, mapping information between copy

images and video location should be available. This mapping information may, for example, take the form of a mathematical formula or of a look-up table. The mapping information may be available in a separate data file stored on the information carrier 2 or it may alternatively be associated with the application itself.

So, browsing through the summary file 21 is a very convenient way of navigating through the video movie 20, allowing a user to find a desired starting location within the movie quickly and easily, or to skip undesired portions of the movie, for example commercial breaks.

It should be clear to those skilled in the art that the present invention is not limited to the exemplary embodiments discussed above, but that several variations and modifications are possible within the protective scope of the invention as defined in the appended claims. For example, the movie data may also be encrypted, only the access application having the corresponding key for decryption.

In the above, MPEG is mentioned as a possible coding scheme for the main video file 20; but alternative coding schemes, for example JPEG, are also possible.

In the above, an example is discussed in which the pictures of the summary file are copies of the pictures of the video file. This is, however, not necessary. For example, it is possible that the copy pictures have a reduced resolution in order to reduce the amount of data. It is even possible that an entirely "new" picture is generated on the basis of a source picture. Preferably such a "new" picture is a representation of the corresponding source picture so as to enable a user to recognize the scene from the movie. A tool is thus provided for easy and quick browsing through the movie. In all of the above cases, the pictures of the summary file will be indicated as "copy" pictures, even if they are not true copies of the corresponding source picture.

In the above, an example was discussed where video file, summary file, and application data are all stored on a disc. This is, however, not necessary. For example, the application may be provided separately from the video file and may be loaded into the operational memory of the disc reader. This is particularly suitable if the disc reader is part of a PC configuration. Furthermore, it is not necessary that the video file and the corresponding summary file are simultaneously present on a common carrier. It is possible, for example, that the summary file is available as an additional tool at an additional price. But it is also possible that the application 22 is designed to generate a summary file 21 on the basis of an existing video file 20. This may apply to an existing video movie stored on an existing disc: a disc drive or PC may be provided with the application in its operational memory. When a

disc with a video file is then loaded into the disc drive, the application may start generating a summary file which is stored in the storage space (hard disc) of the disc drive (PC). If the disc is a writeable disc, the summary file may also, at the option of the user, be written to disc.

It is also possible that the user downloads a video movie through a network, typically the Internet. While the movie is being downloaded, the application residing in the memory of the user's PC may already start generating a summary file which is also stored in the storage space (hard disc) of the PC. Depending on the summary ratio (distance between source images), the summary file may be ready at the same time when the downloading process is completed.

So, a user who wishes to benefit from the advantages of a summary file is not dependent on the services of the movie provider but is capable of making his own video summary file. A further advantage is that the user may be allowed to set certain parameters of the video summary file to his own taste such as, for example, the distance between source images.

In the process of generating the summary file 21, it is possible that the copy images 25(i) are generated in the normal order. If a PC does not have sufficient computing power, it is possible that the summary file is generated in two or more steps. In a first step, copy images are skipped, and only the copy images 25(1), 25(3), 25(5), etc. are generated. In a second step, the intermediate copy images 25(2), 25(4), 25(6), etc. are generated. The summary file is already usable after the first step, but tuning accuracy is increased with time as the PC generates intermediate copy images in the second step. Of course, more images may be skipped in the first step, and the summary file may be completed in more than two steps.

In the above, the present invention has been explained with reference to block diagrams which illustrate functional blocks of the device according to the present invention. It is to be understood that one or more of these functional blocks may be implemented in hardware, where the function of such functional block is performed by individual hardware components, but it is also possible that one or more of these functional blocks are implemented in software, so that the function of such a functional block is performed by one or more program lines of a computer program or a programmable device such as a microprocessor, microcontroller, digital signal processor, etc.

CLAIMS:

1. Machine-executable interface application (22) comprising machine-executable instructions for a reader device (3, 3A) for controlling the reader device's access to a video file (20) and to an associated summary file (21), the summary file (21) containing a collection of single images (25(i)) derived from source images (24(i)) of the video file (20);

wherein the interface application (22) is capable of operating in an image scanning mode, in which the interface application (22) is designed, in response to navigation input commands from a user, to scan the images of the summary file (21) and to generate a video output signal (SV) for displaying the images of the summary file (21) on a display device (4A);

and wherein the interface application (22) is capable of operating in a video play mode, in which the interface application (22) is designed, in response to play input commands from a user, to read the video file (20) and to generate a video output signal (SV) for displaying the images of the video movie on the display device (4A).

2. Application according to claim 1, wherein the speed at which the images of the summary file (21) are scanned in the scanning mode depends on user navigation commands.

3. Application according to claim 2, capable of receiving navigation commands generated by pressing of keys on a keyboard or a remote control.

4. Application according to claim 2, designed for displaying one or more command icons (43, 44) on the display device (4A), wherein the application is capable of receiving navigation commands generated by clicking of the command icons.

5. Application according to claim 2, responsive to the duration of a user command for setting the scanning speed.

6. Application according to claim 2, capable of receiving a key pressure input signal indicating the pressure exerted on a user-operated key and responsive to said key pressure input signal for setting the scanning speed.

7. Application according to claim 2, designed for displaying a tuning knob or wheel (45) on the display device (4A), wherein the application is capable of receiving navigation commands generated through rotation of said knob (45).

8. Application according to claim 2, responsive to mouse icon position control commands for setting the scanning speed.

9. Application according to claim 8, responsive to the screen position of the mouse icon with respect to a predefined reference position for setting the scanning speed.

10. Application according to claim 1, which is designed to generate a graphical video output signal (S) in the scanning mode for displaying on the display device (4A) a graphical visualization (40, 41) representing the summary file (21) and a NOW pointer icon (42) whose position with respect to said graphical visualization (40) represents the position of the copy image (25(i)) currently being displayed.

11. Application according to claim 10, wherein the speed at which the images of the summary file (21) are scanned in the scanning mode depends on user navigation commands, the application being responsive to the screen position of a mouse icon with respect to the position of the NOW pointer icon (42) for setting the scanning speed.

12. Application according to claim 10, designed to allow a user to drag the NOW pointer icon (42) along said graphical visualization (40), the application being responsive to the dragging speed for setting the scanning speed.

13. Application according to claim 10, designed to allow a user to click on a certain position within or along said graphical visualization (40), the application being responsive to the clicking position for selecting a new image for display.

14. Application according to claim 1, wherein the images of the summary file (21) are displayed for a predetermined duration, and wherein a scanning speed is increased by a decrease in said duration.

15. Application according to claim 1, wherein the images of the summary file (21) are displayed for a predetermined duration, and wherein a scanning speed is increased by skipping of images.

16. Application according to claim 1, wherein the application (22), in the scanning mode, is designed to receive a play command from the user, in response to receiving the play command to jump to the start address of that source image (24(i)) that corresponds to the copy image (25(i)) currently being displayed, and to start normal playback of the video file (20) from said source image (24(i)).

17. Application according to claim 1, wherein the application (22), in the video play mode, is designed to receive a scan command from the user, and in response to receiving the scan command to jump to the start address of a copy image (25(i)) corresponding to the source image (24(i)) closest to the video image currently being displayed.

18. Machine-readable information carrier (2) containing:
- at least one video file (20) with a video movie; and
- a summary file (21) associated with the video file (20), the summary file (21) containing a collection of single images (25(i)) derived from source images (24(i)) of the video file (20).

19. Machine-readable information carrier (2) according to claim 18, further containing data (22) associated with the video file (20), the data (22) representing a machine-executable interface application according to claim 1.

20. Information carrier according to claim 18, wherein said information carrier (2) is an optical disc, preferably according to the BD-J format.

21. Information carrier according to claim 18, wherein said source images (24(i)) of the video file (20) are I-frames.

22. Information carrier according to claim 18, further comprising address information linking the copy images (25(i)) of the summary file (21) to the start addresses of the corresponding source images (24(i)) of the video file (20) and vice versa.

23. Information carrier according to claim 18, wherein said source images (24(i)) of the video file (20) have a mutual time distance in a range of 0.3 s to 30 s.

24. Reader device (3) for reading an information carrier according to claim 18, the reader device (3) comprising a memory (5) containing a machine-executable interface application according to claim 1.

25. Reader device (3) according to claim 24 for reading an information carrier according to claim 20, wherein said reader device (3) comprises a disc drive.

26. Method of constructing a summary file (21) on the basis of a video file (22), the method comprising the step of reading the video file (22), selecting source images (24(i)) from the video file, making a copy image (25(i)) on the basis of a source image (24(i)), and storing the copy image (25(i)) in a memory (5), wherein the number of source images is less than the number of images in the video file, and wherein the copy images (25(i)) are preferably identical to the corresponding source images (24(i)).

27. Method according to claim 26, wherein the method is performed while the video file (22) is being read from an information carrier.

28. Method according to claim 27, wherein the method is performed while the video file (22) is being downloaded.

29. Method according to claim 27, wherein the method is performed while the video file (22) is being read from an information disc.

30. Method according to claim 29, wherein the disc is a writable disc, and wherein the summary file (21) is written to disc.

31. Method of presenting a video movie, the method comprising the steps of:

providing a video file (20) with a video movie;

providing a summary file (21) containing a collection of single images (25(i)) derived from source images (24(i)) of the video file (20), the number of single images (25(i)) being less than the number of images in the video file;

allowing a user to select a video play mode, in which the video from the video file (20) is displayed on a display device (4A);

and allowing the user to select an image scanning mode, in which the images from the summary file (21) are displayed on the display device (4A).

32. Method according to claim 31, wherein, when the video play mode is active and display is at a certain video picture of the video file (20), the user is allowed to make a transition from the video play mode to the image scanning mode, and wherein, upon such a transition, an image from the summary file (21) corresponding to said certain video picture is selected for display on the display device (4A).

33. Method according to claim 31, wherein, when the image scanning mode is active and display is at a certain copy image of the summary file (21), the user is enabled to make a transition from the image scanning mode to the video play mode, and wherein, upon such a transition, an image from the video file (20) corresponding to said certain copy image is selected for display on the display device (4A).

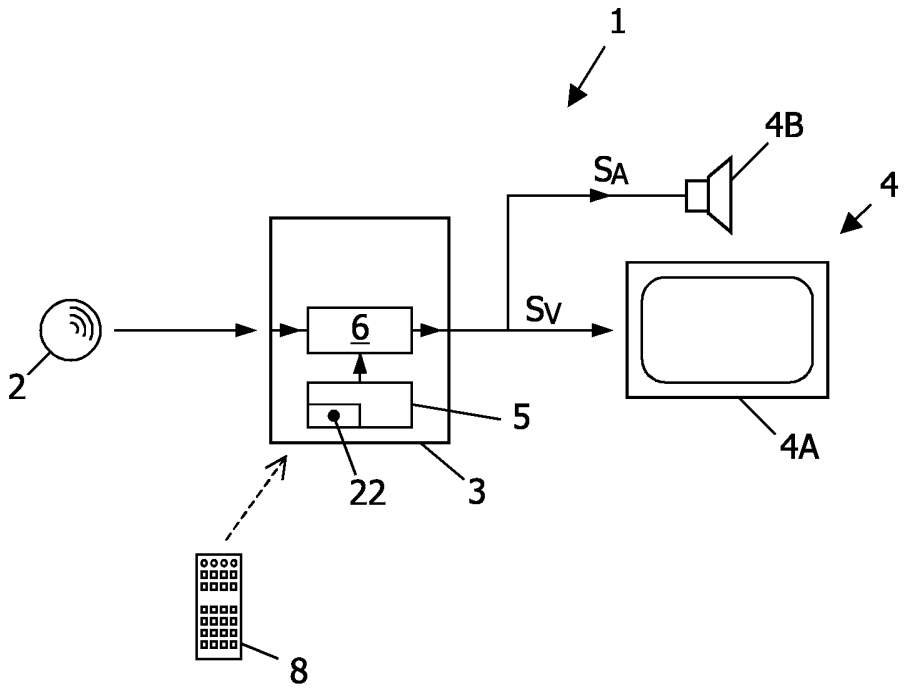

FIG.1A

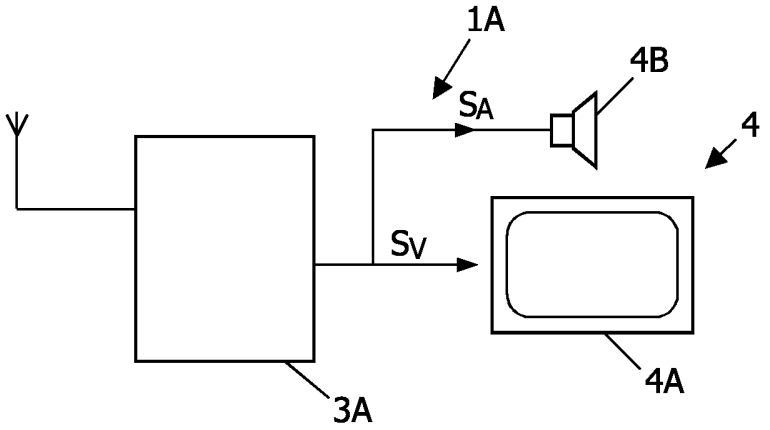

FIG.1B

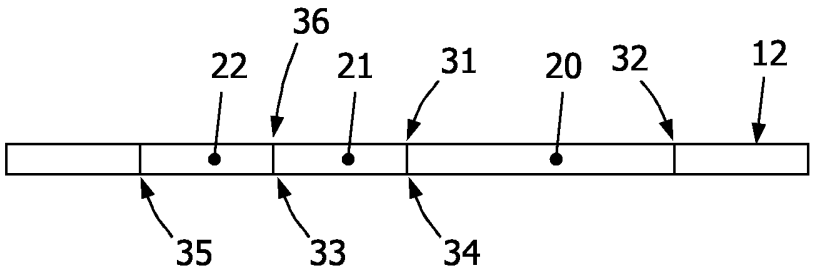
36
22
21
31
20
32
12
35
33
34

FIG.2

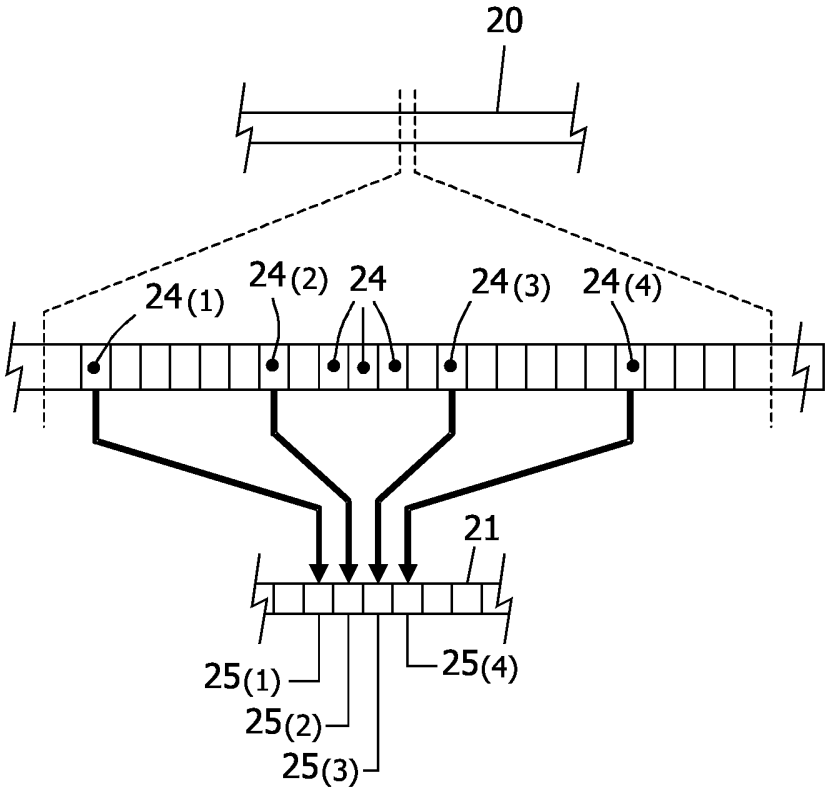
20
24(1)
24(2)
24
24(3)
24(4)
21
25(1)
25(2)
25(3)
25(4)

FIG.3

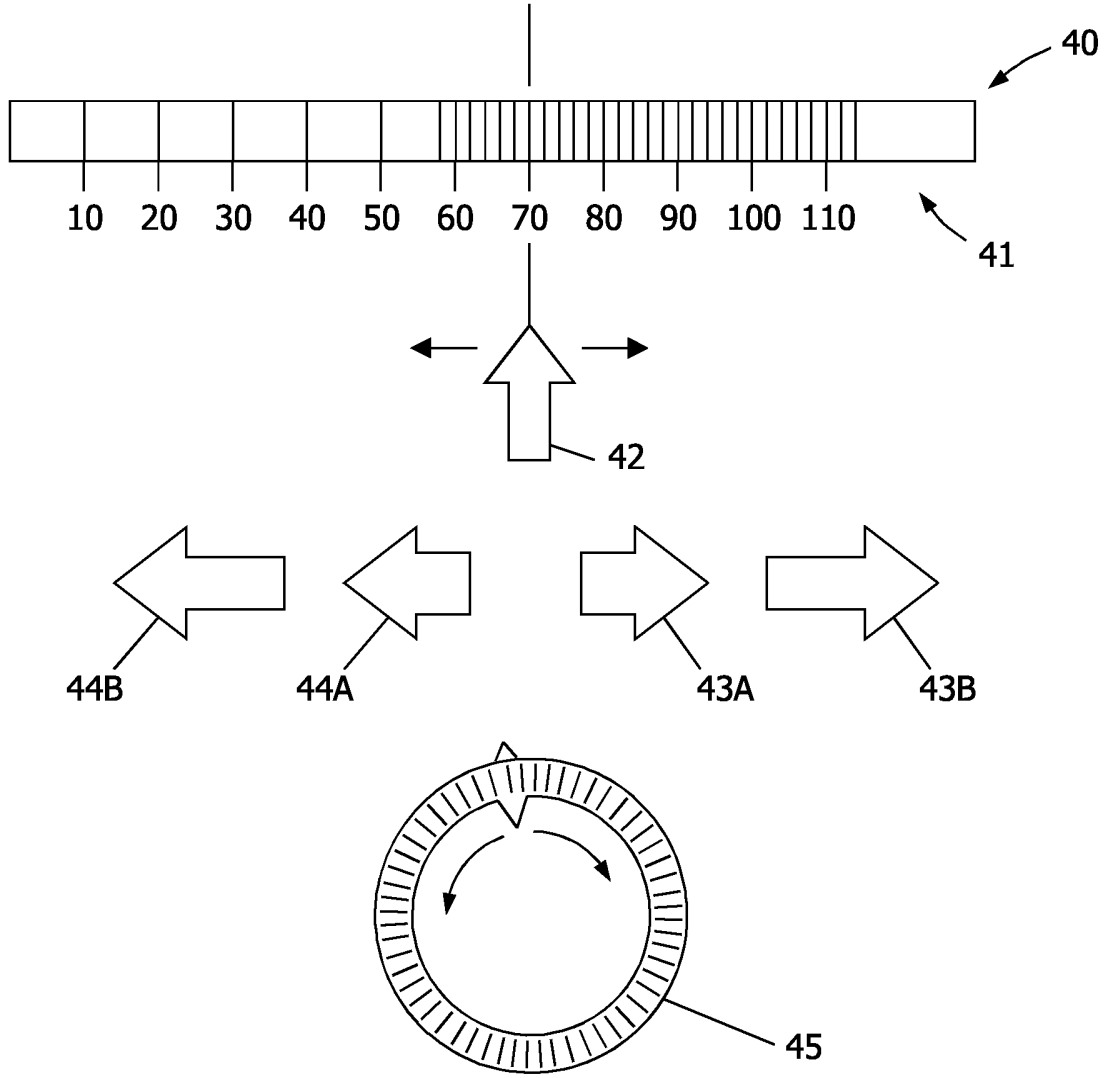

FIG.4

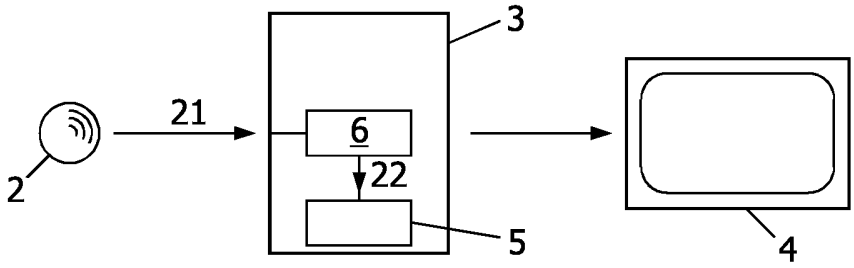

FIG.5A

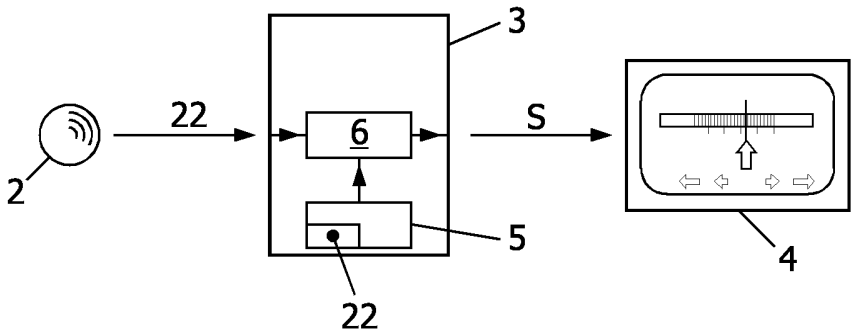

FIG.5B