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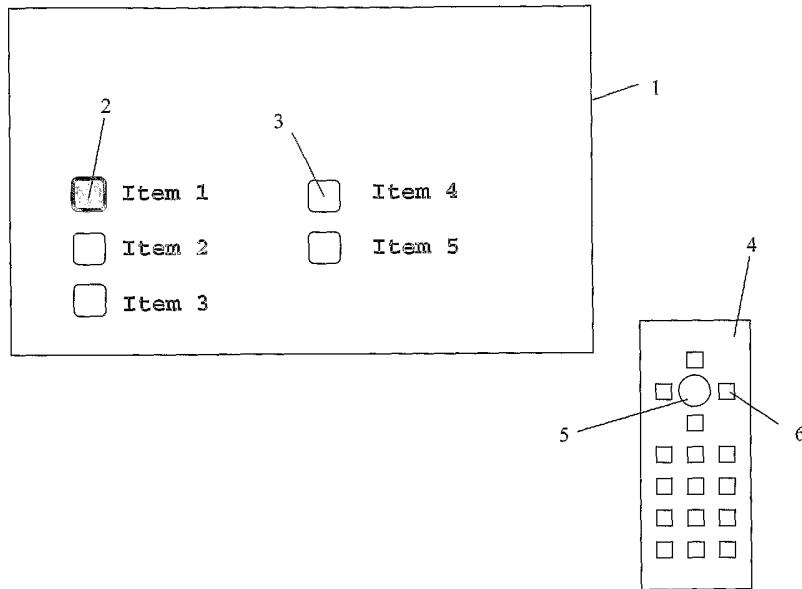
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[Continued on next page]

(54) Title: METHOD FOR REPRESENTING ANIMATED MENU BUTTONS



(57) Abstract: Optical storage media often contain data structures for a menu suitable for selection of a title, a chapter, a parameter or others. Such menus usually comprise a number of buttons to be displayed, with each button having a state. Possible states of buttons are "unselected", "selected" or "activated". According to the invention, the representation of a menu button may vary, depending on its state. An image or an image sequence, e.g. cartoon, may be associated to a buttons state, providing user animation. Further, a sound or sound sequence, e.g. melody or click, may be associated to a buttons state, and may be played back when the button enters this state. A data structure is disclosed which allows storage of such menu data e.g. on a Blu-ray disc.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Method for representing animated menu buttons**Field of the invention

5

This invention relates to a method for adding animated menu buttons to an optical storage medium.

10 Background

Today's optical storage media formats are capable of supporting visual menus, e.g. for content management or control functions. Applications of such visual menus are the 15 selection of one out of multiple titles on the disc, the selection of a chapter within a title, and others. From the user perspective, such menus consist of a number of buttons shown on the display. The user may navigate within the menu, e.g. by pushing the up, down, left and right buttons on his 20 remote control to select a menu button, and may activate a menu button through some kind of "OK" button on the remote control. An indicator, usually a highlight or an arrow, may provide feedback to the user, showing which button is currently selected or activated. A menu button may have one of 25 the states "normal", "selected" or "activated".

However, known DVD menus are rather limited concerning extra features, since they contain only static visual buttons.

30 Further, a subtitling specification contained in the document "ETS 300 743: Digital Video Broadcasting (DVB) ; Subtitling System" (DVB-ST), provided by the European Telecommunication

Standardization Institute (ETSI), is known for embedding subtitles into video sequences.

5 Summary of the Invention

The present invention may be utilized to give more feedback to the user who operates a menu related to an optical storage medium. The feedback comprises visually and/or aurally 10 animated buttons. A method to provide such feedback is disclosed in claim 1.

A storage medium that contains an animated menu is disclosed in claim 9.

15

An apparatus suitable for presenting such menu is disclosed in claim 10.

According to the invention, a menu button shown on a display 20 may look different, depending on its state. The state may be "normal", "selected" or "activated", and for each of these states the button may have different color or shape. Additionally, a sound or sound sequence may be attached to some or all menu buttons, depending on the buttons state. 25 Examples for sounds are a click or a melody, or a speech sequence. The current invention provides a data structure by which those additional features can be described.

Advantageous embodiments of the invention are disclosed in the 30 dependent claims, the following description and the figure.

Brief description of the drawing

An exemplary embodiment of the invention is described with reference to the accompanying drawing in Fig.1, which shows an 5 on-screen menu according to the invention, and a corresponding remote control.

Detailed description of the invention

10

Fig.1 shows a video screen 1 containing a menu that comprises buttons 2,3 and related text describing the buttons. When a user presses a button 5,6 on a remote control 4, the state of a button 2,3 may change, and also the representation of the 15 button. In Fig.1 one button 2 is selected, and thus looks different from the unselected buttons 3. When the user e.g. presses the "right" button 6 on the remote control, another button 3 is selected being right from the currently selected button 2. When the user presses the "OK" button 5, the 20 selected button is activated, and the function associated with the selected button is performed. The selected button 2 according to the invention is animated, e.g. has another color and another shape than an unselected button 3, and its color or shape may change. Particularly, the button may also be 25 replaced by a moving symbol, a moving cartoon or the like, depending on the state.

A preferred embodiment of the invention is based on the syntax and semantics of the subtitling specification contained in the 30 document "ETS 300 743: Digital Video Broadcasting (DVB) ; Subtitling System" (DVB-ST), provided by the European Telecommunication Standardization Institute (ETSI). To provide enhanced capabilities for menus relating to optical storage

media, the page composition segment defined in DVB-ST is extended to describe animated menu buttons and to associate a sound or sound sequence to a button. The enhanced page composition segment is herein called a "menu page composition segment".

This invention, like DVB\_ST, uses page composition segments to describe the position of one or more rectangular regions on the display, assuming that a region contains a representation of one button in a certain state, e.g. as pixel data or bitmap. Each button image is thus addressable through an identifier (ID), or "region\_id". In this embodiment of the invention, backward compatibility is kept with DVB-ST by using an associated segment type ID for the menu page composition segment. The menu page composition segment is defined as listed in Tab.1.

The "menu page composition segment" according to the invention may also replace the original page composition segment, e.g. in DVB-ST. A menu page composition segment describes a menu and provides the necessary layout and timing information as well as additional control information.

In one embodiment of the invention, being a simple case with static menus, each button is represented by e.g. three images. A first image represents the button in the "normal" state, a second image represents the button in the "selected" state and a third image represents the button in the "activated" state. These images may be stored e.g. as bitmap files on the storage medium, and may be used to display the menu.

In another embodiment, going beyond static menus, the menu page composition segment also allows to describe animated

buttons. In this case, the "normal" state and the "selected" state of a button are each represented through a series of images that are displayed, and may be e.g. cyclically repeated, on the screen to achieve the animation effect. Also

5 for the "activated" state of a button an animation can be defined, but here it may be advantageous to display the animation phases only once, because the menu will usually disappear or be modified after a button was activated.

10 For all button animations of a menu the menu author can specify an animation frame rate, defining how long each phase of an animation is displayed.

Advantageously, the invention also provides the possibility to  
15 give aural feedback to the user. If a button is either in the "selected" state or in the "activated" state, it may be assigned a sound identifier associated with a sound, which may be stored on the storage medium. The associated sound is played back when the button enters the respective button  
20 state. In one embodiment of the invention the associated sound is played back repeatedly, as long as the button is in the respective state.

The structure of the menu page composition segment and the  
25 semantics of the fields of the menu page composition segment are based on the structure and semantics given in DVB-ST, Section 7.2.1 "Page composition segment". Additional semantics definitions are used for an enhanced menu according to the invention.

30

Tab.1 shows the structure of a menu page composition segment according to the invention. Lines 1-8 are identical to the subtitle segment of the DVB-ST standard, giving the

possibility to keep backward compatibility. The meaning of the fields shown in Tab.1 is described in the following. The addressing of pixels is based on a coordinate system whose origin is defined by the top-left corner of the associated video screen. Pixel addresses increase from left to right and from top to bottom. The dimensions of the associated video are defined as `video_width * video_height`.

	Field	Size	Type
1	menu_page_composition_segment () {		
2	sync_byte	8	bslbf
3	segment_type	8	bslbf
4	page_id	16	bslbf
5	segment_length	16	uimsbf
6	page_time_out	8	uimsbf
7	page_version_number	4	uimsbf
8	page_state	2	bslbf
9	animation_frame_rate_code	4	uimsbf
10	reserved	6	bslbf
11	while (processed_length < segment_length) {	8	uimsbf
12	button_number	16	uimsbf
13	button_horizontal_address	16	uimsbf
14	button_vertical_address		
15	neighbour_info()	8	uimsbf
16	upper_button_number	8	uimsbf
17	lower_button_number	8	uimsbf
18	left_button_number	8	uimsbf
19	right_button_number		
20	normal_state_info()	8	uimsbf
21	start_region_id_normal	8	uimsbf
22	end_region_id_normal	8	uimsbf
23	selected_state_info()	16	uimsbf
24	start_region_id_selected	8	uimsbf
25	end_region_id_selected	8	uimsbf
26	action_state_info()		
27	start_region_id_activated	8	uimsbf
28	end_region_id_activated	8	uimsbf
29	button_command_info()		
30	sound_info()		
31	selected_sound_id	8	uimsbf
32	activated_sound_id	8	uimsbf
33	}		
34	}		

Tab.1: Syntax of a menu page composition segment

A segment is generally a data unit within the storage area. The *segment\_type* defines its type. The menu page composition segment may be identified by setting e.g. *segment\_type* = 0x18, since this value is not used in DVB-ST yet. The other fields 5 in lines 2-8 of Tab.1 define the segment data set.

The *animation\_frame\_rate\_code* field specifies the frame rate of animations in the case of animated buttons being used. It applies to a range of regions specified by *start\_region\_id\_xxx* 10 and *end\_region\_id\_xxx*, with the "xxx" referring the state of a button. If a *start\_region\_id\_xxx* and its corresponding *end\_region\_id\_xxx* differ, they define a range of regions that shall be presented with this animation frame rate. For the normal and selected state, the presentation may be cyclically 15 repeated; for the "activated" state, the presentation shall be performed only once. When any *start\_region\_id\_xxx* is identical to the associated *end\_region\_id\_xxx*, this designates a static or non-animated button state. Only the region designated by *start\_region\_id\_xxx* is displayed, and for that button state 20 the *animation\_frame\_rate\_code* shall have no meaning.

Tab.2 shows an exemplary list of *animation\_frame\_rate\_codes*. An animation may be visible at full video frame rate, e.g. 30 25 pictures per second, meaning that with each video frame another phase of the animation is displayed. It may also be sufficient to display only with every other video frame another phase of the animated button, thus achieving another effect. Further, it is possible to define the frame rate to either be relative or absolute. Therefore the values of the 30 *animation\_frame\_rate\_code* field have two different meanings, depending on if an associated video is present. In this case the *animation\_frame\_rate\_code* gives the animation frame rate

relative to the video frame rate, otherwise it gives the absolute frame rate.

animation_frame_rate_code	Relative animation frame rate	Abs. animation Frame rate
0x0	Reserved	Reserved
0x1	Full video frame rate	30 Hz
0x2	½ of video frame rate	15 Hz
0x3	¼ of video frame rate	8 Hz
0x4	1/8 of video frame rate	4 Hz
0x5	1/16 of video frame rate	2 Hz
0x6	1/32 of video frame rate	1 Hz
0x7 - 0xF	reserved	Reserved

5

**Tab.2:** Example of animation\_frame\_rate\_code

The button\_number field specifies a number that is an internal identifier for a button, and is used for the fields defined 10 below, e.g. the neighbour\_info() field. Additionally, when button\_number is entered directly through the user interface (UI), the associated button may be activated. Therefore a button\_number is unique within the menu. It may be e.g. a two-digit number in the range between 0 and 99.

15

Some fields used for menu animation according to the invention must be specified separately for each button. They are listed from line 11 of Tab.1, where a loop over all buttons starts. Each instance of the loop refers to one button. Implicitly, 20 the button described by the first instance of the while-loop within menu\_page\_composition\_segment() may be considered as "selected" when entering the menu, and may be considered as "activated" if a page timeout for the menu is set and becomes active.

25

The button\_horizontal\_address field specifies the horizontal address of the top left pixel of the button. The specified horizontal position may be in between 0 and video\_width-1. Likewise, the button\_vertical\_address field specifies the 5 vertical address of the top left pixel of the button. The specified vertical position may be in between 0 and video\_height-1.

The upper\_button\_number field specifies the button to be 10 selected when the user navigates upward from the current button. The lower\_button\_number field specifies the button to be selected when the user navigates downward from the current button. The left\_button\_number field specifies the button to be selected when the user navigates left from the current 15 button. And the right\_button\_number field specifies the button to be selected when the user navigates right from the current button.

The start\_region\_id\_normal field specifies the ID of the first 20 region to be presented for a button presentation in normal state, and the end\_region\_id\_normal field specifies the ID of the last region to be presented for a button presentation in normal state. All regions with an ID between and including start\_region\_id\_normal and end\_region\_id\_normal shall exist; 25 if start\_region\_id\_normal differs from end\_region\_id\_normal, that range of regions shall be presented cyclically with the animation frame rate as defined by animation\_frame\_rate\_code.

The start\_region\_id\_selected field specifies the ID of the 30 first region to be presented for a button presentation in the selected state, and the end\_region\_id\_selected field specifies the ID of the last region to be presented for a button presentation in the selected state. All regions with IDs

between `start_region_id_selected` and `end_region_id_selected` shall exist; if `start_region_id_selected` differs from `end_region_id_selected`, that range of regions shall be presented cyclically with the animation frame rate described  
5 by `animation_frame_rate_code`.

The `start_region_id_activated` field specifies the ID of the first region to be presented for a button presentation in activated state, and the `end_region_id_activated` field  
10 specifies the ID of the last region to be presented for a button presentation in activated state. All regions with IDs between `start_region_id_activated` and `end_region_id_activated` shall exist; if `start_region_id_activated` differs from `end_region_id_activated`, that range of regions shall be  
15 presented once with the animation frame rate described by `animation_frame_rate_code`.

The `button_command_info()` field serves as a container for commands associated with this button, specifying the commands  
20 to be performed when the button is activated.

Finally, the `selected_sound_id` field specifies the ID of the sound to be played when the button enters the "selected" state, and the `activated_sound_id` field specifies the ID of  
25 the sound to be played when the button enters the "activated" state.

The invention may be used particularly for menus stored on  
30 Blu-ray discs, but also DVD or other optical or non-optical high-capacity storage media.

Claims

1. A method for representing menu buttons (2,3), the menu buttons (2,3) having an associated state, the state being unselected (3), selected (2) or activated, characterized in that
  - data representing the menu buttons are stored in bitmap format on a removable storage medium; and
  - a menu button is represented by different symbols, depending on its state, wherein the different symbols are stored as different bitmap formatted data.
2. Method according to claim 1, wherein the data representing a menu button on the display are image data, being a still picture or a sequence of pictures.
3. Method according to claim 2, wherein for a certain state the sequence of pictures representing a button is repeated as long as the button remains in its state.
4. Method according to claim 2 or 3, wherein the rate at which a sequence of pictures is displayed is either an absolute rate or relative to the video frame rate, and a value defining said rate is stored on said storage medium.
5. Method according to any of the previous claims, wherein a sound or sound sequence may be associated to a state of a menu button, the sound or sound sequence being played back upon entry of the button into the associated state.

6. Method according to claim 5, wherein the sound associated with a state of a menu button is a speech sequence.

5 7. Method according to any of the previous claims, wherein a region identifier, the region identifier being stored on said storage medium, determines the display position of a menu button.

10 8. Method according to any of the previous claims, wherein the data structure on said storage medium contains a segment defining the page composition, the data segment containing said data representing the menu buttons.

15 9. A storage medium containing a data segment representing menu data, the menu data comprising menu buttons, wherein the menu buttons may be represented according to any of the methods of claims 1-8.

20 10. An apparatus for displaying a menu on a screen, the menu being controlled by menu data read from a storage medium and the menu comprising menu buttons, wherein the menu buttons may be represented according to any of the methods of claims 1-8.

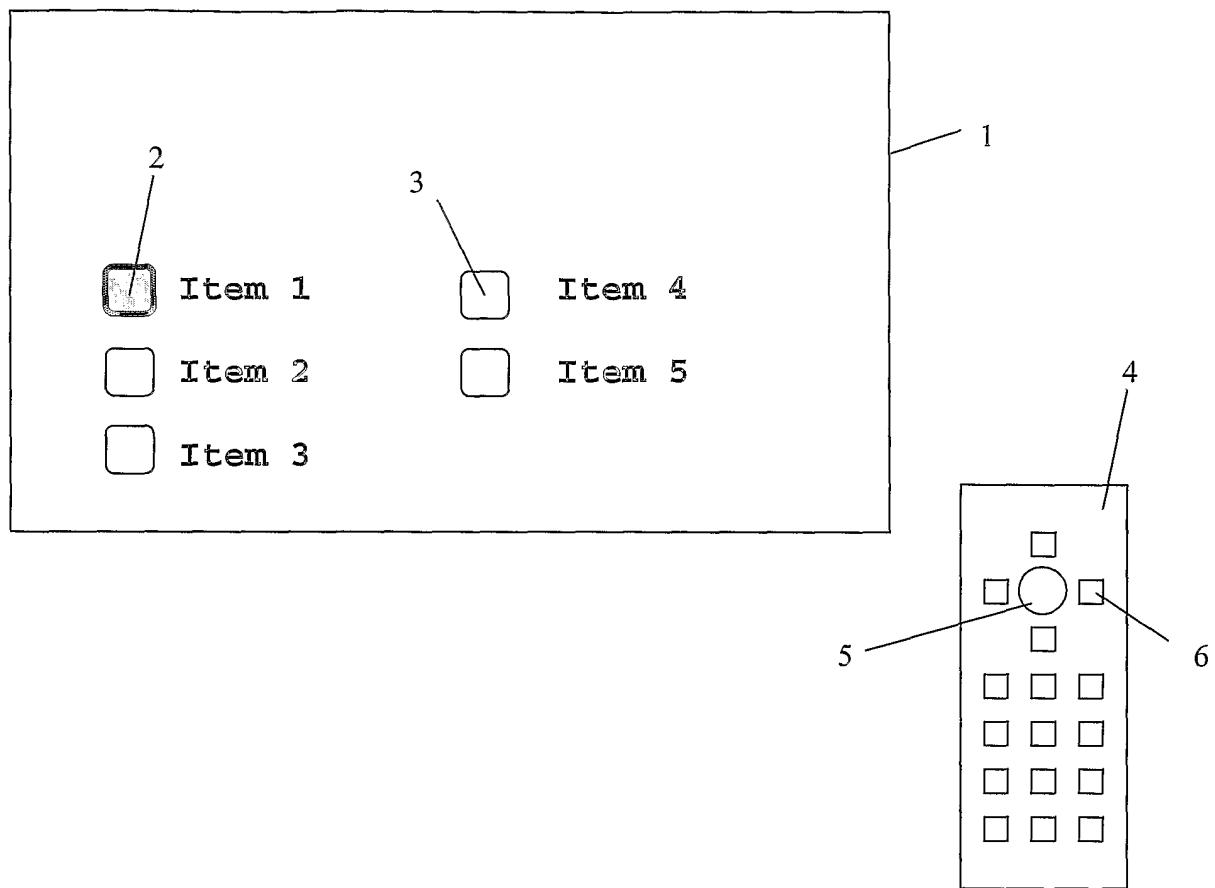


Fig. 1

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/002561

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 G11B19/02 G06F3/033

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

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 G11B G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 052 644 A (TOKYO SHIBAURA ELECTRIC CO) 15 November 2000 (2000-11-15) abstract paragraph '0003! - paragraph '0018! claims 1-10; figure 69 -----	1-10
Y	US 2002/054101 A1 (BEATTY ROBERT A) 9 May 2002 (2002-05-09) abstract paragraph '0006! - paragraph '0019! -----	1-10
A	EP 1 113 442 A (LG ELECTRONICS INC) 4 July 2001 (2001-07-04) the whole document -----	1,7-10
A	WO 02/071197 A (PHILIPS ELECTRONICS NA) 12 September 2002 (2002-09-12) the whole document -----	1-3,10
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

## ° Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
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**INTERNATIONAL SEARCH REPORT**International Application No  
PCT/EP2004/002561**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 898 279 A (SONY CORP) 24 February 1999 (1999-02-24) the whole document -----	1-3, 10

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/EP2004/002561

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
EP 1052644	A 15-11-2000	JP 11215466 A	06-08-1999		
		EP 1052644 A1	15-11-2000		
		US 2003147629 A1	07-08-2003		
		US 6553180 B1	22-04-2003		
		CN 1291336 T	11-04-2001		
		WO 9938167 A1	29-07-1999		
US 2002054101	A1 09-05-2002	NONE			
EP 1113442	A 04-07-2001	KR 2001060616 A	07-07-2001		
		CN 1304252 A	18-07-2001		
		EP 1113442 A2	04-07-2001		
		JP 2001238278 A	31-08-2001		
		JP 2004007639 A	08-01-2004		
		US 2001020958 A1	13-09-2001		
WO 02071197	A 12-09-2002	WO 02071197 A1	12-09-2002		
EP 0898279	A 24-02-1999	JP 11069284 A	09-03-1999		
		CN 1212569 A	31-03-1999		
		EP 0898279 A2	24-02-1999		
		US 6469718 B1	22-10-2002		