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(54) **SYSTEM AND METHOD FOR IMPLEMENTING REMOTE CONTROL FUNCTIONS IN A MOUSE IN A VIDEO PLAYBACK SYSTEM**

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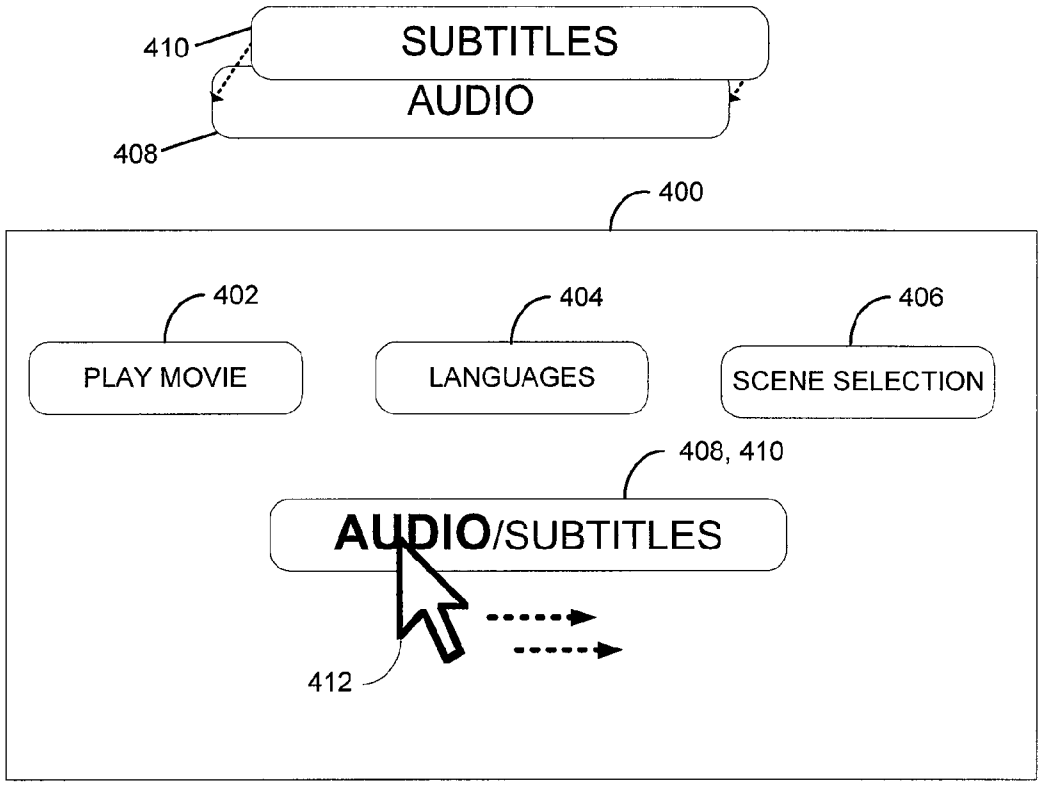
(57) **ABSTRACT**

A method for implementing remote control functionality with a mouse in a video playback system includes the steps of identifying all selectable buttons within the page, depressing a key on a mouse device while the mouse is positioned over a first button currently selected, dragging the mouse device in the direction of a second button to be selected while depressing the key, and releasing the key on the mouse device once the mouse device is positioned over the second button to select the second button.



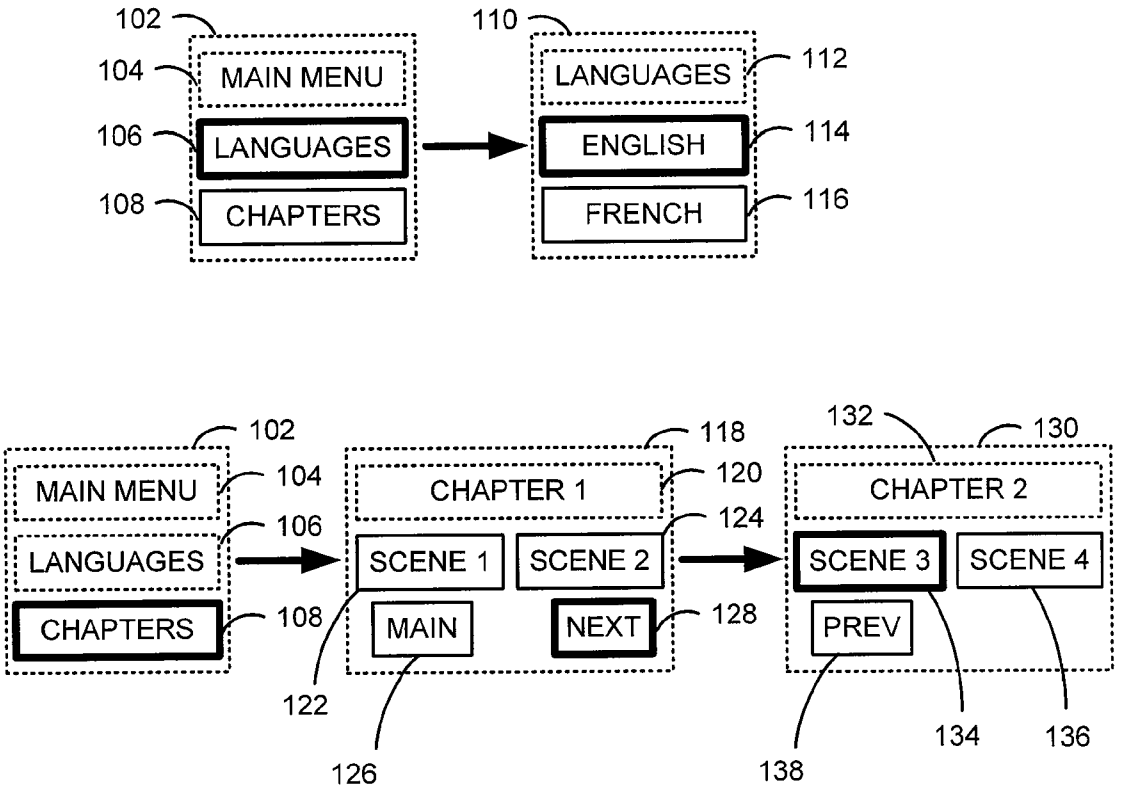
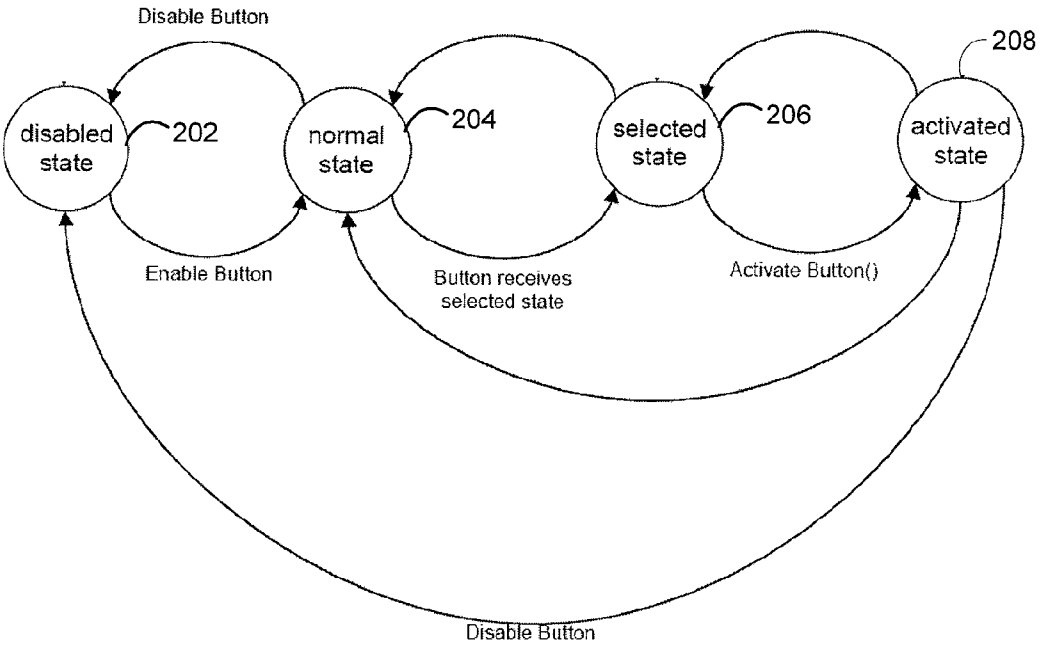

102
MAIN MENU
104
LANGUAGES
106
CHAPTERS
108
110
LANGUAGES
112
ENGLISH
114
FRENCH
116
102
MAIN MENU
104
LANGUAGES
106
CHAPTERS
108
118
CHAPTER 1
120
SCENE 1
SCENE 2
124
MAIN
NEXT
128
122
126
132
130
CHAPTER 2
SCENE 3
SCENE 4
PREV
134
136
138

FIG. 1



Button State Transition Diagram

FIG. 2

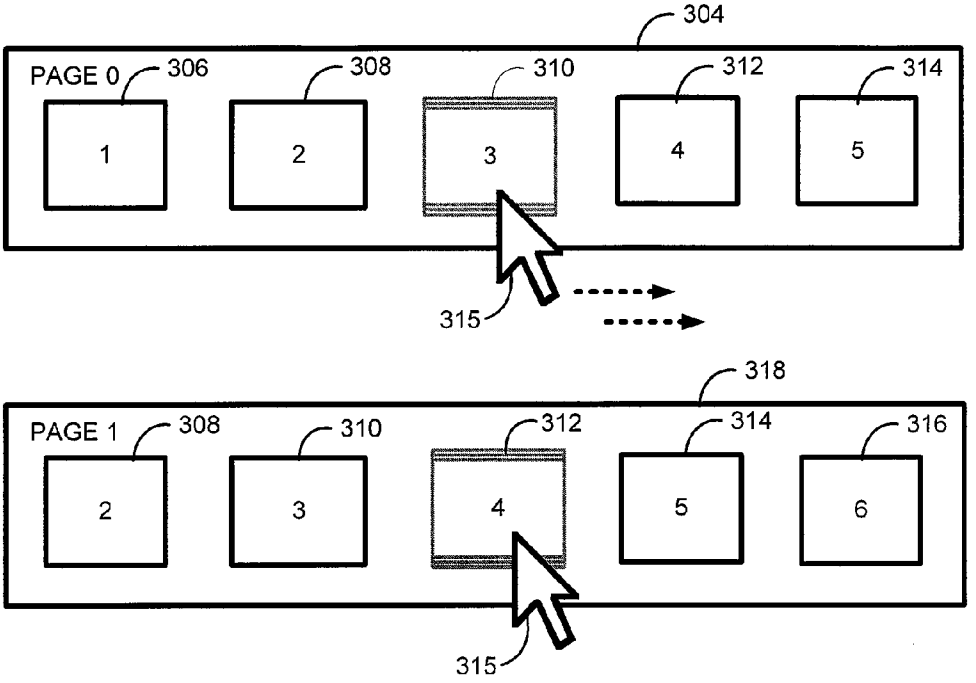

304
PAGE 0
306
308
310
312
314
1
2
3
4
5
315
318
PAGE 1
308
310
312
314
316
2
3
4
5
6
315

FIG. 3A

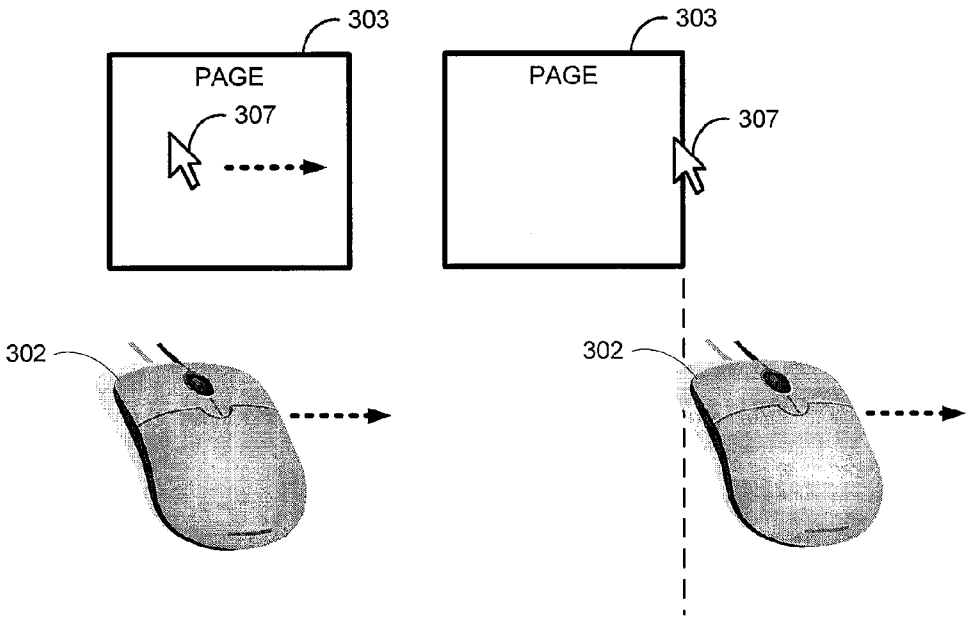

303
PAGE
307
303
PAGE
307
302
302

FIG. 3B

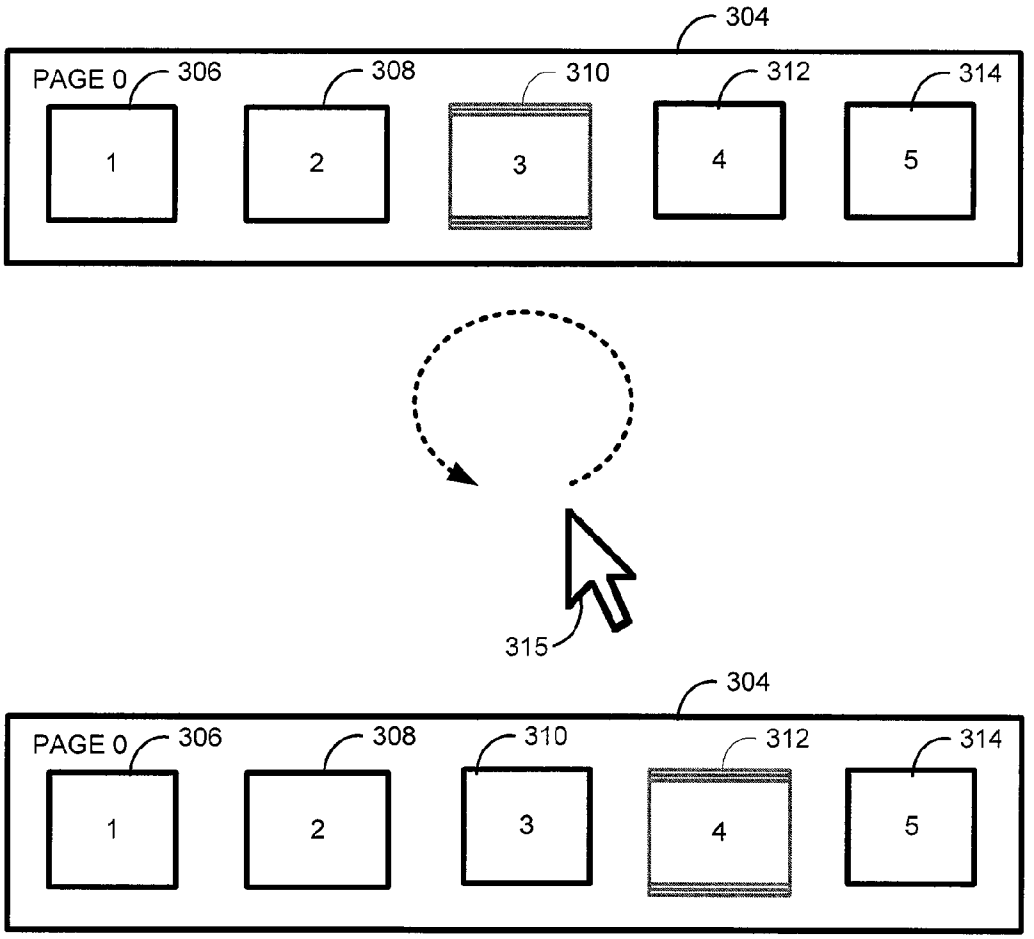

304
PAGE 0
306
308
310
312
314
1
2
3
4
5
315
304
PAGE 0
306
308
310
312
314
1
2
3
4
5

FIG. 3C

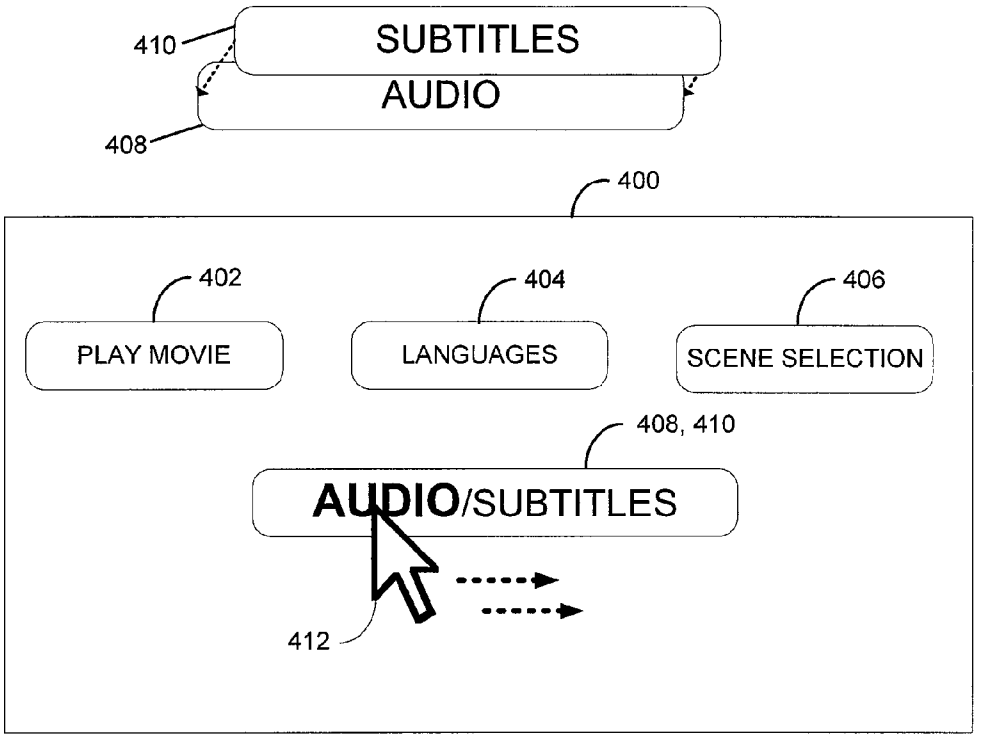

410
SUBTITLES
AUDIO
408
400
402
PLAY MOVIE
404
LANGUAGES
406
SCENE SELECTION
408, 410
AUDIO/SUBTITLES
412

FIG. 4A

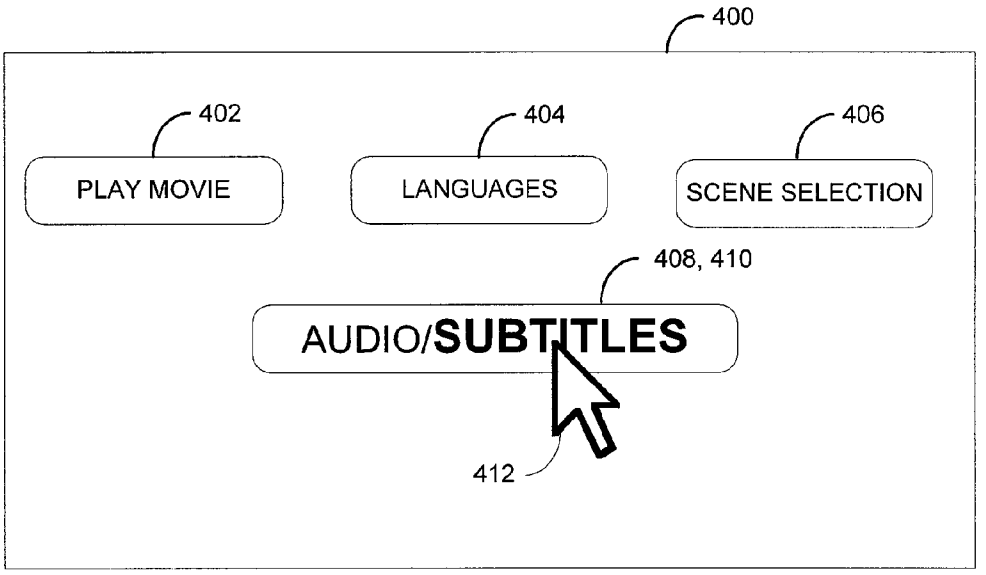

400
402
PLAY MOVIE
404
LANGUAGES
406
SCENE SELECTION
408, 410
AUDIO/SUBTITLES
412

FIG. 4B

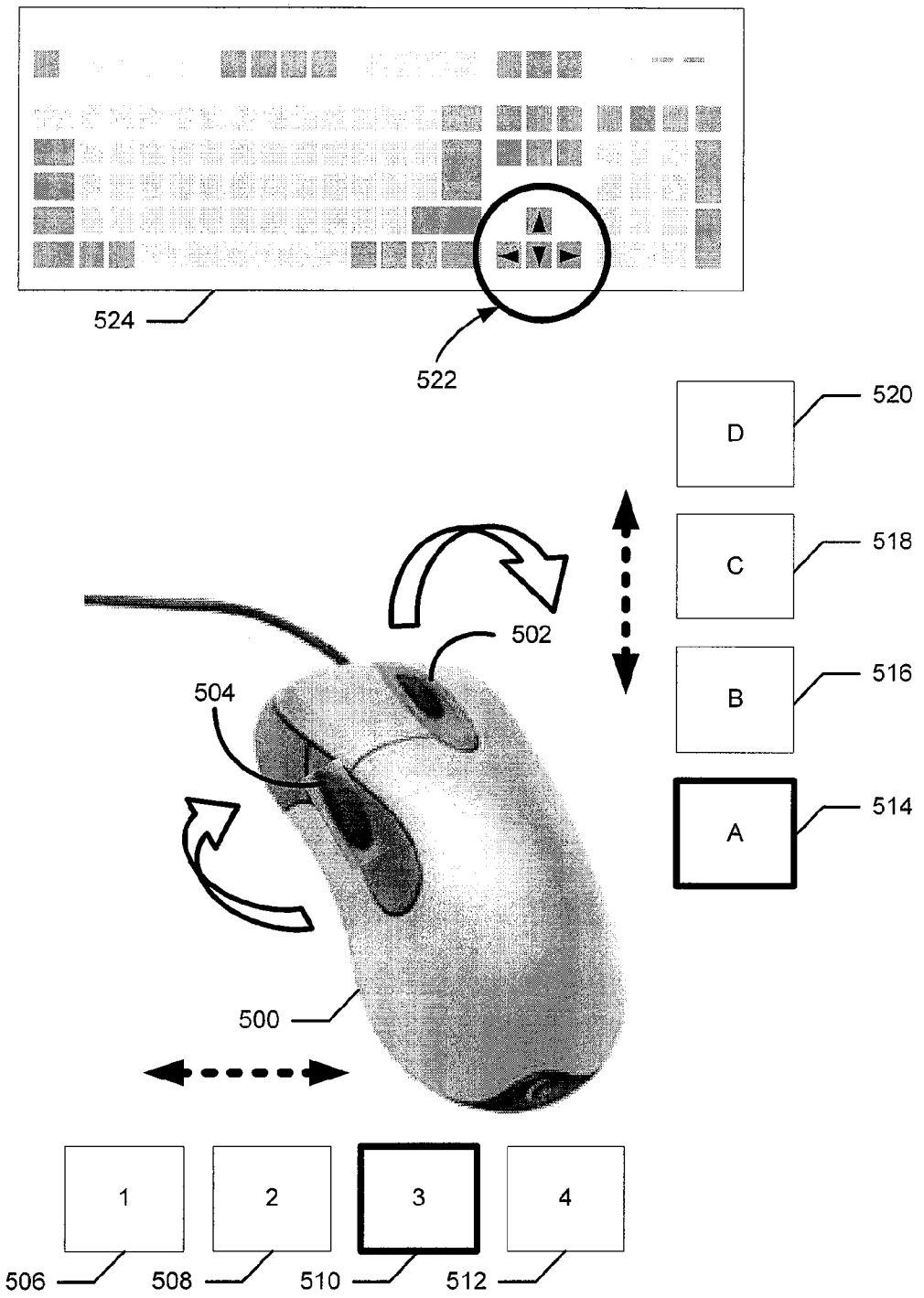


FIG. 5

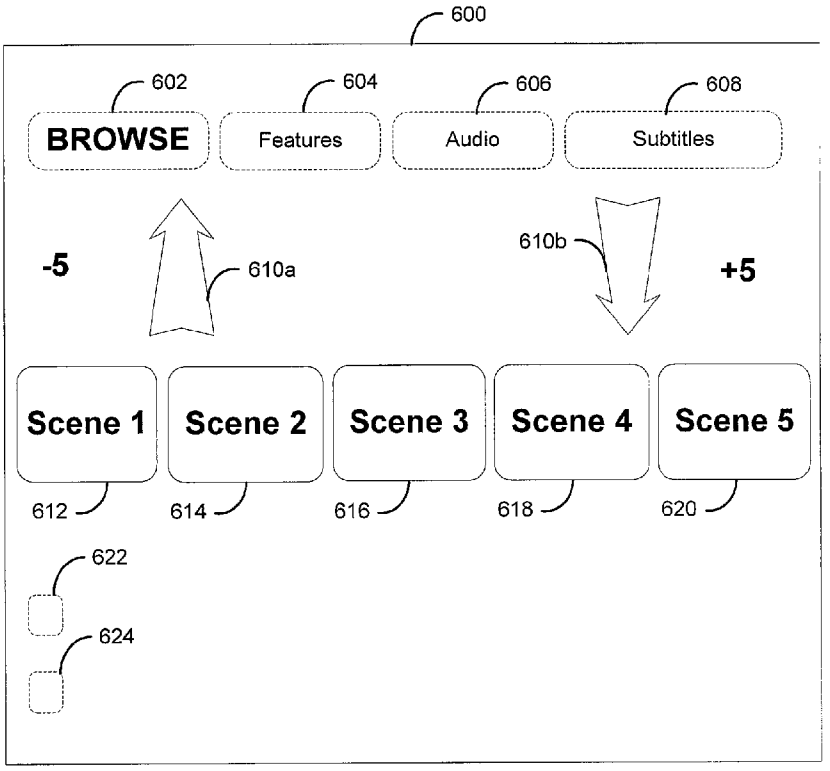

600
602
604
606
608
BROWSE
Features
Audio
Subtitles
-5
610a
610b
+5
Scene 1
Scene 2
Scene 3
Scene 4
Scene 5
612
614
616
618
620
622
624

FIG. 6

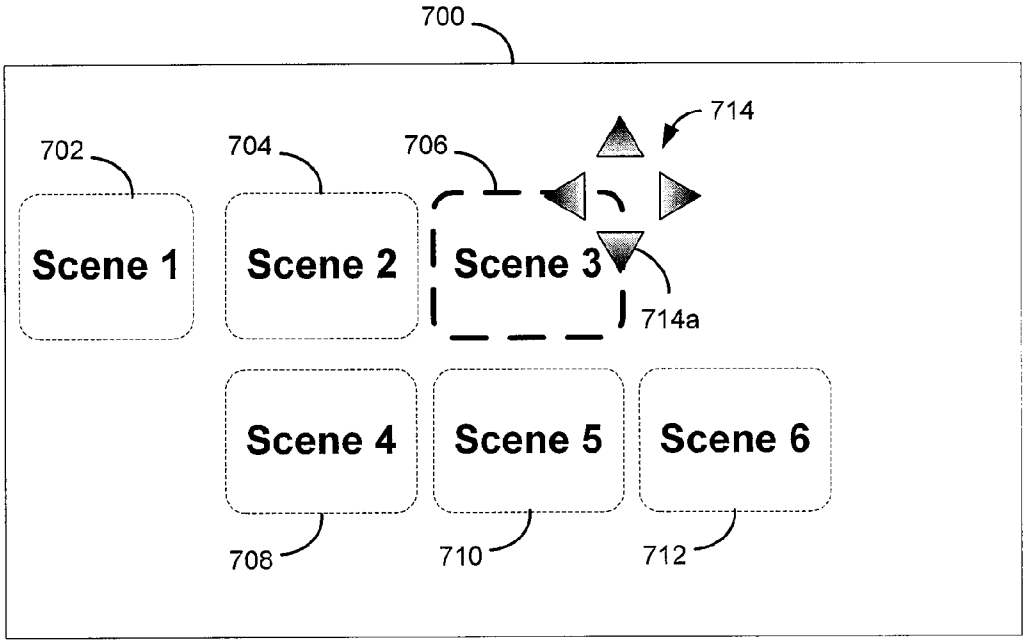

700
714
702
704
706
Scene 1
Scene 2
Scene 3
714a
Scene 4
Scene 5
Scene 6
708
710
712

FIG. 7

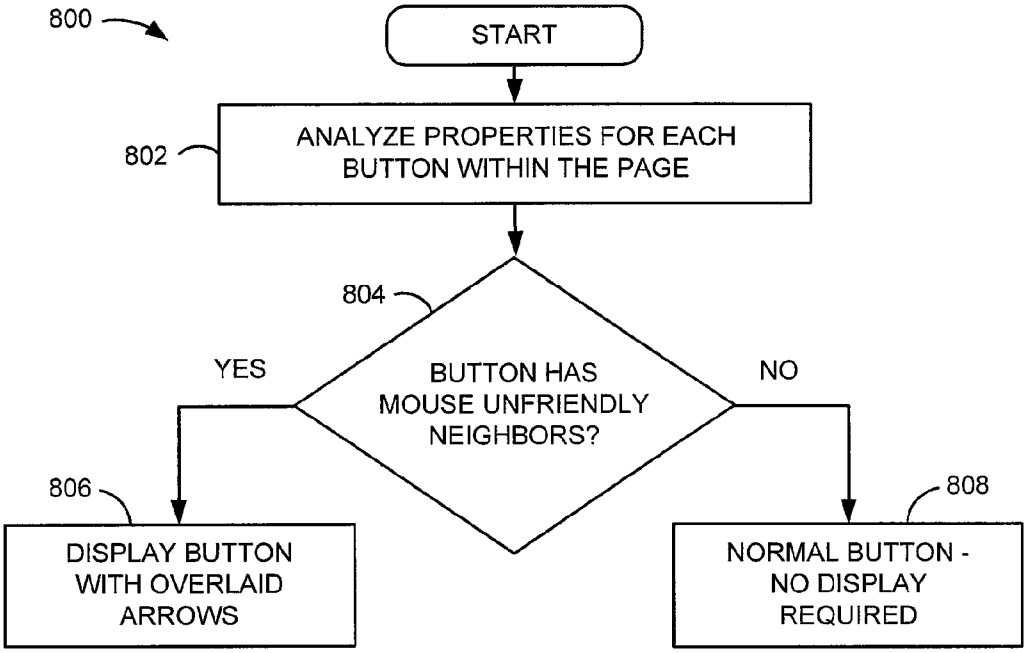

800
START
802
ANALYZE PROPERTIES FOR EACH BUTTON WITHIN THE PAGE
804
BUTTON HAS MOUSE UNFRIENDLY NEIGHBORS?
YES
NO
806
DISPLAY BUTTON WITH OVERLAID ARROWS
808
NORMAL BUTTON - NO DISPLAY REQUIRED

FIG. 8A

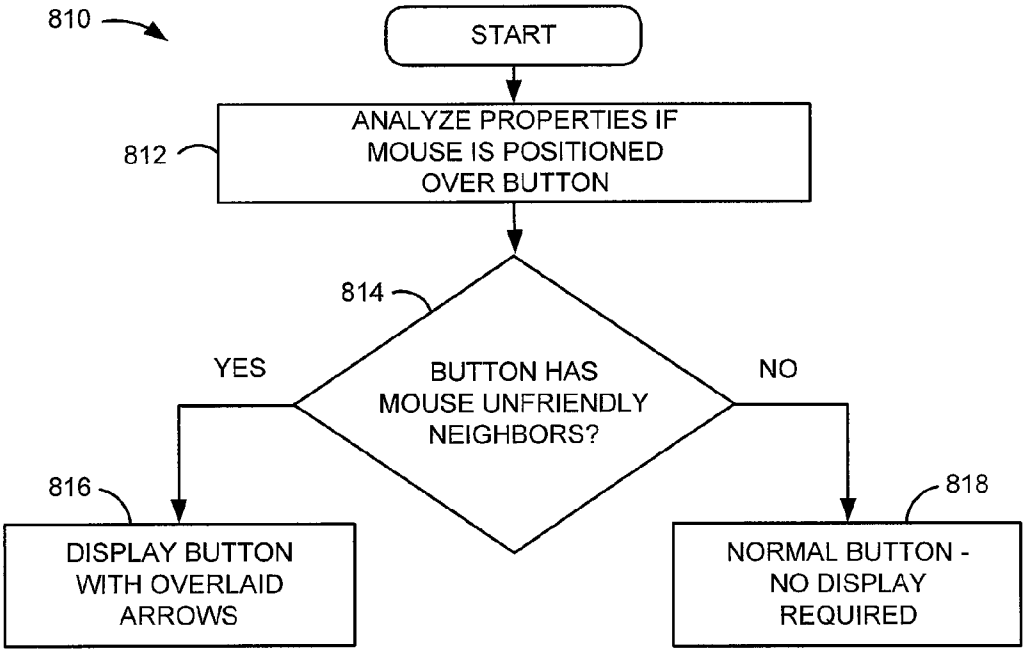

810
START
812
ANALYZE PROPERTIES IF MOUSE IS POSITIONED OVER BUTTON
814
BUTTON HAS MOUSE UNFRIENDLY NEIGHBORS?
YES
NO
816
DISPLAY BUTTON WITH OVERLAID ARROWS
818
NORMAL BUTTON - NO DISPLAY REQUIRED

FIG. 8B

SYSTEM AND METHOD FOR IMPLEMENTING REMOTE CONTROL FUNCTIONS IN A MOUSE IN A VIDEO PLAYBACK SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to, and the benefit of, U.S. Provisional Patent Application Ser. No. 60/807,941, filed on Jul. 21, 2006, which is incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure is generally related to implementation of remote control functions in input/output devices in a video playback system and, more particularly, is related to a system and method for implementing remote control functionality with a mouse in a video playback system.

BACKGROUND

[0003] Video playback systems are well known, and there are a variety of current standards that govern the format and other attributes associated with the various video playback systems. Today, the DVD (Digital Video Disc) standard is the predominant format utilized for optical disc storage because of its high storage capacity, thus enabling high quality video and audio to be stored. Consequently, media content such as movies, television shows, and music videos are made widely available in DVD format. One of the appealing aspects of DVDs over other storage formats such as VHS tapes (Video Home System) is the interactive menu(s) offered on DVDs in addition to the movie itself. These interactive menus have become an integral part in fully enjoying media content, such as a movie or television show on a DVD. For example, now, in addition to watching a movie, consumers can select specific chapters to view, set audio/video options (language for the movie to be played in, subtitles, etc.), and even watch additional footage such as a "behind-the-scenes" look in making the movie. Some DVDs even offer "alternate endings" where consumers can actually select an ending of their choice should they not like the original ending. Since DVD players first became available to consumers in the mid to late 1990's, DVD players are common in many households. This is due in part to the drop in cost of DVD players, therefore making them affordable to consumers. Furthermore, today most personal desktop and laptop computers are sold with a DVD-ROM player built in, making DVD players even more widespread and even more portable than before.

[0004] Typically, with a conventional stand-alone DVD player (e.g., a player not integrated into a computer system and one that requires a separate display device such as a television), the DVD player will come with a remote control which the consumer uses to access features offered by a DVD. With this remote control, the consumer is able to navigate through the hierarchy of interactive menus a particular DVD might offer. A typical remote control for a DVD player will include a set of up/down and left/right arrows. Some remote controls might include a SELECT button in the middle of an arrangement of up/down, left/right navigational buttons. The navigational buttons allows users to intuitively move more around within a menu. For example, in a screen allowing the user to select a specific chapter to view, a series of thumbnail screen shots might be shown on the screen in a grid arrangement (e.g., in a 2×2 arrangement). A particular thumbnail, say the upper left thumbnail on the screen, might be selected by default and highlighted. From there, the user would simply use the up/down, left/right navigational buttons to highlight a different thumbnail until the desired thumbnail is highlighted. The user might then press the SELECT button to enter his selection. Based on this, the corresponding chapter in the movie will be played.

[0005] With DVD players integrated into desktop computers or laptops, the user will generally rely on a graphical user interface (GUI) instead of a remote control to navigate through the series of menus within a DVD. The GUI will generally emulate the same functionality as a remote control. For example, the user can still select chapters to view, fast forward, reverse, set audio/video options, etc. However, instead of navigating through a menu using a series of up/down, left/right selections, the user might click a button shown on the screen using an input device such as a mouse or touch pad on a laptop.

[0006] Today, there are various standards in consideration to become the successor to the DVD standard. Two formats competing to become the next generation optical standard are Blu-ray Disc and HD DVD (High Definition Digital Video Disc). As with these newer standards, Blu-ray Disc offers advantages over DVDs and other previous optical standards in various ways including increased storage capacity and enhanced interactivity (disc content authoring, seamless menu navigation, network/Internet connectivity, etc.). The Blu-ray Disc framework offers content providers almost unlimited functionality when creating interactive titles. The author has complete freedom in designing the user interface, which is controllable by using standard navigational buttons on a remote control.

[0007] With DVDs, playback is interrupted each time a new menu screen is called. For example, if a user desires to change the language from English to French while watching the movie, the user has to select the audio menu. This, however, causes the movie to stop playing, and a menu is displayed for the user to select from. Upon making his selection, the user then returns back to viewing the movie. Due to Blu-ray Disc's ability to read data from the disc without interrupting the current audio/video stream, various menus can be displayed while the movie is playing. Furthermore, the menus may consist of several pages. Users will be able to browse through various pages of menu selections without interrupting the movie.

[0008] Also with DVDs, user browsable slideshows were not possible with uninterrupted audio. As a result of Blu-ray Disc's ability to read data from the disc without interrupting the current audio/video stream, users can browse through various still pictures (e.g., snapshots of various scenes in the movie) while the audio remains playing. This applies not only to forward and backward selections: A user can make different selections on what picture to view (or select from a screen presented with thumbnail images) while the audio remains playing. With DVDs, subtitles were stored in the audio/video stream, and therefore they had limitations on the number of languages and display styles. Again, it is due to Blu-ray Disc's ability to read data from the disc without interrupting the current audio/video stream, that subtitles can be stored independently on the disc. A user may select different font styles, sizes and colors for the subtitles, or

location on screen, depending on the disc's offerings. Subtitles can be animated, scrolled or faded in and out.

[0009] As with the Blu-ray Disc standard, new features have also been added to the new HD DVD standard which provide for enhanced interactive features over DVDs. The HD DVD framework also allows interactive content to be authored for discs.

[0010] Regardless of the particular standard, newer-generation video standards such as Blu-ray Disc and HD DVD are providing greater levels of user control and interactivity with the underlying video content. One area embodying such interactivity relates to the presentation and utilization of buttons. As is known, in interactive graphics, a menu contains one or more pages. Similarly, a page contains one or more buttons, and a button is defined by coordinates (e.g., x-y coordinates), a graphical object, and one or more associated commands. For example, in the context of a DVD video, a user is typically provided with various functions, such as a scene-selection function. In this function, a user may be presented with a variety of single image graphics, which are taken from, and associated with, each of a plurality of scenes. By using the remote control for the DVD player, the user may highlight, or select, any of these images, and may further instruct the DVD player to proceed directly to a given scene by activating the corresponding highlighted image.

[0011] From a more technical standpoint, these images, as seen by the user, are provided in the form of mechanisms called "buttons." As mentioned above, each such button is defined by coordinates (e.g., the x and y location where the button will be presented on the screen), a graphic object (i.e., the image that is presented to the user), and one or more associated commands (e.g., a command that directs the DVD player to jump or skip directly to a selected scene).

[0012] Reference is now made to FIG. **1**, which depicts an exemplary multi-page menu within a video playback system, such as a DVD player. A user typically navigates through the various pages using a remote control. When a user inserts a video disc (e.g., a DVD video), a main menu may be presented on a first page **102** to a user displaying "Main Menu" **104**, "Languages" **106**, and "Chapters" **108**. Using the arrow keys on a remote control for the DVD player, the user may highlight the button for the "Languages" menu **106** option. Once highlighted, the user may press the SELECT key on the remote control, which causes a second page **110** to be presented to the user, having a heading of "Languages" **112**. Underneath this heading, a series of buttons may be presented for each language of the associated audio. The languages illustrated in FIG. **1** are "English" **114** and "French" **116**.

[0013] Alternatively, and as indicated in FIG. **1**, if the user highlighted and activated the "Chapters" button **108** from the first page **102**, then the third page **118** is presented to the user. As illustrated, this third page includes a heading of "Chapter 1" **120** along with four additional buttons labeled as "Scene 1" **122**, "Scene 2" **124**, "Main" **126**, and "Next" **128**. Again, the user may navigate these buttons using the arrow keys on the remote control to highlight any of these buttons. Once highlighted, the user may press a SELECT key provided on the remote control to activate the given button. For example, and as illustrated in the figure, if the user were to activate the "Next" button **128**, then the menu would proceed to display a fourth page **132** (presenting image buttons for "Scene 3" **134** and "Scene 4" **136** to the user). As is known, new video standards provide for these and other robust interactive features, which have generally enhanced the user's experience with the graphics medium.

[0014] Notwithstanding these enhanced features, however, certain problems have been found to arise. One example where such problems have been found to arise is in the use of computers (rather than designated video players) to display or view the videos. Specifically, a problem arises when using standard input/output devices of a computer, such as a mouse, to interact with the video content, instead of using the remote control that is provided with a dedicated video player (e.g., DVD player). When the same video disc is being executed or displayed on a computer, it has been found that a user may freely select otherwise non-selectable buttons, simply by moving the mouse over the top of the button. Returning to the example presented above, if the user were to move the mouse across the "Languages" button **112** on the second page **110**, this would result in an unintended operation. Depending on how the underlying computer program handled it, various different and unintended results could occur. For example, the button may be presented in a highlighted fashion to the user. However, when the user left-clicks the mouse to activate the button, the video program may do nothing as the video disc does not intend that button to be one that can be selected or activated from that page. As an example, in the second page **110**, the "Languages" button **112** is not intended to be selectable as denoted by the dotted lines. Only the two buttons below this button ("English" **114** and "French" **116**) are meant to be selectable. Attempting to activate the "Languages" **112** button in this case could cause the computer program to crash, depending on how the underlying application processes the selection request.

[0015] For purposes of providing nomenclature herein, a button, typically, has one of four possible states. Reference is now made to FIG. **2**, which depicts the different states for buttons within a video playback system. These states include a "disabled" state **202**, a "normal" state **204**, a "selected" state **206**, and an "activated" state **208**. Referring back to FIG. **1**, for the second page **110** being displayed, the "Languages" **112** button would be in a disabled state, as the underlying video content software does not intend for that button to be selected from that particular page. (This is denoted by the dotted line around the button.) The "French" button **114** is in the normal state, while the "English" button **114** is in the selected state. When the user clicks the left mouse key, when the mouse pointer is overlying a selected button, or when the user presses the SELECT key of a remote control for a selected button, then that selected button becomes activated and therefore enters the activated state **208**. The activated state **208** is a temporary state, which typically leaves the underlying video content or software to execute the one or more commands that are associated with the button.

[0016] As illustrated in FIG. **2**, from the activated state **208**, a button may proceed to any of the other three possible states. Again in FIG. **1**, for the first page the "Languages" button **106** is selected. Upon activation of the "Languages" button **106**, the associated command causes, among other possible operations, the menu to proceed to the second page **110**. At this time, the "Languages" button **112** enters the disabled state, as it is not intended for selection from this page of the menu. To provide a specific illustration, and returning to FIG. **1**, in the last three pages (of the four pages

presented in the figure), the top-most button may be a non-selectable button. That is, in the second page **110**, the figure illustrates three buttons of "Languages" **112**, "English" **114**, and "French" **116**. The system, however, may be designed to only permit the user to select the buttons of "English" **114** and "French" **116**. In this regard, the "Languages" button may be a non-selectable button. Thus, when the "English" **114** is highlighted, and the user depresses the up arrow key on the remote control the "Languages" will not be highlighted or selected when a user interacts with the video disc using the remote control of the dedicated video disc player.

[0017] Such features may be implemented, in part, through certain properties of buttons, such as a "neighbor" property. As is known, and defined by certain video specifications (e.g., Blue-ray Disc specification) a button may be defined to have neighbors to the left and right or top and bottom. In such a situation, when a given button is selected (e.g., highlighted) pressing any of the up-arrow, down-arrow, left-arrow, or right-arrow button on the remote control operates to select, or highlight, the button that is defined to the be neighbor of the selected button in the direction selected by the remote control. However, it is not required that neighbors be so associated with buttons in any given direction (or even at all). Therefore, in returning to the figure, it may be that only the "French" button **116** is associated with the "English" button **114** as a neighbor. Therefore, when the "English" button **114** is selected, only the down-arrow key will be recognized as a valid or legitimate arrow-key input (e.g., other arrow keys are ignored). This way, the user is not permitted to select, with the remote control, any button presented on the screen that is not intended for selection in the current page or context of the video presentation.

[0018] However, when the same video disc is being executed or displayed on a computer, it has been found that a user may freely select otherwise non-selectable buttons, simply by moving the mouse over the top of the button. Returning to the example presented above, if the user were to move the mouse across the "Languages" button **112**, this would result in an unintended operation. Depending on how the underlying computer program handled it, various different and unintended results could occur. For example, the button may be presented in a highlighted fashion to the user. However, when the user left-clicks the mouse to activate the button, the video program may do nothing (as the video disc does not intend that button to be one that can be selected or activated from that page). Alternatively, attempting to active such a button could cause the computer program to crash.

[0019] An example of another issue when attempting to use a mouse or other computer input device arises when two buttons are overlaid with each other. When playing a video disc using a computer and while interfacing with the interactive video disc using an input device such as a mouse, problems may arise. As noted above, one problem may be that the system generates errors or confusing results when the mouse is moved over any of buttons in a normal state, but not intended for selection. In addition, when using the mouse to select the overlaid buttons, the user does not have a ready means for toggling between those two buttons, since they are displayed in identical locations on the screen. In this regard, pressing the mouse key will select whichever of those buttons is currently highlighted, but will not permit the user to toggle to the other button, since the mouse does not have a key corresponding the left-arrow or right-arrow keys of the remote control.

[0020] Yet another issue or problem arises in connection with the use of "transparent" buttons or buttons that are too small in size. Transparent buttons are sometimes used as a convenient tool to provide an action when a user depresses a certain button on the remote control input device, without visibly presenting the button to the user. Because these buttons may not be visible to the user, it is not feasible for a user to use a mouse to select these buttons because the precise location is not known.

[0021] The foregoing presents just a few examples of situations in which interactive video graphics are provided which require handling beyond the conventional "point-and-click" action of a mouse. Accordingly, solutions to these and other similar problems are desired. One key aspect of embodiments of the present invention is the detection and identification of buttons that require special handling beyond conventional means of selecting buttons with a mouse.

[0022] Therefore, there exists a need, among others, for providing users with the ability to utilize the interactive graphics within video content using standard input/output devices of a computer. Broadly, the embodiments of the present invention provide robust or effective solutions or workarounds to the problematic issues that arise in connection with buttons in pages within an interactive video playback system.

SUMMARY

[0023] Briefly described, one embodiment, among others, directed to a method for implementing remote control functions with a mouse in a video playback system. One embodiment among others, includes the steps of identifying all selectable buttons within the page, depressing a key on a mouse device while the mouse is positioned over a first button currently selected, dragging the mouse device in the direction of a second button to be selected while depressing the key, and releasing the key on the mouse device once the mouse device is positioned over the second button to select the second button.

[0024] Another embodiment includes the steps of identifying all selectable buttons within the page, visibly distinguishing a first button in a selected state among the selectable buttons, dragging a mouse device in the direction of a second button to be selected, and ceasing movement of the mouse device when the second button is selected.

[0025] Another embodiment includes the steps of identifying all selectable buttons within the page, visibly distinguishing a first button in a selected state among the selectable buttons, rotating a wheel on the mouse device to select a second button in a direction that is correlated to the position of a second button with respect to the first button, and ceasing rotation of the wheel when the second button is selected.

[0026] Another embodiment includes the steps of identifying all selectable buttons within the page, positioning a mouse device over one of the selectable buttons, and displaying a context menu upon depressing a key on the mouse device, the context menu presenting the user with possible actions that can be performed in relation to the button.

[0027] Another embodiment includes the steps of identifying all selectable buttons within the page, determining the properties for each selectable button within the page, over-

laying a graphic display over each selectable button, the graphic display presenting to the user all available actions that can be performed in relation to the button based on the properties of the button.

[0028] Yet another embodiment includes the steps of identifying all selectable buttons within the page, visibly distinguishing a first button in a selected state among the selectable buttons, and dragging a mouse device in a circular fashion in the clockwise direction to select a neighboring button on one side of the first button.

[0029] Other systems, methods, features, and advantages of the present disclosure will be or become apparent to one with skill in the art upon examination of the following drawings and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the present disclosure, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] Many aspects of a system for implementing remote control functions through a mouse in a video playback system and the underlying methods can be better understood with reference to the following drawings. The components in the drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of remote video editing system. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views.

[0031] FIG. **1** depicts an exemplary multi-page menu within a video playback system.

[0032] FIG. **2** depicts the different states for buttons within a video playback system.

[0033] FIG. **3**A illustrates the basic operation of selecting a button within a multi-page menu by dragging a mouse.

[0034] FIG. **3**B depicts one embodiment of the present invention for making a selection within a multi-page menu by dragging the mouse beyond one edge of the page.

[0035] FIG. **3**C depicts one embodiment of the present invention for making a selection within a multi-page menu by dragging the mouse in a circular motion.

[0036] FIG. **4**A depicts one embodiment for selecting between multiple buttons overlaid on one another by dragging a mouse.

[0037] FIG. **4**B depicts the selection of one button between multiple buttons overlaid on one another by dragging a mouse.

[0038] FIG. **5** depicts one embodiment for selecting transparent buttons or buttons that are extremely small in size.

[0039] FIG. **6** depicts a scene selection page with transparent buttons.

[0040] FIG. **7** depicts one embodiment for generating a context menu upon positioning the mouse over a button and depressing a mouse key.

[0041] FIG. **8**A depicts top level functional operation of a method for generating a context menu as soon as a new page is displayed.

[0042] FIG. **8**B depicts top level functional operation of a method for generating a context menu for a particular button only when the mouse is positioned over the button.

DETAILED DESCRIPTION

[0043] Having summarized various aspects of the present disclosure, reference will now be made in detail to the description of the disclosure as illustrated in the drawings. While the disclosure will be described in connection with these drawings, there is no intent to limit it to the embodiment or embodiments disclosed herein. On the contrary, the intent is to cover all alternatives, modifications and equivalents included within the spirit and scope of the disclosure as defined by the appended claims.

[0044] In one implementation of the present invention, such an embodiment operates on a page-by-page basis. As each new page is accessed or presented, the embodiment scans or searches the page to detect buttons that cannot be selected through conventional means and that require an alternate means of selecting the buttons. Such buttons may be defined by any of a variety of conditions, including, but not limited to: (1) two buttons corresponding to different actions that are directly overlaid on top of each other; (2) buttons that are transparent and hence not visible to the user; and (3) buttons that fall below a pre-defined minimum size such that the buttons are not visible to the user. It will be appreciated that, based upon video standards, which now exist or may be developed in the future, other circumstances or conditions may likewise be identifiable which require an alternate means of selecting buttons. Therefore, the present invention should not be deemed as limited to merely detecting one of the three conditions listed above. Instead, these conditions have been illustrated simply as exemplary in the context of the broader operational aspect of detecting buttons within pages of a video playback system.

[0045] Once detected, embodiments of the present invention then implement various solutions for handling, or permitting user interaction with buttons within a page in a video playback system. These solutions may vary from embodiment to embodiment and likewise may vary based on the context in which such buttons are detected. For example, transparent buttons that are detected may be handled or implemented differently than buttons detected due to a mismatch between the logical relationship with a selected button and a physical or dimensional relationship with that selected button (e.g., where multiple buttons corresponding to different actions are overlaid on top of each other). Again, various solutions or handling operations may be implemented consistent with the scope and spirit of the present invention. Several, non-limiting examples are presented below.

[0046] With regard to the first condition listed above, there should generally be a match between the logical relationship between two buttons and the physical location between two buttons. In this regard, when visibly selectable buttons are presented on a page, the user would naturally press a corresponding arrow key of the remote control to select and/or activate a given button, in relation to a currently-selected button. When, however, there is a mismatch between such relationships, that mismatch sometimes results in circumstances where buttons are directly overlaid or when transparent buttons are provided. In either situation, the positionally mismatched buttons must first be identified and then handled appropriately.

[0047] Reference is first made to FIG. **3**A, which illustrates the basic operation of selecting a button within a multi-page menu by dragging a mouse. Consider a situation in which a "Page 0" **304** displays five buttons **306**, **308**, **310**, **312**, **314**, with the third button **310** currently selected. Furthermore, assume that the third button **310** defines the second button **308** as a left neighbor and the fourth button **312** as a right neighbor. With the third button **310** selected, dragging the mouse pointer **315** in either the left or right directions will result in selection of the corresponding neighbor. Therefore, if the mouse pointer **315** is dragged to the right as illustrated in FIG. **3**, the resulting operation may be the presentation of "Page 1" **318**, which now shows the fourth button **312** as being selected. From this page, selection of button three **310** or five **314** may be accomplished either to the left or right, in a similar fashion. Similar operations could likewise be implemented by dragging operations in the up or down directions as well.

[0048] Reference is now made to FIG. **3**B, which depicts one embodiment of the present invention for making a selection within a multi-page menu by dragging the mouse beyond one edge of the page. In one embodiment of the present invention, buttons are not selected until the mouse **302** is dragged in such a way that the mouse pointer **307** is positioned along one of the edges of a give page **303**. This is illustrated in FIG. **3**B where the mouse pointer **307** has been dragged to the right-most edge of the page **303**. At this point, any further dragging of the mouse **302** would result in selections being made in the manner discussed in the preceding paragraph. In this case, buttons to the right of a currently selected button would be selected. If the user wanted to select buttons above the currently selected button, he would simply drag the mouse **302** until the mouse pointer **307** is positioned along the top edge of the page **303**. At this point, any further dragging of the mouse **302** would result in selections being made.

[0049] Reference is now made to FIG. **3**C which depicts another embodiment of the present invention for making a selection within a multi-page menu by dragging the mouse in a circular motion. For certain embodiments of the present invention, the functionality of left and right keys on a remote control may be implemented by dragging the mouse in a circular fashion. By way of example, moving the mouse in a circular motion in the clockwise direction would be comparable to pressing the left key on a remote control. Hence, a left neighboring button would be selected. Likewise, moving the mouse in a circular motion in the counter-clockwise direction would be comparable to pressing the right key on a remote control. By way of example, FIG. **3**C shows the same page from FIG. **3**A where a "Page 0" **304** is presented. "Page 0" **304** displays five buttons **306**, **308**, **310**, **312**, **314**, with the third button **310** currently selected. Furthermore, assume again that the third button **310** defines the second button **308** as a left neighbor and the fourth button **312** as a right neighbor. With the third button **310** selected, dragging the mouse **315** in a counter-clockwise fashion would emulate the right key being pressed on a remote control. Hence, the fourth button **312**, which is the right neighbor of the third button **310**, would be selected as shown in FIG. **3**C.

[0050] In other embodiments of the present invention, the mouse pointer may be hidden from the user's view when any movement is made by the mouse. This avoids confusing the user and avoids any unexpected mouse operations on buttons within the page. In this instance, the user would only see successive buttons being selected (e.g., highlighted) as the mouse is dragged in a particular direction. When the desired button is selected, the user would simply click on one of the mouse buttons to activate the button.

[0051] In yet another embodiment of the present invention, neighboring buttons are selected only when a predetermined number of pixels on the page have been traversed by the mouse pointer. For example, a button adjacent to a currently selected button would be selected when 10 pixels on the page have been traversed by the mouse pointer. Any movement of the mouse less than 10 pixels would result in no selections being made. To select the button after that would require movement of the mouse of at least 20 pixels and so on. In yet another embodiment of the present invention, neighboring buttons are selected only when a predetermined velocity is achieved when dragging the mouse. Therefore, general, slow-moving motion of the mouse would not result in any buttons being inadvertently being selected. Another embodiment of the present invention would require that a pre-determined degree of acceleration must be achieved before selections of neighboring buttons are made.

[0052] Reference is now made to FIGS. **4**A and **4**B, which depicts one embodiment for making a selection by dragging a mouse within a multi-page menu where multiple buttons are overlaid on one another. In one embodiment of the present invention, a drag feature of the mouse is used to address or handle the circumstance where two buttons are physically located at the same x-y coordinates (i.e., overlaid on one another). Such a condition is illustrated in FIGS. **4**A and **4**B, in which two buttons **408**, **410** are overlaid directly on top of each other and visibly present "Audio/Subtitles." In one instance, the "Audio" button **408** is emphasized (FIG. **4**A), while in the other instance the "Subtitles" button **410** is emphasized (FIG. **4**B). In a situation where the "Audio" button **408** is selected, the mouse may be used to select the other button ("Subtitles" **410**) by dragging the mouse to the right. As will be appreciated, the "drag" operation of a mouse may be performed by depressing (but not releasing) the left mouse key, and while holding the left mouse key in its depressed position, moving the mouse to the right. Conversely, if the "Subtitles" button **410** is selected, the "Audio" button **408** may be selected by dragging the mouse to the left. In this regard, the drag operation can be used by a mouse to have the effect of selecting the neighboring button (of a currently selected button), in the direction that the mouse is dragged. In the example just presented, only two buttons existed, with one button having only a right neighbor and the other button having only a left neighbor. As illustrated in FIG. **3** above, the drag feature of the mouse can be used to select among two or more buttons in a similar fashion.

[0053] As stated above, another circumstance requiring special handling of buttons may involve the presence of buttons that are not visible or transparent to the user on a given page. This condition can be readily detected by evaluating a transparency value of a button (or other appropriate parameter) to determine whether the button is visible to the user. Upon identification or detection of transparent buttons, such buttons would be identified as buttons requiring special handling. In connection with the third condition indicated above (buttons that are too small for the user to see), it is appreciated that buttons must be presented with a

certain realistic size in order to be visible or discernable to a user. Therefore, in a circumstance where, for example, a button is detected having a very small dimension (e.g., 2×2 pixels), such a condition would also result in the button being identified as a special button. Generally, these buttons cannot be intentionally selected through conventional use of a mouse (e.g., "click-and-point" action), because they are not visible to a user since they are either too transparent or too small to see.

[0054] In another embodiment of the present invention, a mouse wheel can be used to affect the selection of these special buttons. In this regard, mouse devices are known to include one or two wheels. Referring to FIG. **5**, a mouse has a first wheel **502** that is located between the left and right mouse keys, and a second wheel **504** that is located on the thumb (or left) side of the mouse. The first mouse wheel **502** may be used to implement the up-down arrow keys of a corresponding remote control or computer keyboard **524**, and the second mouse wheel **504** may be used to implement the left-right arrow keys. As an illustration, suppose buttons A, B, C and D **514**, **516**, **518**, **520** are arranged in a vertical fashion as illustrated in FIG. **5**. To select one of the buttons, the first mouse wheel **502** would be rotated. If button A **514** was initially selected, buttons B, C or D could be selected by rotating the first mouse wheel away from the user to emulate use of the up arrow on a remote control. Likewise, if button D **520** was initially selected, buttons C, B, or A **518**, **516**, **514** could be selected by rotating the first mouse wheel toward the user to emulate a down arrow on a remote control.

[0055] The second mouse wheel **504** (i.e., the thumb wheel) may be used to implement left-arrow and right-arrow operations of the remote control. As an illustration, suppose buttons **1**, **2**, **3** and **4** **506**, **508**, **510**, **512** are arranged in a horizontal fashion as illustrated in FIG. **5**. To select one of the buttons, the second mouse wheel **504** would be rotated. If button **3** **510** was initially selected, buttons **1** or **2** **506**, **508** could be selected by rotating the thumb wheel toward the user to emulate use of the left arrow on a remote control. Likewise, to select button **4** **512**, the user would rotate the thumb wheel away from the user to emulate a right arrow on a remote control.

[0056] In some embodiments of the present invention, a single mouse wheel may be used to perform the same functionality as the two mouse wheels discussed above. In this instance, a mouse key (or mouse wheel) may be clicked to toggle between an up/down selection mode and a left/right selection mode. For example, in referring back to FIG. **5**, suppose that a user initially uses a mouse wheel **502** located between the left and right mouse keys to select buttons A, B, C and D **514**, **516**, **518**, **520**, which are arranged in a vertical arrangement. If the user decided that he wanted to select buttons **1**,**2**, **3** and **4** **506**, **508**, **510**, **512**, which are arranged in a horizontal fashion, he would simply click on a mouse key (or simply click the mouse wheel itself) to toggle to a new mode. Now, rotating the wheel would allow the user to make selections in a left/right manner. This is achieved using a single mouse wheel.

[0057] As an example of selecting transparent buttons, FIG. **6** illustrates a scene selection page to a user. In this page, five selectable buttons **612**, **614**, **616**,**618**, **620** are visibly presented to the user. The buttons **602**, **604**, **606**, **608** presented across the top, in this example, are disabled and therefore not selectable by the user. The visibly selectable buttons **612**, **614**, **616**, **618**,**620** include images from different scenes of the video. The user may select each of these buttons in sequence by using the left-arrow or right-arrow keys on a remote control. The user could likewise use a mouse to select each of these buttons by rotating the thumb wheel **504** (FIG. **5**) or dragging the mouse (see FIG. **3**).

[0058] In addition, a feature may be provided, whereby a user may, for example, by depressing the up-arrow or down-arrow keys of a remote control device skip forward or backward five images at a time. While visible buttons **610***a*, **610***b* may be displayed to reflect this option to the user, transparent buttons **622**, **624** (which perform the same action of skipping forward/backward five images) may be provided in some potentially obscure location of the page such that the user is totally unaware of their presence. Furthermore, such transparent buttons may be very small in size. Therefore, using the conventional "point-and-click" feature of the mouse would not be sufficient since the user cannot see the buttons.

[0059] One key aspect of embodiments of the present invention is the fact that users can select these transparent (i.e., "special") buttons without knowing the precise location of the buttons. As discussed in FIG. **5**, one embodiment of the present invention would involve the use of one or two mouse wheels to select buttons. In the current example (FIG. **6**), each visibly selectable button **612**, **614**, **616**, **618**, **620** presented on the page could have transparent button **622** associated as its neighbor in the up direction, and transparent button **624** associated as its neighbor in the down direction. Therefore, no matter which visibly-selectable button is selected, rotating the first mouse wheel **502** away from the user results in immediate activation of transparent button **402** (similar to pressing the up-arrow key of a remote control), which results in a new page being presented to the user showing the next five selectable scene image buttons.

[0060] In yet another embodiment of the present invention, a context menu may be invoked by clicking the right mouse key when the mouse is positioned over a particular button so as to select that corresponding button. Depressing the right mouse key to invoke the context menu could result in, for example, a graphical display being presented. The context menu may, for example, be a graphical menu displaying arrows that illustrate directions in which the mouse may be used to effectively emulate the corresponding arrow keys of a remote control.

[0061] Referring to FIG. **7**, when a button **706** is selected, if that button **706** has defined neighboring buttons, then the activation of the right click on the mouse will result in arrows **714** being presented that allow the mouse to effectively implement the arrow operations in the directions of the two neighboring buttons. In some embodiments of the present invention, the arrows **714** are displayed only if the mouse is positioned somewhere over the button **706**. In other embodiments of the present invention, the arrows **714** are displayed over the button that is currently selected (e.g., highlighted) regardless of where the mouse is currently positioned within the page. These graphical arrows displayed over the button **706** function as a "virtual keyboard" which the user uses to navigate to other buttons on the page.

[0062] In FIG. **7**, "Scene 3" **706** has two neighboring buttons: "Scene 2" **704** and "Scene 5" **710**. Activation or implementation of these arrow keys similar to those on a remote control could be implemented by, for example, moving the mouse over the arrow key desired and pressing the left mouse button (i.e., left-clicking the mouse over the

arrow desired). In the example illustrated in FIG. **7**, moving the mouse over the down-pointing arrow **714***a* and left-clicking on that arrow causes the button of "Scene 5" **710** to be selected.

[0063] Yet another embodiment may be implemented similar to the embodiment described above. In this embodiment, when a page is displayed, the system analyzes every button on the page and determines which buttons require special operations (i.e., buttons with neighboring buttons, such that dragging of the mouse or rotation of the mouse wheels result in selection of a defined neighboring button). This embodiment may be implemented using a graphical overlay in connection with each button having a defined neighboring button. It should be appreciated that these graphic overlays are not part of the content of the video disc, but are rather dynamically drawn by the application (being executed on the computer) that enables the viewing of the video disc.

[0064] In one implementation, all such special graphics could be displayed when the page is first displayed for a given period of time, or as soon as a new page is displayed. Reference is now made to FIG. **8**A, which depicts top level functional operation of a method for generating a context menu as soon as a new page is displayed. In block **802**, every button in a page is analyzed as soon as a new page is displayed. In step **804**, if the button has neighbors that are special buttons (e.g., neighboring buttons that are transparent, too small, etc.), then a context menu is generated. In this case, graphical arrows are overlaid on top of the block as seen in step **806**. If the button is not a special button, then no display is required (step **808**).

[0065] In another implementation, special graphics are displayed only when the mouse is positioned over a particular button. The overlying application can detect the alignment of the mouse pointed with a corresponding button and at that time cause the graphic overlay to be presented showing, for example, arrows in the directions of legitimate neighboring buttons. The corresponding arrow key operation (if depressed from a remote control) can be implemented by using the mouse by aligning the mouse pointer with the corresponding arrow and, for example, left clicking on that graphic arrow overlay. FIG. **8**B depicts top level functional operation of a method for generating a context menu for a particular button only when the mouse is positioned over the button. In block **812**, a button is analyzed only if the mouse is positioned over the button. In step **814**, if the button has neighbors that are special buttons (e.g., neighboring buttons that are transparent, too small, etc.), then a context menu is generated. In this case, graphical arrows may be overlaid on top of the block as seen in step **816**. If the button is not a special button, then no display is required (step **818**).

[0066] It should be emphasized that the above-described embodiments are merely examples of possible implementations. Many variations and modifications may be made to the above-described embodiments without departing from the principles of the present disclosure. All such modifications and variations are intended to be included herein within the scope of this disclosure and protected by the following claims.

At least the following is claimed:

1. A method for selecting between a plurality of buttons in a page within a video playback system comprising the steps of:

identifying all selectable buttons within the page;

depressing a key on a mouse device while the mouse is positioned over a first button currently selected;

dragging the mouse device in the direction of a second button to be selected while depressing the key; and

releasing the key on the mouse device once the mouse device is positioned over the second button to select the second button.

2. The method of claim **1**, wherein some of the selectable buttons are overlaid on top of each other.

3. The method of claim **1**, wherein releasing the key on the mouse selects and activates the button.

4. The method of claim **1**, further comprising the step of clicking the key on the mouse to activate the second button.

5. A method for selecting between a plurality of buttons in a page within a video playback system comprising the steps of:

identifying all selectable buttons within the page;

visibly distinguishing a first button in a selected state among the selectable buttons;

dragging a mouse device in the direction of a second button to be selected; and

ceasing movement of the mouse device when the second button is selected.

6. The method of claim **5**, wherein dragging the mouse results in other buttons located within the page between the first button and the second button being selected.

7. The method of claim **6**, wherein a new button is selected only when a pre-determined number of pixels within the page have been traversed by dragging the mouse device.

8. The method of claim **6**, wherein a new button is selected only when the mouse device is dragged in an accelerated fashion.

9. The method of claim **6**, wherein a new button is selected only when the mouse device is dragged beyond an edge within the page.

10. The method of claim **5**, further comprising the step of activating the second button by depressing a key on the mouse device.

11. The method of claim **5**, wherein the step of dragging the mouse device further comprises:

hiding a mouse pointer that is associated with the mouse device and that is normally displayed on the page.

12. A method for selecting between a plurality of buttons in a page within a video playback system comprising the steps of:

identifying all selectable buttons within the page;

visibly distinguishing a first button in a selected state among the selectable buttons;

rotating a wheel on the mouse device to select a second button in a direction that is correlated to the position of a second button with respect to the first button; and

ceasing rotation of the wheel when the second button is selected.

13. The method of claim **12**, wherein the second button is aligned along a common axis with the first button.

14. The method of claim **12**, further comprising the step of rolling a second wheel on the mouse to select buttons that are orthogonal to the axis on which the first button and second button are aligned.

15. The method of claim **14**, wherein rolling the first wheel results in selecting buttons in a left and right fashion and rolling the second wheel results in selecting buttons in an up and down fashion.

16. The method of claim **12**, wherein depressing a mouse button results in buttons being selected in a means that is orthogonal with respect to a means in which the buttons were selected prior to depressing the mouse button.

17. The method of claim **12**, wherein some of the buttons in the page are not visible to the user.

18. The method of claim **12**, wherein some of the buttons in the page are smaller than a pre-defined size.

19. The method of claim **12**, further comprising the step of clicking a key on the mouse device to activate the button selected.

20. A method for selecting between a plurality of buttons in a page within a video playback system comprising the steps of:

identifying all selectable buttons within the page;

positioning a mouse device over one of the selectable buttons; and

displaying a context menu upon depressing a key on the mouse device, the context menu presenting the user with possible actions that can be performed in relation to the button.

21. The method of claim **20**, wherein displaying the context menu upon depressing a key on the mouse device occurs when the mouse device is positioned over one of the selectable buttons.

22. The method of claim **20**, wherein the context menu is comprised of a graphical display.

23. The method of claim **22**, wherein the graphical display is comprised of arrows which allow the user to select neighboring buttons by clicking on the arrows.

24. The method of claim **22**, wherein the context menu is comprised of a pop-up menu presenting a list of actions that can be executed in relation to the button.

25. A method for selecting between a plurality of buttons in a page within a video playback system comprising the steps of:

identifying all selectable buttons within the page;

determining the properties for each selectable button within the page;

overlaying a graphic display over each selectable button, the graphic display presenting to the user all available actions that can be performed in relation to the button based on the properties of the button.

26. The method of claim **25**, wherein the graphic display is comprised of arrows that allow the user to select neighboring buttons.

27. The method of claim **25**, wherein the step of overlaying the graphic display is performed only after the page has been displayed for a pre-defined period of time.

28. The method of claim **25**, wherein the step of overlaying the graphic display is performed immediately after a page is displayed.

29. The method of claim **25**, wherein the step of overlaying the graphic display is performed only when a mouse device is positioned over a particular button.

30. A method for selecting between a plurality of buttons in a page within a video playback system comprising the steps of:

identifying all selectable buttons within the page;

visibly distinguishing a first button in a selected state among the selectable buttons; and

dragging a mouse device in a circular fashion in the clockwise direction to select a neighboring button on one side of the first button.

31. The method of claim **30**, wherein dragging the mouse device in a circular fashion in the counter-clockwise direction results in the selection of a neighboring button on the opposite side of the first button.

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