

touch screen. Typically, when at least one of the fingers is positioned over the image on the GUI object, the GUI object will be associated with or locked to the fingers. As a result, when the fingers are rotated, the rotate signal can be used to rotate the object in the direction of finger rotation (e.g., clockwise, counterclockwise). In most cases, the amount of object rotation varies according to the amount of finger rotation, i.e., if the fingers move 5 degrees then so will the object. Furthermore, the rotation typically can occur substantially simultaneously with the motion of the fingers. For instance, as the fingers rotate, the object rotates with the fingers at the same time.

[0110] FIGS. 15A-15C illustrate a rotating sequence based on the method described above. Using the map of FIG. 11, FIG. 15A illustrates a user positioning their fingers 366 over the map 364. Upon set down, the fingers 366 are locked to the map 364. As shown in FIG. 15B, when the fingers 366 are rotated in a clockwise direction, the entire map 364 is rotated in the clockwise direction in accordance with the rotating fingers 366. As shown in FIG. 15C, when the fingers 366 are rotated in a counterclockwise direction, the entire map 364 is rotated in the counterclockwise direction in accordance with the rotating fingers 366.

[0111] It should be noted that the methods described in FIGS. 10-15 can be implemented during the same gestural stroke. That is, zooming, rotating and panning can all be performed during the gestural stroke, which may include spreading, rotating and sliding fingers. For example, upon set down with at least two fingers, the displayed object (map) is associated or locked to the two fingers. In order to zoom, the user can spread or close their fingers. In order to rotate, the user can rotate their fingers. In order to pan, the user can slide their fingers. Each of these actions can occur simultaneously in a continuous motion. For example, the user can spread and close their fingers while rotating and sliding them across the touch screen. Alternatively, the user can segment each of these motions without having to reset the gestural stroke. For example, the user can first spread their fingers, then rotate their fingers, then close their fingers, then slide their fingers and so on.

[0112] FIG. 16 is a diagram of a GUI operational method 500, in accordance with one embodiment of the present invention. The GUI operational method 500 is configured for initiating floating controls in a GUI. The GUI operational method 500 generally begins at block 502 where the presence of an object such as a finger or thumb is detected. This may for example be accomplished using a touch screen. Following block 502, the GUI operational method 500 proceeds to block 504 where the object is recognized (the identity of the object is found). The object may be recognized among a plurality of objects. For example, see block 104 of FIG. 2 above.

[0113] Following block 504, the GUI operational method 500 proceeds to block 506 where an image in the vicinity of the object is generated. The image is typically based on the recognized object. The image may include windows, fields, dialog boxes, menus, icons, buttons, cursors, scroll bars, etc. In some cases, the user can select and activate the image (or features embedded therein) in order to initiate functions and tasks. By way of example, the image may be a user interface element or a group of user interface elements (e.g., one or more buttons that open, close, minimize, or maximize a window). The image may also be one or more icons that launch a particular program or files that open when selected. The image may additionally correspond to non interactive text and

graphics. In most cases, the image is displayed as long as the object is detected or it may be displayed for some preset amount of time, i.e., after a period of time it times out and is removed.

[0114] In one particular embodiment, the image includes one or more control options that can be selected by the user. The control options may include one or more control buttons for implementing various tasks. For example, the control option box may include music listening control buttons as for example, play, pause, seek and menu.

[0115] FIGS. 17A-17E illustrate a floating control sequence using the method described above. As shown in FIG. 17A, a user 510 is using a tablet PC 512 and therefore is holding the tablet PC 512 with one hand 514 while navigating (e.g., tracking, gesturing) with the other hand 516. As shown in FIG. 17B, which is a close up of the user holding the tablet PC 512, a portion of the thumb of the holding hand 514 is positioned over the touch screen 520. As shown in FIG. 17C, the tablet PC 512 recognizes the thumb and displays a control box 522 adjacent the thumb. The control box 522 includes various buttons 524, which can be selected by the user's thumb to initiate tasks in the tablet PC 512. As shown in FIG. 17D, while holding the tablet PC 512, the thumb is extended over one of the buttons 524 and subsequently tapped thereby selecting the task associated with the button 524. By way of example, the task may be associated with launching a program or gaining access to a network or changing the mode of operation of the device. The control box 522 and buttons 524 may be used to change the input mode of the touch screen 520 so that, for example, the identical gesture made with the fingers of the user's other hand may have multiple meanings depending on which of buttons 524 is selected. As shown in FIG. 17E, when the thumb is moved away from the touch screen 520, the control box 522 may time out and disappear. Alternatively, the control box may be closed using conventional close icons or buttons.

[0116] FIG. 18 is a diagram of a GUI operational method 550, in accordance with one embodiment of the present invention. The GUI operational method 550 is configured for initiating zooming targets. The GUI operational method 550 generally begins at block 552 where a control box GUI element is displayed. The control box contains one or more control buttons, which are somewhat close together, and which can be used to perform actions. The control box may, for example, include control buttons such as maximize, minimize, close, and the like. Following block 552, the GUI operational method 550 proceeds to block 554 where the control box is enlarged, or at least one of the control buttons is enlarged for a period of time when the presence of an object over the control box or one of the control buttons is detected. In the case where the control box is enlarged each of the control buttons is enlarged thereby making selection thereof much easier. In the case where only the control button is enlarged, the user would decide whether this is the correct button and if so select the enlarged control button, or restart the process so that the appropriate control button is presented. In most cases, the size of the control buttons corresponds to the size of the finger so that they may be easily selected by the object. Following block 554, the GUI operational method 550 proceeds to block 556 where a control signal associated with the selected control button is generated when the presence of the object over one of the enlarged control buttons is detected.

[0117] FIGS. 19A-19D illustrate a zooming target sequence using the GUI operational method 550 described