

possible gestures corresponding to the detected contacts, and the user can then select a gesture from the list. In still other embodiments, the particular gesture of interest can be selected as described below.

[0027] FIG. 2 illustrates an exemplary popup panel 200 that can appear automatically when finger touchdowns are detected followed by a freeze or pause in motion according to embodiments of the invention. At the center is the detected finger touches 202, with a bubble 204 formed around the finger touches. Surrounding bubble 204 are other bubbles 206, 208, 210 and 212 indicating possible gestures that start with the detected finger touches. Each bubble 206, 208, 210 and 212 can provide an indication (e.g. text or graphic) of a gesture that could be performed using the detected finger touches. If the user moves his fingers from location (A) to (B) so that bubble 204 follows the contacts and pushes against bubble 212, for example, that bubble can light up or provide some other indication that it has been selected. When the user stops touching the touch sensor panel, a gesture movie associated with bubble 212 can start playing as described above. Although FIG. 2 illustrates bubbles, it should be understood that other shapes or user interface arrangements capable of allowing users to slide their fingers to different areas to select a particular gesture can be employed.

[0028] FIG. 3a illustrates an exemplary virtual gesture movie control ring 300 according to embodiments of the invention. In the example of FIG. 3a, virtual gesture movie control ring 300 appears around contact points 302 when a finger touchdown is detected. On the perimeter of virtual gesture movie control ring 300 can be gesture movie activation ring 304 and a gesture ring 306, the gesture movie activation ring having an “open” end and a “close” end. By rotating the user’s fingers until either the open end or the close end of ring 304 touches ring 306, a gesture movie associated with the gesture ring 306 can either be made to appear or disappear. Thus, at any point in time, a user can touch fingers down on a certain area of a touch sensor panel and call up a gesture movie associated with the particular finger touches.

[0029] FIG. 3b illustrates another exemplary virtual gesture movie control ring 300 according to embodiments of the invention. In the example of FIG. 3b, the perimeter of virtual gesture movie control ring 300 may contain different areas 308, one area for each possible gesture that may be performed from the detected starting position. A user can rotate the contact points and move pointer 310 until a particular gesture is selected for display. Thus, FIG. 3b is an alternative to FIG. 2 in that it allows for selection of a particular gesture by rotation rather than sliding.

[0030] FIG. 4 illustrates an exemplary touch screen showing gesture movies according to embodiments of the invention. For touch screens such as those on handheld devices, there may not be the luxury of having separate boxes for a list of gestures, the gesture itself, and an object being manipulated by the gesture. Therefore, in the example of FIG. 4, a list box 402 of gestures can first appear on the touch screen at 420. After the user has selected a gesture from the list, the list box 402 can be replaced with a gesture movie at 422. Because important user interface (UI) features of object 414 may be displayed under the gesture being performed, instead of a movie showing an opaque hand, a semi-transparent hand 410 can appear over the touch screen, with the object 414 being manipulated appearing under the hand.

[0031] FIG. 5 illustrates exemplary computing system 500 that can include one or more of the embodiments of the

invention described above. Computing system 500 can include one or more panel processors 502 and peripherals 504, and panel subsystem 506. Peripherals 504 can include, but are not limited to, random access memory (RAM) or other types of memory or storage, watchdog timers and the like. Panel subsystem 506 can include, but is not limited to, one or more sense channels 508, channel scan logic 510 and driver logic 514. Channel scan logic 510 can access RAM 512, autonomously read data from the sense channels and provide control for the sense channels. In addition, channel scan logic 510 can control driver logic 514 to generate stimulation signals 516 at various frequencies and phases that can be selectively applied to drive lines of touch sensor panel 524 at a voltage established by charge pump 515. In some embodiments, panel subsystem 506, panel processor 502 and peripherals 504 can be integrated into a single application specific integrated circuit (ASIC).

[0032] Touch sensor panel 524 can include a capacitive sensing medium having a plurality of drive lines and a plurality of sense lines, although other sensing media can also be used. Each intersection, adjacency or near-adjacency of drive and sense lines can represent a capacitive sensing node and can be viewed as picture element (pixel) 526, which can be particularly useful when touch sensor panel 524 is viewed as capturing an “image” of touch. (In other words, after panel subsystem 506 has determined whether a touch event has been detected at each touch sensor in the touch sensor panel, the pattern of touch sensors in the multi-touch panel at which a touch event occurred can be viewed as an “image” of touch (e.g. a pattern of fingers touching the panel).) Each sense line of touch sensor panel 524 can drive sense channel 508 (also referred to herein as an event detection and demodulation circuit) in panel subsystem 506.

[0033] Computing system 500 can also include host processor 528 for receiving outputs from panel processor 502 and performing actions based on the outputs that can include, but are not limited to, moving an object such as a cursor or pointer, scrolling or panning, adjusting control settings, opening a file or document, viewing a menu, making a selection, executing instructions, operating a peripheral device coupled to the host device, answering a telephone call, placing a telephone call, terminating a telephone call, changing the volume or audio settings, storing information related to telephone communications such as addresses, frequently dialed numbers, received calls, missed calls, logging onto a computer or a computer network, permitting authorized individuals access to restricted areas of the computer or computer network, loading a user profile associated with a user’s preferred arrangement of the computer desktop, permitting access to web content, launching a particular program, encrypting or decoding a message, and/or the like. Host processor 528 can also perform additional functions that may not be related to panel processing, and can be coupled to program storage 532 and display device 530 such as an LCD display for providing a UI to a user of the device. Display device 530 together with touch sensor panel 524, when located partially or entirely under the touch sensor panel, or partially or entirely integrated with the touch sensor panel, can form touch screen 518.

[0034] Note that one or more of the functions described above can be performed by firmware stored in memory (e.g. one of the peripherals 504 in FIG. 5) and executed by panel processor 502, or stored in program storage 532 and executed by host processor 528. The firmware can also be stored and/or