

on a “top” side and has a plurality of conductive sense paths 744 on the “bottom” side. The dielectric spring layer 750 has alternating, or spatially offset, raised structures 752 on both sides of the layer 750. The base layer 760 has a plurality of conductive drive paths 762. The drive paths 742 on the substrate 742 are laid down in a first direction to form rows as are the drive paths 762 on the base layer 760. The sense paths 744 on the bottom side of the substrate 740 are laid down in a second direction to form columns.

[0100] To sense location, the device 700 uses many of the same techniques discussed above with reference to the capacitive sensor array of FIG. 5. During operation, for example, data acquisition circuitry (not shown) of the device 700 drives the plurality of drive paths 742 (one at a time) during a first time period. During this same time period, the sense paths 744 on the other side of the substrate 740 are interrogated to obtain data representing the location of one or more touches to the cosmetic layer 730. For example, a user’s finger placed in proximity to various rows and columns of the drive paths 742 and sense paths 744 on the top and bottom of the substrate 740 alters their capacitive relationship when processed by the data acquisition circuitry.

[0101] To sense force, circuitry of the device 700 drives the drive paths 762 on the base layer 760 (one at a time) during a second time period. During this same time, the sense paths 744 on the bottom side of the substrate 740 are again interrogated to obtain data representing the strength or intensity of force applied to cosmetic layer 730 by a user’s touch. For example, when a force is applied by a user’s finger on the cosmetic layer 730, the spring layer 750 deforms moving the sense paths 744 on the bottom of the substrate 740 closer to the drive paths 762 on the top of the base layer 760. A resulting change in mutual capacitance is then used to generate data indicative of the strength or intensity of an applied force. Additional details related to the layers and other aspects of this embodiment are disclosed in incorporated U.S. patent application Ser. No. 11/278,080.

[0102] Using force and location detection, the bezel 720 of the present embodiment can provide additional user interface and controls. For example, a user’s finger in FIG. 7 is shown touching an area 721 of the bezel 720 designated for a “page down” operation (as indicated by the adjacent visual guide 780). The electronic device 700 uses the sensed location on the bezel 720 to determine which control is invoked by the user’s touch. In addition, the force applied by the user’s touch is obtained using the force detection features of the bezel 700. The sensed force can be used to determine the desired speed or extent with which to perform the “page down” operations, for example.

[0103] Given all of the previous discussion of the present disclosure, we now turn to an embodiment of an electronic device that incorporates one or more of the aspects and features discussed above. In FIGS. 15 through 19, an embodiment of a multimedia device 800 having a housing 802, a display 810, a touch sensitive bezel 820, and a user interface 900 according to certain teachings of the present disclosure is illustrated in a number of stages of operation and use. The multimedia device 800 in FIGS. 15 through 19 is meant to be exemplary. It will be appreciated that the user interface 900, available features and functions, user controls, screens, designations of the bezel 820, and various other details provided in the discussion that follows may be altered depending on the implementation and desired results.

[0104] In FIG. 15, a menu screen of the user interface 900 is displayed and lists various functions or features 902 (e.g.,

Music, Photos, Videos, etc.) that are available on the device 800. An area 822 of the bezel 820 adjacent a battery symbol 906 can be touched at any point during operation to access power settings for the device 800 without the user having to access the settings function 902 on the menu screen 900. A plurality of areas 824 on one side of the bezel 820 are designated for selection of one of the available functions or features 902, and visual guides 904 are provided on the perimeter of the bezel 820 adjacent the designated areas 824. A user touching one of these areas 824 of the bezel 820 accesses a subsequent screen of the user interface 900 for the selected function or feature 902. It should be noted that the side of the housing 802 may include a touch sensitive pad (similar to pads 560 of FIG. 11) on a side of the housing 802, and areas (e.g., areas 562 of FIG. 11) of this side pad can be similarly designated.

[0105] In FIG. 16, the user has accessed the photo feature from the previous menu so that the display 810 shows a photo screen 910 listing various available photos 912. An area 826 on the left side of the bezel 820 is designated for scrolling up and down the list of photos 912, and a visual scroll guide 916 is provided at the perimeter of the display 810 adjacent the area 826. A plurality of areas 828 on the right side of the bezel 820 are designated for selecting to open a selected photo 912, and visual guides 914 for each photo 912 are provided adjacent these areas 828. An area 830 in the upper corner adjacent a close window icon 914 on the screen 910 is designated on the bezel 820 for closing the current screen 910 to return to the menu screen of FIG. 15.

[0106] In FIG. 17A, the display 810 shows a screen 920 having a selected photo (e.g., sunrise). A toggle area 831 of the bezel 830 in the lower right corner is designated to access and display additional user controls that are discussed below with reference to FIG. 17C. A visual guide 921 is provided on the display 810 adjacent this toggle area 831. A first area 832 on the bezel 820 is designated for moving to a previous photo of those available, and a second area 834 is designated for moving to a subsequent photo. Corresponding visual guides 922 are displayed adjacent these areas 832 and 834 on the bezel 820. Additional areas 836 and 838 on adjacent sides of the bezel 820 may be designated for any of a number of operations, such as zoom, contrast, brightness, page down, scroll, etc. In the present embodiment, visual guides are not shown adjacent these areas 836 and 838 so that the majority of the display 810 is unobstructed with elements of the user interface, and the screen 920 can primarily display the content (i.e., the sunrise photo). The user controls for which these areas 836 and 838 are designated may be already known or readily apparent to the user.

[0107] As shown in FIG. 17A, the device 800 is rectangular and is shown in a vertical (i.e., “portrait”) orientation. The user may rotate the device 800 so that it has a horizontal (i.e., “landscape”) orientation, such as shown in FIG. 17B. As discussed previously, the device 800 can have an orientation sensor (not shown), such as an accelerometer or an inclinometer, and can determine the orientation of the device 800. In FIG. 17B, the device 800 has determined the horizontal or landscape orientation. Based on this determination, the device 800 has adjusted the orientation of the screen 920 showing the photo on the display 810 in a landscape orientation and has readjusted the location of all the areas on the bezel 820 designated for the various user controls.

[0108] If the user selects the toggle area 831 in the lower right corner, the screen 920 shows additional user controls.