

[0090] FIGS. 29-30 illustrate one example of the control logic 200 controlling tactile and visual characteristics of the tactile morphing display 2604. FIG. 29 is an exemplary front view the non-keypad display 2618 displaying contents of a webpage. The contents include a selectable element 2800 (e.g., hyperlink) and non-selectable elements 2802 (e.g., text). The control logic 200 controls the non-keypad display 2618 to adjust visual characteristics of the selectable element 2800 with respect to the non-selectable elements 2802. In this example, the selectable element 2800 is bolded and underlined, however any suitable visual characteristic can be adjusted.

[0091] FIG. 30 is an exemplary side view of the tactile morphing display 2604 displaying contents of the webpage. The contents include the selectable element 2800 and the non-selectable elements 2802. The control logic 200 controls the controllable skin texture surface to protrude (i.e., raise) at a location corresponding to the selectable element 2800 to provide a protruding selectable element 2804. In this manner, the protruding selectable element 2804 moves closer in proximity to a user input 2806 such as a finger, a stylus, and/or any other suitable user input. Moving the protruding selectable element 2804 closer in proximity to the user input 2806 aids a user in selecting and/or activating the selectable element 2800 displayed on the non-keypad display 2618.

[0092] When the user input 2806 selects the protruding selectable element 2804, the control logic 200 provides the audible feedback 2624, which can, in some embodiments, verbally describe the selectable element 2800. When the user input 2806 activates the protruding selectable element 2804, the control logic 200 retrieves additional display information 2610 (e.g., another webpage) based on the selectable element 2800, which is displayed on the non-keypad display 2618.

[0093] FIGS. 31-32 illustrate another example of the control logic 200 controlling tactile and visual characteristics of the tactile morphing display 2604. FIG. 31 is an exemplary front view the non-keypad display 2618 displaying contents of a workspace. The contents include selectable elements 2900 (e.g., file folders) and can include non-selectable elements (not shown) such as text. The control logic 200 can control the non-keypad display 2618 to adjust visual characteristics of the selectable elements 2900. In this example, a color of the selectable elements 2900 are visually adjusted, however any suitable visual characteristic can be adjusted.

[0094] FIG. 32 is an exemplary side view of the tactile morphing display 2604 displaying contents of the workspace. The contents include the selectable elements 2900 and can include non-selectable elements (not shown) such as text or other suitable non-selectable elements. The control logic 200 controls the controllable skin texture surface to protrude (i.e., raise) at locations corresponding to the selectable elements 2900 to provide protruding selectable elements 2902. In this manner, the protruding selectable elements 2902 move closer in proximity to the user input 2806, which aids the user in selecting and/or activating the selectable element displayed on the non-keypad display 2618.

[0095] When the user input 2806 selects each of the protruding selectable elements 2902, the control logic 200 provides the audible feedback 2624, which can, in some embodiments, verbally describe each of the selectable elements 2900. When the user input 2806 activates one of the protruding selectable elements 2902, the control logic 200 retrieves additional display information 2614 (e.g., contents of the file

folder) based on the selectable element 2900, which is displayed on the non-keypad display 2618.

[0096] Referring now to FIG. 33, exemplary steps that can be taken to control the tactile morphing display 2604 are generally identified at 3000. The process starts in step 3002 when the device 2600 is powered on. In step 3004, the non-keypad display 2618 displays non-keypad information representing at least one selectable element that represents a location of additional display information. In step 3006, the control module 2600 controls at least a portion of the controllable skin texture surface 2616 to protrude at a location corresponding to the selectable element to provide a protruding selectable element. The process ends in step 3008.

[0097] Referring now to FIG. 34, additional exemplary steps that can be taken to control the tactile morphing display 2604 are generally identified at 3100. The process starts in step 3102 when the device 2600 is powered on. In step 3104, the control logic 200 receives non-keypad display information 2610, 2614 from the network interface 2606 and/or memory 2608. In step 3106, control logic 200 controls the non-keypad display 2618 to display the non-keypad information 2610, 2614 including at least one selectable element that represents a location of additional display information. In step 3108, the control logic 200 controls a portion of the controllable skin texture surface 2616 to protrude (i.e., raise) at a location corresponding to the selectable element to provide a protruding selectable element. In step 3110, the sensor 2602 senses whether the user input 2806 has activated the protruding selectable element. If the sensor 2602 senses that the user input 2806 has activated the protruding selectable element, the non-keypad display 2618 displays the additional information based on the location represented by the selectable element in response thereto in step 3112. The process ends in step 3114.

[0098] If however, the sensor 2602 does not sense that the user input 2806 has activated the protruding selectable element in step 3110, the sensor 2602 senses whether the user input 2806 has selected the protruding selectable element in step 3116. If the user input 2806 has not selected the protruding selectable element, the process returns to step 3110. However, if the sensor 2602 does sense that the user input 2806 has selected the protruding selectable element, the control logic 200 provides the audible feedback 2624 in response thereto in step 3118. The process ends in step 3114.

[0099] Among other advantages, a portable electronic device includes a tactile morphing display to move a selectable element closer in proximity to a user input such as a finger or stylus, which aids a user in selecting and/or activating the selectable element. In addition, the portable electronic device provides audible feedback that can verbally describe the selectable elements, which can aid the user in selecting the selectable elements. Furthermore, visual characteristics of the selectable elements are adjusted with respect to non-selectable elements to aid the user in selecting and/or activating selectable elements more efficiently. Other advantages will be recognized by those of ordinary skill in the art.

[0100] The above detailed description of the invention, and the examples described therein, has been presented for the purposes of illustration and description. While the principles of the invention have been described above in connection with a specific device, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention.