

portions 404. The transition region 408 produces a slope or roll off at the edge of the plateau region 406. In fact, the transition region 408 may be a gradient of magnification between the remaining portions 404 and the plateau region 406. By way of example, when the plateau region 406 is magnified 3 times that of the target area 410, the magnification of the transition region 408 may slope from a magnification of 1 proximate the remaining portions 404 to a magnification of 3 proximate the plateau region 406. The size and slope of the transition region 408 may be widely varied. The size and slope may depend on the amount of virtual distortion that is desired or allowed. As should be appreciated, the greater the slope the greater the virtual distortion.

[0074] FIG. 11 is an expansion method 500, in accordance with one embodiment of the present invention. The method 500 may for example correspond to any of the expansion steps mentioned herein. The method 500 includes block 502, 504 and 506. In block 502, the target area is enlarged. For example, the target area may be enlarged from a 3 mm×6 mm area to an area of about 6 mm×12 mm. In block 504, the target area is magnified. For example, the target area may be magnified 3× its normal state. In block 506, the outer edges of the target area are compressed to provide a smooth transition between the target area and the areas that are not targeted. The compressed area may include varying the magnification level between the enlarged target area and the non target areas that immediately surround the targeted area. The compressed area may be compressed in a topographical manner with each level representing a different magnification.

[0075] FIGS. 12A-12N illustrate an exemplary sequence using some of the techniques described above. This particular sequence shows for example expansion of a localized area as a finger is moved across the touchscreen of touchscreen display. As shown in FIG. 12A, a display portion of a touchscreen display 510 presents a GUI 512 to a user. As shown in FIG. 12B, the user places their finger 514 on the touchscreen portion of the touchscreen display 510 and over an area of the GUI 512. As shown in FIG. 12C, after the finger 514 dwells for some time over the GUI 512, a localized area 516 of the GUI 512 is expanded. In this particular illustration, the localized area 516 includes a plateau region and a transition region that is located between the plateau region and the remaining portions of the GUI. The targeted area in proximity to the finger is presented in an enlarged and magnified state within the plateau region while the remaining portions are not. Furthermore, the transition region compresses the graphical information between the plateau and the remaining portions. The compressing causes the plateau to appear raised relative to the remaining portions. The transition region generally provides gradient of magnification between the remaining portions and the plateau such that the information contained therein looks somewhat distorted or stretched.

[0076] As shown in FIG. 12D, as the finger 514 maintains contact and is moved to the right, the localized expanded area 516 moves with the finger 514. A different portion of the GUI 512 is therefore expanded. In this particular case, the edge of a window 520 comes into the center of the plate and a button is disposed partially in the plateau and partially in the transition region. In the illustrated sequence, the portions in the plateau are magnified at a constant level and the

portions in the transition region are magnified in a descending manner. As shown in FIG. 12E, as the finger 514 continues to move, the first button is positioned within the center of the plateau and a second button is disposed partially in the plateau region and partially in the transition region. As shown in FIG. 12F, as the finger 514 continues to move, the second button is positioned within the center of the plateau and a first and third buttons are disposed partially in the plateau region and partially in the transition region. As shown in FIG. 12G, as the finger 514 continues to move, the third button is positioned within the center of the plateau and the second button is disposed partially in the plateau region and partially in the transition region. As shown in FIG. 12H, as the finger 514 continues to move, the third button is disposed partially in the plateau region and partially in the transition region. It should be noted at this time that if the user had decided to select any of the buttons, they could have done so when the button was located within the plateau region. This may have been accomplished with increased touch pressure or by tapping the button.

[0077] As shown in FIG. 12I, as the finger 514 moves away from the buttons, it moves over an inside edge of the window 520 thereby causing the inside edge to be expanded. As shown in FIG. 12J, as the finger moves along the window 520, the window title comes into view. Similar to the buttons, the portions of the title in the plateau are fully enlarged and magnified while the portions in the transition region are distorted. As shown in FIGS. 12K and 12L, this effect is continues as the finger 514 moves across the title.

[0078] As shown in FIG. 12M, the finger 514 is moved from the title to a link positioned within the window 520. Similar to the buttons and title, the portions of the link in the plateau are fully enlarged and magnified while the portions in the transition region are distorted and further the portions outside the expansion are of normal size and magnification. As shown in FIG. 12N, the user exerts a greater pressure on the touchscreen while the link is in its expanded form. This increased pressure is recognized as a touch event, and the element associated with link is launched or opened (although not shown).

[0079] FIGS. 13A-13D illustrate an exemplary sequence using some of the techniques described above. This particular sequence shows for example expansion of different objects as a finger is moved across the touchscreen of touchscreen display. As shown in FIG. 13A, a display portion of a touchscreen display 510 presents a GUI 512 to a user. As shown in FIG. 13B, the user places their finger 514 on the touchscreen portion of the touchscreen display 510 and over an area of the GUI 512. In this particular case, the finger 514 is placed over the heading portion of the window 520. As shown in FIG. 13C, after the finger 514 dwells for some time over the heading, the heading is expanded. In this illustration, the heading is presented in an enlarged and magnified state while the remaining portions are not. As shown in FIG. 13D, when the finger 514 maintains contact with the touchscreen and is moved over a different GUI object as for example the field of the window, the field is expanded. In this illustration, the field is presented in an enlarged and magnified state while the remaining portions are not (including the heading).

[0080] FIG. 14 is a block diagram of an exemplary computer system 650, in accordance with one embodiment