tions of fingers f2 and f3. As finger f2 and/or finger f3 moves, the window edge follows the axis that extends through the fingers' contact points, as shown in FIG. 3E.

[0091] FIGS. 3E and 3F collectively illustrate that the window's size may be controlled after the window has been rotated. The window's size, as well as its position, may also be controlled simultaneously while (or prior to) the window is rotated. For example, extending and rotating two fingers contacting the same window edge both rotates that window edge and extends the window's size along that axis. Moving a third finger on, for example, the opposite window edge further simultaneously increases the window's size accordingly, as previously discussed. Multiple other forms of simultaneous control of window position, size and angular position (anisotropic RST control) also are possible by employing the herein-described control techniques.

[0092] The above-described techniques may be implemented, in accordance with the present invention, by having two points of contact (e.g., fingers f2 and f3) on one of the window's edges in order to control the position/scale/rotation of the line segment that corresponds to (i.e., represents) that edge. In other words, the two points that delineate this line segment are directly controlled by two points of contact. The third point of contact (e.g., finger f1) then uniquely specifies a line that is parallel to this line segment, with such specified line representing the window's opposite edge. These two line segments, fully controlled by the three points of contact, then specify the rectangular-shaped window.

[0093] Multi-Touch Enabled Rectilinear Window Frame Style 2

[0094] FIGS. 4A-4B schematically show a second embodiment for controlling a window frame, wherein each contact point on an edge adjusts that edge along a direction normal to it. For example, four fingers f1, f2, f3 and f4 are shown in FIG. 4A contacting four different edges of window 12. Moving any finger in a direction normal to the axis of that edge (e.g., while holding another finger on another edge) moves that edge in the direction of movement of the finger. In FIG. 4A, finger f1 slides from contact point G1 to contact point G2 (e.g., while finger f3 remains at position I1), thus causing the window's right edge to move toward the right as shown in FIG. 4B. Similarly, moving finger f2 down from contact point H1 to contact point H2 (e.g., while finger f4 remains in position J1) causes the window's top edge to move down. Moving fingers f3 and f4 likewise control the respective positions of the window's left and bottom edges.

[0095] In window frame style 2, the position of each and every edge of the window is controlled separately by moving a finger (or other contact item) contacting that edge (e.g., relative to a finger contacting an opposite edge). A single edge may be controlled with a single finger. Two edges may be controlled simultaneously or in succession with two fingers. Likewise, three or four edges may be controlled simultaneously or in succession with three or four fingers, respectively.

[0096] Multi-Touch Enabled Rectilinear Window Frame Style 3

[0097] FIGS. 5A-5C, 6A-6B, and 7A-7C schematically show a third embodiment for controlling a window frame, referred to herein for convenience as window frame style 3. In window frame style 3, the user may control the window as herein described by utilizing one, two or three points of contact (e.g., one, two or three fingers). A single point of contact moves the window frame in the same manner as previously described above with reference to FIGS. 1A and 1B.

[0098] Two points of contact control the window frame in various different manners depending upon the particular edges each of the two fingers contacts. FIGS. 5A-5C schematically illustrate window frame control when two points of contact (e.g., fingers f1 and f2) are disposed on opposite edges of window 12. In this initial configuration, the two contact points adjust the window to maintain distance and position along the axis that is defined by the two points of contact. More specifically, two points of contact (e.g., fingers f1 and f2) initially are disposed on contact points K1 and L1, as shown in FIG. 5A. Sliding finger f1 from contact point K1 to contact point K2 moves the axis on which finger f1 is disposed horizontally to contact point K2, as shown in FIG. 5B. In addition, the position of the axis as defined by the two contact points controls the vertical position of the window or, in other words, the vertical position of the axis defined by the two points of contact. For example, moving fingers f1 and f2 from contact points K2 and L1, respectively, as shown in FIG. 5B, to contact points K3 and L2 causes window 12 to follow such movement and to move down the display to the position shown in FIG. 5C. Placing two contact points on the upper and lower edges of the window and subsequent movement of these contact points similarly controls the height and horizontal position of window 12 within the display.

[0099] In accordance with the embodiment of window frame style 3, two points of contact disposed on adjacent edges of window 12 moves and uniformly scales window 12, as shown in FIGS. 6A and 6B. As shown in FIG. 6A, fingers f1 and f2, initially disposed on contact points M1 and N1, slide to contact points M2 and N2, thereby causing a uniform increase in the window size as shown in FIG. 6B.

[0100] Two points of contact disposed on the same edge of window 12 controls the window in yet a different manner, namely the scale and position of that edge, as shown in FIGS. 7A, 7B and 7C. Fingers f1 and f2 initially are disposed on contact points O1 and P1, respectively, as shown in FIG. 7A. Uniform movement downward of the contact points to points O2 and P2 causes the relative position of the window to follow such movement, as shown in FIG. 7B. The two contact points positioned on the same edge further control the relative scale, that is, length of the edge. Specifically, increasing the distance between the two fingers, for example, sliding the fingers from respective contact points O2 and P2 to contact points O3 and P3, as shown in FIG. 7B, results in a proportional increase in the height of window 12, as shown in FIG. 7C.

[0101] Multi-Touch Enabled Rectilinear Window Frame Style 4

[0102] FIGS. 8A-8C and 9A-9C schematically show a fourth embodiment for controlling a window frame, referred to herein for convenience as window frame style 4. As shown in each of these figures, a window frame 20 is a sort-of double edge window and includes an inner frame 22 (or inner edge) and an outer frame 24 (or outer edge) in which a picture (or other image) 26 is disposed. Window frame style 4 operates in different manners depending on the number of contact points, the relative positions of those contacts including whether the contact points are disposed on the window's inner frame or its outer frame, and the movement of those contact points.

[0103] In accordance with the present invention, contacting the window's inner frame 22, such as shown in FIGS. 8A-8C, operates to control the window in any of the styles discussed