over, the present system and method may be incorporated into any device including, but in no way limited to, household devices such as interactive TV, stereo, CD-MP3 players, and other control panels. Moreover, the sensing surface of the present system and method can be placed behind a liquid crystal display (LCD) device, allowing the visual key mapping process to be performed in real time thereby further aiding with computing interaction. As can be illustrated above, there is no limit to the application of the present system and method using a single input device.

[0111] Multiple Pointer Interaction Mode

[0112] **FIG. 21** illustrates multiple pointers **(64)** on a display screen **(38)**. The multiple pointers **(64)** represent fingertips, which are sensed by the sensing surface **(1)**. The locations and displacements of these pointers will depend on the movement of the operator's fingers and hands **(55)** on the sensing surface **(1)**.

[0113] **FIG. 22** shows that according to one exemplary embodiment, the pointers **(64A** to **64D)** will have different appearances according to the changes in pressure detected from each fingertip (z value) on the sensing surface **(1)**. The pointer **(64E)** has the most distinct features, which indicates that an indentation sufficient to make a selection was made on the surface or when (S_n=1).

[0114] The motion of the pointers in multiple pointers mode simulates the actual hand and finger motion. The motion of the pointers, however, also depends on the size of the sensing surface and its geometry, which in turn are relative to the viewing screen geometry. Note also that the pointers disappear when there are no fingers on the sensing surface.

[0115] Shortly after at least one finger presses the sensing surface **(1)** and causes a selection signal S_n=1, the movement of other pointers from the same hand will be interpreted by the computerized systems as any number of programmed gestures corresponding to the pointer movement. Programmed gestures may include, but are in no way limited to, press to make selection (e.g. close window), press then twist hand to simulate turning a knob gesture, press then put two fingers together to grab object (equivalent to mouse drag gesture), press then put three or four fingers together to activate vertical and horizon scrollbar simultaneously from any location in the window, press then put five fingers together to activate title bar (as to relocate window) from anywhere in the window.

[0116] As shown above, the gesture method allows elimination of the basic user interface such as a title bar and a scrollbar into one simple intuitive grabbing gesture. Other functions such as expanding or shrinking windows can also be performed easily using intuitive gestures. Accordingly, the present multiple pointer interaction mode simulates placing the operator's hands in the world of software. Additionally, the present multiple pointer interaction mode allows an operator to perform two gestures at the same time e.g. relocating two windows simultaneously to compare their contents.

[0117] According to one exemplary embodiment, the above-mentioned hand gestures can be interpreted from two hands as well as one. For example, performing a grab gesture in a window and then moving hands to stretch or shrink the window. Alternatively, a user may press one finger on an object, then press another finger from the different hand on the same object and drag the second finger away to make a copy of the selected object.

[0118] Besides, being able to perform gestures with visual feedback, software can be created for specific applications such as a disc jockey turntable, an advance DVD control panel, and/or an equalizer control panel. These applications are not possible with traditional input devices.

[0119] Mini-Hands Interaction Mode

[0120] The above-mentioned multiple pointer mode is particularly suited to larger computing systems such as desktop PCs. However, having up to ten pointers floating on a display screen can be confusing. The mini-hands interaction mode eliminates the multiple pointers by displaying a mini-hand cursor for each operator's hand. Unlike common single pointer cursors, each finger on the mini-hand will simulate the finger of the operator hand. Additionally, unlike multiple pointers mode, the computerized systems will gain extra information by knowing the state of the mini-hand. For example: laying down five fingers on the sensing surface indicates that the mini-hand is ready to grab something, placing only one finger on the sensing surface indicates that the mini-hand is to be used as a pointer. **FIG. 23** shows a display screen **(38)** including two mini-hands **(65)** to illustrate the present system and method. Notice on the left hand **(55)** only one finger is detecting by the sensing surface **(1)** so the corresponding mini-hand **(65)** shows a pointing gesture on the screen **(38)**.

[0121] **FIGS. 24A** to **24D** further illustrate an implementation of the mini-hands interaction mode according to one exemplary embodiment. In **FIG. 24A**, the right mini-hand **(65)** performs a grabbing gesture on a folder/directory **(66B)**. Accordingly, the window **(68)** is a current active window, and window **(69)** in an inactive window. **FIG. 24B** illustrates the operator shortly lifting his hand **(55)** off of the sensing surface **(1)**. The computerized system interprets this continuous gesture as cut operation according to one exemplary embodiment. At this point, the operator would feel as though the folder was lifted off of the sensing surface **(1)**. The folder **(66B)** in **FIG. 24A** turned faint as shown in **FIG. 24B** to indicate that this folder **(67)** is being cut. Note that mini-hand disappears in **FIG. 24B** since no hands or fingers are detected on the sensing surface **(1)**. In **FIG. 24C**, the mini-hand **(65)** reappears to activate the background window **(69)** with a selecting gesture. Additionally, **FIG. 24D** illustrates the operator starting with fingers together, pressed on the sensing surface **(1)** then gently spreads fingers apart to indicate a paste operation. Consequently, the folder **(66B)** was relocated to a new window. Notice from **FIG. 24A** to **24D** that the continuous gesturing is much like how we function our hands in the real world.

[0122] Chameleon Cursor Interaction Mode

[0123] The chameleon cursor interaction mode illustrated in **FIGS. 25A through 25D** takes full advantage of a sensor input device that is able to detect for multiple fingers, palms, and hands. According to one exemplary embodiment of the chameleon cursor interaction mode, the input device quickly interprets hand configurations and produces a unique characteristic cursor in response. For example, **FIG. 25A** illustrates that when a single fingertip and a palm are detected from one hand, the cursor become a pointer **(70)**. Similarly,