

input includes one or more inputs. Each input has a unique identifier. The method also includes, during the user input, classifying the user input as a tracking or selecting input when the user input includes one unique identifier or a gesture input when the user input includes at least two unique identifiers. The method further includes performing tracking or selecting during the user input when the user input is classified as a tracking or selecting input. The method additionally includes performing one or more control actions during the user input when the user input is classified as a gesturing input. The control actions being based at least in part on changes that occur between the at least two unique identifiers.

**[0019]** The invention relates, in another embodiment, to a touch-based method. The method includes outputting a GUI on a display. The method also includes detecting a user input on a touch sensitive device. The method further includes analyzing the user input for characteristics indicative of tracking, selecting or a gesturing. The method additionally includes categorizing the user input as a tracking, selecting or gesturing input. The method further includes performing tracking or selecting in the GUI when the user input is categorized as a tracking or selecting input. Moreover, the method includes performing control actions in the GUI when the user input is categorized as a gesturing input, the actions being based on the particular gesturing input.

**[0020]** The invention relates, in another embodiment, to a touch-based method. The method includes capturing an initial touch image. The method also includes determining the touch mode based on the touch image. The method further includes capturing the next touch image. The method further includes determining if the touch mode changed between the initial and next touch images. The method additionally includes, if the touch mode changed, setting the next touch image as the initial touch image and determining the touch mode based on the new initial touch image. Moreover, the method includes, if the touch mode stayed the same, comparing the touch images and performing a control function based on the comparison.

**[0021]** The invention relates, in another embodiment, to a computer implemented method for processing touch inputs. The method includes reading data from a touch screen. The data pertaining to touch input with respect to the touch screen, and the touch screen having a multipoint capability. The method also includes converting the data to a collection of features. The method further includes classifying the features and grouping the features into one or more feature groups. The method additionally includes calculating key parameters of the feature groups and associating the feature groups to user interface elements on a display.

**[0022]** The invention relates, in another embodiment, to a computer implemented method. The method includes outputting a graphical image. The method also includes receiving a multitouch gesture input over the graphical image. The method further includes changing the graphical image based on and in unison with multitouch gesture input.

**[0023]** The invention relates, in another embodiment, to a touch based method. The method includes receiving a gestural input over a first region. The method also includes generating a first command when the gestural input is received over the first region. The method further includes receiving the same gestural input over a second region. The method additionally includes generating a second command when the same gestural input is received over the second region. The second command being different than the first command.

**[0024]** The invention relates, in another embodiment, to a method for recognizing multiple gesture inputs. The method includes receiving a multitouch gestural stroke on a touch sensitive surface. The multitouch gestural stroke maintaining continuous contact on the touch sensitive surface. The method also includes recognizing a first gesture input during the multitouch gestural stroke. The method further includes recognizing a second gesture input during the multitouch gestural stroke.

**[0025]** The invention relates, in another embodiment, to a computer implemented method. The method includes detecting a plurality of touches on a touch sensing device. The method also includes forming one or more touch groups with the plurality of touches. The method further includes monitoring the movement of and within each of the touch groups. The method additionally includes generating control signals when the touches within the touch groups are moved or when the touch groups are moved in their entirety.

**[0026]** It should be noted that in each of the embodiments described above, the methods may be implemented using a touch based input device such as a touch screen or touch pad, more particularly a multipoint touch based input device, and even more particularly a multipoint touch screen. It should also be noted that the gestures, gesture modes, gestural inputs, etc. may correspond to any of those described below in the detailed description. For example, the gestures may be associated with zooming, panning, scrolling, rotating, enlarging, floating controls, zooming targets, paging, inertia, keyboarding, wheeling, and/or the like.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0027]** The invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

**[0028]** FIG. 1 is a block diagram of a computer system, in accordance with one embodiment of the present invention.

**[0029]** FIG. 2 is a multipoint processing method, in accordance with one embodiment of the present invention.

**[0030]** FIGS. 3A and B illustrate an image, in accordance with one embodiment of the present invention.

**[0031]** FIG. 4 illustrates a group of features, in accordance with one embodiment of the present invention.

**[0032]** FIG. 5 is a parameter calculation method, in accordance with one embodiment of the present invention.

**[0033]** FIGS. 6A-6G illustrate a rotate gesture, in accordance with one embodiment of the present invention.

**[0034]** FIG. 7 is a diagram of a touch-based method, in accordance with one embodiment of the present invention.

**[0035]** FIG. 8 is a diagram of a touch-based method, in accordance with one embodiment of the present invention.

**[0036]** FIG. 9 is a diagram of a touch-based method, in accordance with one embodiment of the present invention.

**[0037]** FIG. 10 is a diagram of a zoom gesture method, in accordance with one embodiment of the present invention.

**[0038]** FIGS. 11A-11H illustrates a zooming sequence, in accordance with one embodiment of the present invention.

**[0039]** FIG. 12 is a diagram of a pan method, in accordance with one embodiment of the present invention.

**[0040]** FIGS. 13A-13D illustrate a panning sequence, in accordance with one embodiment of the present invention.

**[0041]** FIG. 14 is a diagram of a rotate method, in accordance with one embodiment of the present invention.