

not be necessary for the described functionality, it can be used for any kind of application in which the first point is supposed to be moved. Therefore, in a next step the third real input point P_3 is calculated or extrapolated, giving the triple input point data $\{P_1, P_2, P_3\}$. On the basis of these data a 'right click event' at P_1 is generated and reported data to an application. This represents the third path through said flowchart.

[0118] It is also possible that the user points on the touch-device with the (index) finger or a pen providing the first contact. The equivalent of a mouse 'left-click' or '1st-click' can be done conventionally by tapping on the desired position or simply by lifting the finger. While pointing to the desired position with the (index) finger or a pen, the user can do a 'right-click' or '2nd click' by touching anywhere on the touch-device with another finger (middle finger, thumb). This second contact can be used for a function such as a position-specific menu popping up. While maintaining the first and second contacts, the user can make a third contact anywhere on the touch-screen with a third finger to do a 'middle-click' or '3rd-click'. While using a stylus a second contact can be made e. g. with the thumb of the supporting hand.

[0119] As described above, an abrupt jump of the pointing coordinate signals that a second contact has been established. This new coordinate is the average of the first and second contacts. In the present embodiment, it is required to detect the presence of the second contact, but there is not necessarily a need to extrapolate its position. While maintaining the first and second contacts, the user is not supposed to move the fingers on the touch-device—this would make position computation ambiguous. However, this is not a serious limitation, as the user would just tap with the second finger as if pressing a button. After a first contact and a second contact have been detected, there can be two alternatives. If the pointing coordinate jumps back to the original position, the second contact has been released. If the pointing coordinate jumps, but not to the original position, a third contact has been established, and so on. In principle, the number of contacts is limited by the user's capabilities, not by the capabilities of the algorithm.

[0120] However, this is also possible to combine the calculation of the second positions to enable a movement of the first position with an activated 'left-', 'right-' or 'middle-' 'mouse click'.

[0121] The average position of the first, second and third contacts may accidentally be the same as the position of the first contact. In case of a calculated third position, which may be interpreted as a 'jump back' i. e. a release of the second contact.

[0122] To prevent the occurrence of such misinterpretations a characteristic behavior of resistive touch-input devices that the number of contacts changes also the overall resistance can be employed. Thus, it may be possible to detect the number of fingers contacting the touch-device by the resistance (or capacitance) alone. It is definitively possible to detect by the resistance (or capacitance) alone, if the number of fingers contacting the touch-device has been increased or decreased.

[0123] In combination with the analysis of the movement of the input or 'center of mass' position this can be a strong algorithm for determine the actual number and positions of multiple user input.

[0124] In the present embodiment of the invention the input functionality is assigned to the number of fingers contacting the touch-device. Thus, on the input device it can be expected that is always free space somewhere on the touch-device for the second and third contacts. In the present embodiment of the invention there is no need to detect or compute the positions of the second and third contacts.

[0125] It is also possible to utilize the movement of the second contact position. For example a pen or the index finger of the right hand could be used for pointing at the first contact position. A second contact with the thumb or one of the fingers of the supporting hand could switch the graphic user interface into e.g. a zooming mode. Moving the thumb towards the index would zoom into pointed region, moving the thumb away from index would zoom out. The movement of the thumb can be detected with the method described in the preceding specification, assuming that the index finger does not move (significantly). The standard operation will be resumed, when the thumb is lifted.

[0126] Thus, the present invention provides the functionality for the pressing of key-combinations (two keys simultaneously) on a soft keyboard, or pointing and pressing a function key simultaneously and can simultaneously provide mouse-click functionality to a touch screen device.

[0127] In this invention the behavior of touch pads that are capable of outputting only a single position information notwithstanding the number of actual input points or areas, as in the case of e.g. resistive touch pads is used to allow dual inputs. The invention is essentially a two-step process. First, a dual input situation is detected by monitoring the hardware signal. In the second step the actual second input point is calculated on the basis of the first input point and the middle point.

[0128] The present invention provides a simple method to allow dual input on touch pads that are designed for single input only, and provides therefore cheap possibility to implement dual input on existing touch based input devices. The present invention allows for the creation of new user interface features, that further improve usability of touch pad or touch screen enabled devices.

[0129] The method is based on novel way of resistive touch pad signal interpretation and the implementation can be made with software. Therefore, the innovation can be implemented with resistive touch pad devices or with any other touch pad technology that behaves similarly. One useful property of suitable touch pad technology is that when two points are pressed on the active input area, the device (which is designed for single point entry) interprets the situation so that only one point is pressed in the middle of the interconnecting line between these two points. Basically, only an unambiguous signal and an unambiguous relationship between a single pressed input point and two simultaneously pressed input points are actually required. In such a case the derivation of the third point P_2 may be more complicated.

[0130] The operation principle is simple and the implementation requires only small modifications in the software of a hardware driver module. The performance or quality of the new feature is easy to validate and therefore the development time in research and development is short.

[0131] The present invention can easily be implemented and tested. The present invention can be used in specific