

KEYBOARD ERROR REDUCTION METHOD AND APPARATUS

FIELD OF THE INVENTION

[0001] This invention relates to the selection of items displayed on a screen, for example virtual keyboard keys. The invention is particularly useful for, but not necessarily limited to keyboard keys on a touch screen and is aimed at helping reduce errors in the selection of keys.

BACKGROUND ART

[0002] A frequently used interface between man and machine is a display screen. Increasingly, such screens are not just used for one way communication, that is to display data to the user, but also as means for the user to input data to the relevant apparatus, for example by way of a touch screen or the use of a mouse (or other cursor-orientated selections) or such like.

[0003] One of the main growth areas in screen devices is in small portable devices, such as mobile telephones, personal digital assistants (PDA), global positioning system (GPS) navigators and the like. These adopt various methods for entering symbols or data into them, for instance buttons, voice recognition, hand writing recognition virtual buttons (such as virtual keyboard), etc. In the last case various buttons appear on the screen and touching the screen at a point corresponding to one of those buttons causes the device to react as if the corresponding button itself had been touched. The construction of touch screens is well known in the art and touch detection can be way of many well known systems, such as capacitive or inductive sensing, contact switches etc.

[0004] Whilst touch screens and other screen input devices are very useful, they can suffer from the problem of parallax error. This is where the point the user thinks an image appears on the screen is actually displaced slightly, due to being viewed at an angle. This is particularly a problem in touch screens where the selected position, at the point of contact on the screen, is removed from the image of a target button by the thickness of the sensor screen and display glass. Unless the viewer is looking along a line substantially perpendicular to the plane of the screen from directly in front of the target button, the point on the front of the sensor screen where, he thinks he sees the target, is not exactly where the sensor corresponds to that target button. The offset between the actual position of the button and where the user sees the button as being, depends upon the angle between the viewer and the plane of the screen.

[0005] This problem can be exacerbated with mobile, hand held devices where a user is using one hand to select targets on a touch screen held in the other hand. There, the most natural and comfortable position may involve holding the device at an angle to the viewer's eyes and slightly towards the other hand. This ensures that parallax remains a problem. Further, screens on hand held devices tend to be quite small. The virtual buttons on them are clearly smaller than the screen and are usually very much smaller. Where many buttons appear, for instance in a virtual keyboard, the size is such that parallax, combined with inaccurate aim, can very easily lead to a significant number of errors in typing.

SUMMARY OF THE INVENTION

[0006] In this specification, including the claims, the terms 'comprises', 'comprising' or similar terms are intended to

mean a non-exclusive inclusion, such that a method or apparatus that comprises a list of elements does not include those elements solely, but may well include other elements not listed.

[0007] According to one aspect of the invention, there is provided a method for use in deciding a selectable portion that is selected during a selection operation from amongst a first plurality of selectable portions of an image displayed on a screen. A selection operation indicates a selected position in the image. Each of the first plurality of selectable portions has a representative position within the image. The method includes receiving input data identifying the selected position, indicated during the selection operation, and deciding on at least one candidate for the selected selectable portion, using the position of the selected position relative to the representative positions of a second plurality of the selectable portions.

[0008] According to another aspect of the invention, there is provided a method for use in displaying a plurality of selectable portions in an image displayed on a screen. Individual selectable portions are selected during selection operations where a selection operation indicates a selected position on the image. Each of the plurality of selectable portions has a representative position on the image. The method includes determining a selectable portion selected through a selection operation, determining an offset distance between the selected position and the representative position of the selected selectable portion and repositioning the representative position of the selected selectable portion using at least the determined offset distance.

[0009] According to again another aspect of the invention, there is provided a driver circuit for use in deciding a selectable portion that is selected during a selection operation from amongst a first plurality of selectable portions of an image displayed on a screen. The selection operation indicates a selected position in the image. Each of the first plurality of selectable portions has a representative position in the image. The circuit includes a memory for storing the representative positions of the selectable portions, an input for receiving a selected position from a selection operation and a microprocessor for deciding on one or more candidates for the selectable portion being selected through the selection operation, using the position of the received selected position relative to the representative positions of a second plurality of the selectable portions, stored in the memory.

BRIEF DESCRIPTION OF THE DRAWING

[0010] In order that the invention may readily be understood and put into practical effect, reference will now be made to a preferred exemplary embodiment, as illustrated with reference to the accompanying drawings, in which:

[0011] **FIG. 1** is an illustration of a mobile telephone of an exemplary embodiment;

[0012] **FIG. 2** is a schematic view of a touch screen circuit of an exemplary embodiment;

[0013] **FIG. 3** is a close up of an area of a display of an exemplary embodiment;

[0014] **FIG. 4** is a flow chart according to the operation of an exemplary embodiment; and