VIRTUAL POINTING DEVICE FOR TOUCHSCREENS

CROSS-REFERENCE TO RELATED APPLICATIONS

The present invention appears to claim subject matter disclosed in prior co-pending application, Ser. No. 08/654,486, filed on May 28, 1996; co-pending application, Ser. No. 08/654,487, filed on May 28, 1996; co-pending application, Ser. No. 08/654,484, filed on May 28, 1996; co-pending application, Ser. No. 08/664,038, filed on Jun. 13, 1996; and co-pending application, Ser. No. 08/664,037, filed on Jun. 13, 1996.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to pointing devices and pointers and, more particularly, but without limitation, to pointing devices for use on touchscreen systems.

2. Background Information and Description of the Related Art

Conventionally, users interface with the desktop and operating system of their computer system using a "mouse". A mouse is a special hardware input device connected by a wire or infrared signal to the computer system. Typically, the mouse has one or more push buttons on its top and a roller on its bottom designed to roll along a surface next to the computer system. When the user moves the mouse's roller on the surface, a mouse pointer positioned on the computer system's display tracks the movement of the mouse's roller. When the user has positioned the pointer at a desirable location, such as over an object, the user clicks or multiple clicks, depending on how the mouse is programmed, one of the mouse push buttons to invoke or open the object.

The user may customize the operations of a mouse and mouse pointer. Through a customization menu maintained by some conventional operating systems, the user may customize, for example, the assignment of a single click of a first mouse button to invoke a first function and the assignment of a single click over a second mouse button to invoke a second function. Further, the user may customize the appearance of the mouse pointer on the display screen. For example, one user may prefer a small arrow to be the mouse pointer, while another user may prefer a large blinking arrow. Similarly, some users may prefer a fast mouse pointer (i.e., small movements of the mouse's roller cause large movement of the mouse pointer), while other users may prefer a slower mouse pointer. This feature is referred to as the "sensitivity" of the mouse pointer.

These types of mouse and mouse pointer behaviors may be customized for each individual user. However, most operating systems provide customization for only one user on one system. Therefore, for a multi-user system, the user must re-customize the mouse from the prior setting. This typically involves the user editing a mouse settings file or local database that maps button behavior to a specific function. Some systems, such as X11, have a special init file to do this.

Conventional mice suffer certain disadvantages and limitations. For example, the mouse is bulky, fixed in size so that very small hands or very large hands alike do not properly fit over the mouse, not permanently attached to the computer system, subject to corrosion, and requires the user to know the specific mouse behavior (e.g., which mouse button and how many clicks invoke a function). Accordingly, many

customer oriented systems (e.g., ATM machines) and multi-user systems do not use mice. Rather, the trend for multi-user systems is to use touchscreens.

Conventional touchscreens allow the user's finger or a pointing device to replace the conventional mouse and mouse pointer. Conventional touchscreens utilize, for example, heat sensitive, sound sensitive, pressure sensitive, or motion sensitive grids/detectors to detect a hand, finger, or object placed on the touchscreen. However, conventional touchscreens suffer certain limitations and disadvantages. For example, unlike a mouse pointer, fingers vary in size and, therefore, the desktop must place contiguous object icons and text far apart to accommodate the largest fingers. Also, the user cannot select the customization features as found in conventional mice and mouse pointers.

Accordingly, there would be great demand for a new pointing device that uses touchscreen technology, but allows object icons and text to be placed close to one another and allows user customization of the pointing device.

SUMMARY

A method, memory, and apparatus, having at least a processor, memory, and touchscreen, create a virtual pointing device. The method includes the steps of displaying a non-activated virtual pointing device on the touchscreen, in response to detecting at least one finger placed on the virtual pointing device, activating the virtual pointing device, and moving the virtual pointing device in accordance with movement of the at least one finger.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a conventional hardware configuration for use with the present invention.

FIG. **2** illustrates a virtual pointing device in accordance with the present invention.

FIG. **3** illustrates detailed logic in the form of a flowchart for performing the steps in accordance with the present invention.

FIG. **4** illustrates a variation of the virtual pointing device illustrated in FIG. **2**.

FIG. **5** illustrates another view of the virtual pointing device shown in FIG. **2**.

FIG. **6** illustrates a menu for defining the characteristics of the virtual pointing device in accordance with the present invention.

FIG. **7** illustrates a shape menu, define functionality menu, and define pointer menu in accordance with the present invention.

FIG. **8** illustrates detailed logic in the form of a flowchart for performing the steps in accordance with the present invention.

FIG. **9** illustrates detailed logic in the form of a flowchart for performing the steps in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments may be practiced in any suitable hardware configuration that uses a touchscreen, such as computing system **100** illustrated in FIG. **1** or, alternatively, in a laptop or notepad computing system. Computing system **100** includes any suitable central processing unit **10**, such as a standard microprocessor, and any number of other objects interconnected via system bus **12**.