

TOUCH-SENSITIVE INPUT OVERLAY FOR GRAPHICAL USER INTERFACE

BACKGROUND

[0001] 1. Field of the Invention

[0002] The invention relates to graphical user interfaces, and more particularly to touch-screen graphical user interfaces for computer systems.

[0003] 2. Background Information

[0004] As computers are deployed in an increasing number of environments and for an increasing number of applications, it is becoming more and more common that users expect a graphical user interface ("GUI") that simplifies the interaction between the user and a program executing on the computer (or over a network on a remote computer).

[0005] Since the GUI's infamous conception at Xerox PARC labs in the 1980s, and subsequent commercialization by Apple Computer shortly thereafter, the GUI has become the interface of choice of nearly every operating system to date. Linux (TM), Solaris (TM), and Microsoft Windows (TM) all have GUIs to promote ease of use between users and application programs running over these operating systems.

[0006] While the underlying concept of a GUI is consistent between implementations, GUIs do exhibit certain characteristics, which are note here.

[0007] The standard and most ubiquitous GUI is the icon-based interface, in which a pointing device, such a mouse or a capacitive pointer is used to identify and select the icon and execute a program on the computer system. Such systems are evidenced by commercially available operating systems like those available from Apple Computer, and Microsoft Corporation, which typically have a full-screen display. However, the capacitive pointer is more frequently found in systems with a small-screen display, or in systems where display real estate is severely limited, such as in a personal digital assistant.

[0008] Occasionally, touch-screen implementations of the GUI are employed. Again, these are found mostly in systems where display real estate is limited, but also in systems where the GUI is relatively simple. For instance, most commercial department stores have networked bridal registries that have a full-screen display but no keyboard or mouse. Instead, the GUI is a set of push buttons and a keyboard that appear on the display in fixed locations and that are responsive to touch. In a normal operation, a user navigates through a series of screens with limited options and must select from a sequentially pre-ordained input with an appropriate touch response (either a push button or a keyboard entry) in the fixed location.

[0009] Besides commercial implementations described above, certain patent documents disclose elements of some touch-screen GUI systems.

[0010] For instance, U.S. Pat. No. 6,335,725, by Koh et al. (the '725 patent), discloses a method for partitioning a screen into two fixed portions and uses a touch-input in the first portion to navigate with scroll buttons in the second portion. U.S. Pat. No. 6,310,634, by Bodnar et al. is similar.

Also similar is U.S. Pat. No. 6,346,955, by Moon et al., but rather than using scroll bars or scroll buttons, a tab and button system is disclosed. Slightly different is U.S. Pat. No. 6,037,937, by Beaton et al., which provides a more flexible GUI tool, here a transparent navigation tool that does not obstruct the view of data on a small screen.

[0011] In each of the above examples, two issues appear to motivate the use of a touch-screen GUI: a relatively small amount of display real estate, and the implementation of the GUI for a portable computing device where a mouse or other peripheral navigation device is not practical.

[0012] Another type of system where a touch-screen GUI is employed is in industrial control systems, which either operate physical plants (e.g. a factory, an HVAC system, etc.) or medical equipment. In these systems, the environmental conditions may drive the choice of a touch-screen GUI. U.S. Pat. No. 6,063,030, by Vara et al. (the '030 patent), discloses such a system.

[0013] Similar to the '030 patent is U.S. Pat. No. 5,559,301, by Bryan et al. (the '301 patent). The '301 patent discloses a system where a computer emulates an analog interface in the real-world. Here, buttons and sliders are employed on a GUI to tune or balance a sound processing system, just like the buttons and sliders are used on a traditional equalizer. In each of two above patents, the presentation and manipulation of the touch-inputs for data entry is very rigid, much like the bridal registry systems mentioned above. In these systems, the input is simple, predictable, and consistent.

SUMMARY OF THE INVENTION

[0014] A computer implemented apparatus and method for an improved graphical user interface with a touch-sensitive input overlay is described. According to an embodiment, the computer includes program modules (software) configured to cause one or more microprocessors to: determine a location of a first touch input received on the display; correlate the first touch input to a control on the graphical user interface; determine a location to present a touch-sensitive input overlay relative to the control; place the touch-sensitive input overlay at the location; and receive a second touch input in the area defined by the touch-sensitive input overlay, the second touch input aiding entry of a parameter into the control. Corresponding computer implemented methods and data structures are also described. These and other embodiments are presented in the detailed description, figures and claims that follow.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 is a diagram of a touch-sensitive input overlay for a graphical user interface.

[0016] FIG. 2 is a hardware and communication flow diagram of the touch-sensitive input overlay.

[0017] FIG. 3 is a diagram of additional data structure attributes useful in implementing the touch-sensitive input overlay.

[0018] FIG. 4 is a flowchart detailing acts corresponding to implementing the touch-sensitive input overlay.

[0019] FIGS. 5-7 depict embodiments of touch-sensitive input overlays.