VIRTUAL INPUT DEVICE PLACEMENT ON A TOUCH SCREEN USER INTERFACE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of prior application Ser. No. 10/903,964, from which priority under 35 U.S.C. §**120** is claimed, which is hereby incorporated by reference in its entirety. This application is also related to the following co-pending applications: U.S. Ser. No. 10/840,862, filed May 6, 2004; U.S. Ser. No. 11/048,264, filed Jul. 30, 2004; U.S. Ser. No. 11/038,590, filed Jul. 30, 2004; Atty Docket No. APL1P307X2 (U.S. Ser. No._____), entitled "ACTIVATING VIRTUAL KEYS OF A TOUCH-SCREEN VIRTUAL KEYBOARD", filed concurrently herewith; and Atty Docket No.: APL1P307X4 (U.S. Ser. No._____), entitled "OPERATION OF A COMPUTER WITH TOUCH SCREEN INTERFACE", filed concurrently herewith; all of which are hereby incorporated herein by reference in their entirety for all purposes.

BACKGROUND

[0002] 1. Technical Field

[0003] The present patent application relates to touch screen user interfaces and, in particular, relates to placement of a virtual input device, such as a virtual keyboard or other virtual input device, on a touch screen user interface.

[0004] 2. Description of the Related Art

[0005] A touch screen is a type of display screen that has a touch-sensitive transparent panel covering the screen, or can otherwise recognize touch input on the screen. Typically, the touch screen display is housed within the same housing as computer circuitry including processing circuitry operating under program control. When using a touch screen to provide input to an application executing on a computer, a user makes a selection on the display screen by pointing directly to graphical user interface (GUI) objects displayed on the screen (usually with a stylus or a finger).

[0006] A collection of GUI objects displayed on a touch screen may be considered a virtual input device. In some examples, the virtual input device is a virtual keyboard. Similar to a conventional external keyboard that is not so closely associated with a display screen, the virtual keyboard includes a plurality of keys ("virtual keys"). Activation of a particular virtual key (or combination of virtual keys) generates a signal (or signals) that is provided as input to an application executing on the computer.

[0007] External keyboards and other external input devices, by their nature (i.e., being external), do not cover the display output of an application. On the other hand, virtual input devices, by virtue of being displayed on the same display screen that is being used to display output of executing applications, may cover the display output of such applications.

[0008] What is desired is methodology to intelligently display a virtual input device on a touch screen to enhance the usability of the virtual input device and the touch screen-based computer.

SUMMARY

[0009] A display is generated on a touch screen of a computer. The display includes an application display, associated with an application executing on the computer, and a virtual input device display for a user to provide input to the application executing on the computer via the touch screen. In response to a virtual input device initiation event, initial characteristics of the virtual input device display are determined. Based on characteristics of the application display and the characteristics of the virtual input device display, initial characteristics of a composite display image are determined including the application display and the virtual input device display. The composite image is caused to be displayed on the touch screen.

[0010] This summary is not intended to be all-inclusive. Other aspects will become apparent from the following detailed description taken in conjunction with the accompanying drawings, as well as from the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] **FIG. 1-1** is a block diagram of a touch-screen based computer system.

[0012] **FIG. 1** illustrates, in accordance with an aspect, processing within a computer that results in a display on a touch screen.

[0013] **FIG. 2** illustrates an example touch screen display output not including a virtual input device display.

[0014] **FIGS. 3 and 3-1** illustrate example touch screen display outputs including both an application display and a virtual input device display, each with the application output display substantially unchanged from the **FIG. 2** display.

[0015] **FIGS. 4 and 5** illustrates an example touch screen displays where the spatial aspect of the application display is modified in accommodation of a virtual input device display.

[0016] **FIG. 6** illustrates an example touch screen display in which an indication of the input appears in a portion of the display associated with a virtual input device.

[0017] **FIGS. 7A, 7B** and **7**C illustrate a virtual input device display in various states of having been scrolled.

DETAILED DESCRIPTION

[0018] Examples and aspects are discussed below with reference to the figures. However, it should be understood that the detailed description given herein with respect to these figures is for explanatory purposes only, and not by way of limitation.

[0019] **FIG. 1-1** is a block diagram of an exemplary computer system **50**, in accordance with one embodiment of the present invention. The computer system **50** may correspond to a personal computer system, such as a desktops, laptops, tablets or handheld computer. The computer system may also correspond to a computing device, such as a cell phone, PDA, dedicated media player, consumer electronic device, and the like.

[0020] The exemplary computer system **50** shown in **FIG. 1-1** includes a processor **56** configured to execute instructions and to carry out operations associated with the computer system **50**. For example, using instructions retrieved for example from memory, the processor **56** may control the reception and manipulation of input and output data between components of the computing system **50**. The processor **56**