processing includes providing a composite display that has characteristics based on the application display as well as characteristics relative to a virtual input device. The virtual input device display includes at least an input portion, to receive appropriate touch input to the touch screen relative to the displayed input device, for a user to interact with the virtual input device. The user interaction with the virtual input device includes activating portions of the virtual input device to provide user input to affect the application processing. The virtual input device (i.e., processing on the computer to accomplish the virtual input device) processes the user interaction and, based on the processing, provides the corresponding user input to the application.

[0029] The virtual input device display is typically highly correlated to the virtual input device processing of user interaction with the virtual input device. For example, if the virtual input device is a virtual keyboard, the virtual input device display may include a graphic representation of the keys of a typical QWERTY keyboard, whereas virtual input device processing of user interaction with the virtual keyboard includes determining which virtual keys have been activated by the user and providing corresponding input (e.g., letters and/or numbers) to the application.

[0030] Reference is made now to **FIGS. 1, 2, 3** and **3-1**. **FIG. 1** broadly illustrates processing to accomplish the composite display (i.e., composite of the application display and the virtual input device display) on the touch screen. **FIG. 2** illustrates an example of an application display on a touch screen, without a virtual input device being displayed on the touch screen. **FIG. 3** schematically illustrates an example composite display, whose components include an application display and a virtual input device display.

[0031] Referring first to **FIG. 1**, a flowchart illustrates processing steps executing on a computer such as the touch screen based computer illustrated in **FIG. 1-1**. First, processing steps of an application **102** executing on a computer are abstractly illustrated. The application may be, for example, an e-mail client program, word processing program or other application program. The application **102** executes in cooperation with an operating system program **104** executing on the computer. In particular, the operating system **104** provides the executing application **102** with access to resources of the computer. One resource to which the operating system **104** provides access is the touch screen.

[0032] The application **102** provides to the operating system **104** an indication of the characteristics of the application display. Broadly speaking, the indication of the characteristics of the application display includes data that, at least in part, is usable by the operating system to cause the application display to be generated on the touch screen.

[0033] The application display characteristics provided from the application **102** are typically related to a result of processing by the application. At least some of the characteristics of the application display may be known to, and/or controlled by, the operating system without the indication being provided by the application. These types of characteristics would typically be more generically display-related, such as "window size" of a window of the application display and background color of the window of the application display.

[0034] Given the characteristics of the application display, display processing **106** of the operating system program **104** determines the characteristics of a resulting display image, to be displayed on the touch screen, based at least in part on the indication of application display characteristics.

[0035] In addition, the operating system program **104** includes virtual keyboard processing **108**. More generally, the processing **108** may be processing for any virtual input device that is displayed on the touch screen and that receives user input from the touch screen. Initial characteristic processing **110** of the virtual keyboard processing **108** responds to a keyboard initiation event and determines initial display characteristics of the virtual keyboard. Ongoing characteristic processing **112** of the virtual keyboard processing **108** determines ongoing display characteristics of the virtual keyboard, typically based on activation of the virtual keys of the virtual keyboard but possibly also based on other conditions. (While the discussion here is relative to display characteristics of the virtual keyboard, it should be appreciated that operational characteristics of the virtual keyboard, such as mapping of keys to application input, are often intertwined with the display characteristics. The determined display characteristics of the virtual keyboard are provided to the display processing **106**.

[0036] The display processing **106** determines characteristics of a composite display, including displaying the virtual input device, based on the indicated characteristics of the virtual input device, in view of the indication of characteristics of the application display. More specifically, the virtual input device portion of the composite display is intelligent with respect to the characteristics of the application display. This is particularly useful, since the same touch screen is being used for both the virtual input device display output and the application display output. Displaying the virtual input device in a particular way for a particular application (i.e., for particular application display characteristics) can improve the usability of the touch screen to interact with the application using the virtual input device.

[0037] As mentioned above, **FIG. 2** illustrates an application display, without display of a virtual input device.

[0038] In accordance with an example, illustrated in **FIG. 3**, a resulting composite display is such that the application display (e.g., illustrated in **FIG. 2**) is substantially unchanged except, however that the virtual input display is overlaid on top of a portion, but not all, of the application display. In accordance with another example, illustrated in **FIG. 3-1**, a resulting composite display is such that the application display (e.g., illustrated in **FIG. 2**) is substantially unchanged except, however, that the application display is "slid up" and the virtual input device is displayed in the portion of the touch screen vacated by the "slid up" application display.

[0039] The display processing **106** accounts for the indicated characteristics of the application display to determine the location of the virtual input device display in the composite display on the touch screen. For example, the display processing **106** may determine characteristics of the composite display such that significant portions of the application display, such as an input field associated with the application display (and the virtual input device), are not covered by the virtual keyboard display.

[0040] That is, an input field of an application display is typically determined to be significant because it may repre-