

**METHODS AND SYSTEMS FOR INCREASING
THE INPUT EFFICIENCY OF PERSONAL DIGITAL
ASSISTANTS AND OTHER HANDHELD
STYLUS-ENGAGABLE COMPUTING DEVICES**

TECHNICAL FIELD

[0001] This invention relates to methods and systems for increasing the input efficiency of personal digital assistants and other handheld stylus-engagable computing devices.

BACKGROUND

[0002] With the increased mobility of people in today's workforce, the demand for mobile computing and communication capabilities outside of the office has also increased. Those inside the office, as well as those who typically work outside the office such as salespeople and field professionals, often require the ability to communicate with others and access various data files. In response to this demand, handheld computing devices such as personal digital assistants (PDAs) have been developed.

[0003] A PDA is a compact device that can serve various functions including a cellular phone, facsimile transmitter, personal organizer, and the like. PDAs typically include a stylus and a touch screen for user input, and may include a keyboard. PDAs can be used for such things as sending and retrieving e-mail, Web browsing, and data-sharing applications over the Internet, intranet or corporate networks.

[0004] FIG. 1 shows an exemplary PDA 100 including a stylus 102. PDA 100 includes a housing 104 that defines a display area 106 that supports a touch screen 108. Various user-engagable buttons 110 are provided and enable a user to interact with the PDA. To interact with the PDA, the user can either use buttons 110 to make various menu selections that are displayed on the touch screen 108, or they can use stylus 102 to physically engage the touch screen.

[0005] Because of the compact nature of PDAs, there are some fundamental issues that have evolved with respect to their input efficiency. Specifically, the input fidelity in PDAs is typically very low. There is a stylus that will allow a user to touch on various places on the screen. There typically is not a keyboard per se, so if a user wishes to enter a large volume of information rapidly, they really don't have that capability.

[0006] There have been attempts in the past directed to solving the input fidelity issues regarding PDAs.

[0007] One such attempt provides character recognition technology whereby a user can write on the touch screen using the stylus, or have a small keyboard pop up on the display that can then be used to touch-select letters. This attempt can be slow and cumbersome. For example, due to the small screen real estate area, it is often inconvenient and difficult to write large amounts of information on the touch screen. In addition, the small screen real estate can adversely affect the visual resolution of the displayed keyboard, thus making input activities more difficult.

[0008] Another attempt to solve the input fidelity issues regarding PDAs places a large number of buttons on the PDA and/or screen for the user to engage. This attempt is limited by the form factor or size of the PDA. Consider again

FIG. 1. There simply is not a great deal of space available to accommodate a large number of additional buttons.

[0009] Yet another attempt to solve the input fidelity issues regarding PDAs provides a "drill down" functionality that allows a user to drill down to various lower level menus which, in turn, display additional and different menu options. One way of doing this is to have the stylus physically engage the screen for a predetermined time period (e.g. 3 seconds), whereupon a second menu can pop up and be displayed. This attempt requires extra time and effort on the user's part to drill down through the various menus. In addition, this attempt can be confusing to use and can result in the user following unintended menu branches. This drill down problem is similar to the drill down problem that exists in cell phones having drill down capabilities. Anyone who has ever attempted to use the drill down capabilities in a cell phone has probably experienced at least one unintended frolic through menu selections that they were not looking for.

[0010] Accordingly, this invention arose out of concerns associated with improving the input fidelity of personal digital assistants (PDAs) and other handheld computing devices.

SUMMARY

[0011] Methods and systems for enhancing the input fidelity of personal digital assistants (PDAs), and other handheld, stylus-engagable computing devices are described. In some embodiments, this can be done by associating input commands with different user-input activities, including different combinations of user-input activities. By using different combinations of user-input activities to designate particular input commands, a more robust collection of commands can be provided to a user in a manner that is simple, straight-forward and easy to understand.

[0012] In some embodiments, methods and systems are provided that associate one or more input commands for use with a stylus-engagable, hand-held computing device, with a combination of user-input activities. The computing device comprises a touch screen that is engagable with a stylus. A combination of user-input activities is detected and an input command is generated that is associated with the detected combination of user-input activities. In some embodiments, one type of user-input activity comprises transmitting a signal from the stylus to the hand-held computing device. The generated command is then performed.

[0013] In other embodiments, methods and systems are provided that display a selectable area on a touch screen of a hand-held computing device. The selectable area is touch-selectable by a stylus that is associated with the handheld computing device. A first command is executed if a stylus engages the selectable area. A second different command is executed if the stylus engages the selectable area and the stylus transmits a receivable signal to the personal digital assistant.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The same numbers are used throughout the drawings to reference like features and components.

[0015] FIG. 1 is an illustration of a personal digital assistant.