

[0026] In a UI according to an embodiment of the present invention, the user experiences a particular sequence of events. The user begins at some point on a list. After the user rotates the jog/shuttle dial, the list rolls down at a low rate. As the user applies more force (i.e., rotates the jog/shuttle dial more) the scroll accelerates. After a predetermined time (e.g., about a second), a helper character is displayed. This character may represent a first letter of a name or a first digit of a telephone number. The character displayed is representative of a cluster of entries in the ordered list at the position currently being scrolled over. The UI displays the helper character to the user. The user continues to hold the scroll button until a help character, corresponding to his/her desired selection, appears. The user releases the scroll button and may slowly browse among a smaller group of data to locate the particular selection.

[0027] Refer to FIG. 1. The process, according to the present invention, is outlined. The procedure 100 begins at a list start point 110. The search is begun when the user rotates the knob 120 slightly. The UI does a slow scroll 130. If the scroll 130 is too slow, the user may rotate the knob 120 further. A helper character is displayed 150. The helper character 150 represents the cluster of data currently being scrolled over. The user observes the display until the helper character displayed is in the vicinity 160 of the data he/she desires; that is, the helper character indicates the cluster sought. Having found the desired data, the user releases the knob 170. The knob springs back to its neutral position thus assisting the user in arresting the scrolling quickly. The list either scrolls forward or backward depending upon whether the knob 120 is rotated clockwise or counter-clockwise.

[0028] In another embodiment according to the present invention, such a scrolling procedure 100 may also be performed using a pressure-sensitive device such as a touch pad. The scroll moves in proportion to the force exerted by the user's finger or stylus. Forward or backward motion of the scroll may be defined by selected areas on the touch pad.

[0029] Refer to FIG. 2. In an example screen UI 200, the user starts at a point in an alphabetically ordered list 210 whose entries begin with the letter "B." The user is interested in viewing an entry whose name begins with the letter "E." The user rotates the knob; the list starts to step down at a low rate. Scrolling starts off slowly at the rate of about one line per second in step 220.

[0030] If desired, the knob is rotated further and the scrolling speeds up in step 230. After a predetermined time (T_1) or number of items, the screen area for the scrolling list is replaced by a single large character representing the first character of the cluster of items currently displayed in the window (or on the first line of the window for a window that has multiple lines). It is difficult to read the entries as they pass; a large "helper" letter ("B") 240 supersedes above the list. In another embodiment, the "helper" letter may appear to the right or left (top or bottom) of the scrolled list and not cover the entire screen area.

[0031] After some time (T_2) or number of items, the character increments to the next possible value, as long as the user is holding down the scroll key. For example, in an alphabetically sorted list of names, the user might have started scrolling from "C", after holding the key down for 3 seconds, stepping slowly through the entries starting with "C", the list of discrete entries is replaced by a large "C"

which overlaps the whole UI. As long as the user continues to maintain orientation of the knob, the letter will change, at about one second intervals to "D", then "E", etc

[0032] The list goes through the alphabet, as depicted by helper letters "C"241, "D"242, and "E"243. The user releases the scroll button, having reached the vicinity of interest in step 244, upon viewing the helper letter "E"243. When the user finally releases the knob, the entry in the list "closest" to the helper letter (or letters) is selected and displayed as the first item in the scroll list window in the UI screen 200.

[0033] In another example embodiment, the character displayed on the screen during the fast scroll does not necessarily need to be tied to the entries in the list being scrolled. For instance, the list may contain an alphabetically sorted list of names, with no entries for "L" and "M", but that does not mean that the fast scroll mechanism needs to skip those letters during its operation. There are advantages in doing this. The list need not be traversed to retrieve entries for each increment, hence saving processing time. The user is not "caught-out" by the list suddenly jumping from "K" to "N".

[0034] An example embodiment may also incorporate "decelerating" the scroll. If the user releases the knob momentarily during the "fast scroll", but re-rotates the knob before a certain time elapses (T_3), the scroll continues. The spring-loaded knob also provides for a rapid stop of the scrolling data so that the user does not overshoot his desired selection. The neutral position is defined as "stop." Rather than the single character being displayed incrementing on screen at the T_2 rate, a second letter appears alongside the first and that would increment instead. For example, the display would increment as "EA," "EB," "EC." This of course can be extended to a third and four letters, as appropriate for a given application. Each subsequent short release of the scroll knob adds an additional letter to the display. The helper display encompasses a smaller subset of scrolling data. This short-release of the knob may be described as momentarily releasing the knob so that it springs back to the neutral position, then re-rotating it (at a predetermined angle) to continue the scrolling. Again, as mentioned earlier, the helper characters may be displayed along the side of the scrolled list.

[0035] As explained above with respect to some examples, aspects of the invention reside in providing an ergonomic user-interface for finding a specific information item in an ordered list or array. While scrolling through the list or array, the representations of the individual items get blurred and cannot be recognized anymore. An aspect of the invention addresses the issue of displaying a meta item that is representative of a group of items that is currently being scrolled.

[0036] The ergonomic user-interface may also include not only graphical, visually oriented user-feedback of the helper character but may include aurally oriented audio feedback or touch-oriented tactile feedback. For example, one who is blind may be able to use such an equipped device to listen to the helper character or feel a Braille representation thereof. Further information on an audio interface U.S. patent application Ser. No. 09/464,855 (Docket Number PHA 23,875) filed on Dec. 16, 1999, titled, "Hand-Ear Interface for Handheld Device," incorporated by reference herein its entirety.