USER INTERFACE FOR ELECTRONIC DEVICES FOR CONTROLLING THE DISPLAYING OF LONG SORTED LISTS

PRIORITY OF EARLIER APPLICATION

[0001] This application claims the benefit of Provisional Application (Attorney Docket No. US 028002P) filed on Jan. 8, 2002 which is hereby incorporated by reference.

FIELD OF THE INVENTION

[0002] The present invention is generally directed to electronic devices and their user-interfaces. In particular, the present invention relates to a user-interface suitable for portable electronic devices.

BACKGROUND OF INVENTION

[0003] The increasing functionality of electronic devices provides the user more convenience in adapting a piece of gear to his or her specific requirements. With the increasing number of features available in a piece of gear there has not been a concomitant increase of the gear's size. Technology has made it possible to pack many transistors in the underlying circuits that make up the gear. For example, computing capability that once required a space on a tabletop now fits in the palm of one's hand. Similar trends are exhibited in audio/visual equipment, wireless telephones, diagnostic medical equipment and the like. Consequently, the user-interface is scaled-down with the size of the equipment.

[0004] Although one can miniaturize the equipment, a challenge exists to enable the user to easily interact with such equipment and yet maintain features. Human physiology sets limits as to how small a piece of equipment may be made and yet still be sufficiently convenient and enjoyable to use. Attributes found on larger gear, for example a laptop computer and its keyboard and display, provide high functionality and ease of use. The keyboard accommodates the hands and the display is large enough to be easy to read. However, such attributes may have to be sacrificed in going smaller. However, the sacrifice cannot be so great as to render the miniaturized gear too bothersome and too limited in capability

SUMMARY OF THE INVENTION

[0005] In many pieces of gear, the user interface prominently features a spring-loaded control knob. For example, in a video cassette recorder (VCR) the tape may be moved forward or backward by the user turning a knob clockwise or counter-clockwise a predetermined number of degrees. Twisting the knob to the extreme clockwise or counter-clockwise rotation causes the tape to either fast-forward or fast-rewind. Turning the same knob an incremental amount allows the tape to advance in a step-wise manner typically advancing frame-by-frame. The knob in a neutral position, not turned in opposition to a spring force, results in the tape being in a freeze-frame.

[0006] Thus, on a tape, the user may conveniently fast forward through unwanted information or pause to view the desired scenes. However, as one fast-forwards the tape he must cross through the unwanted information (i.e., the tape must pass over the VCR's playback heads), for the medium is serial. The information observed is literal. He cannot go to one piece of information without passing another along the way.

[0007] Media in which one can randomly access data does not have the above limitation. Such random access media include, but not limited, disk drives and memory. Such disk drives may be optical or magnetic. Memory may include random access memory (RAM), read only memory (ROM), programmable ROM, dynamic RAM, static RAM, and variations of these. One does not have to pass through the unwanted information. A representation of the stored data is usually placed in an index. Thus, one scrolls through the index to find the literal location on the medium for the desired information.

[0008] Such storage may exist for the user locally or be available on equipment coupled via a wired or wireless network. Consequently, application of a spring-loaded control knob (or a representation thereof) may be applied to obtaining access to information stored in random access media.

[0009] There exists a need to provide a user-interface (UI) that maintains functionality and ease of use while keeping the size of the screen and number of controls for the interface small. A consumer electronics device may have a small screen to indicate to the user which functions are available or have been used. The small screen is often a digital display of limited bit-depth. Consequently, it is not possible to render large amounts of data on the screen and have it be readable as it is on a large laptop computer display. Also it is impractical to employ the same keyboard interfaces that are used with a laptop computer. Multiple functionality has to be built into the UI so that it may keep the consumer electronics device small and light enough to fit into the user's hand.

[0010] On a piece of consumer electronics gear according to the present invention, the searching and viewing of data of long lists the scrolling through a large ordered list may be facilitated by the UI having a force-sensitive interface that provides tactile feedback (resistance) to the user in proportion to the displacement applied. The displacement applied may be any linear, rotational, compressive, tensile force applied. Such a control may comprise a spring-loaded jog/shuttle knob. The knob may also be emulated on a display device. The scrolling speed is determined by how many degree the knob is rotated. The direction of the scrolling is determined by whether the knob is rotated clockwise or counter-clockwise. Other devices similar to the jog-shuttle knob may include joysticks and spring-loaded scroll wheels. Additionally, pressure-sensitive devices such as touch pads on laptop PCs or drawing tablets may enable the user to scroll through a large list. The speed of the scrolling is for example, proportional to the pressure applied. The present invention is exemplified in a number of implementations, a number of which are summarized below. Thus, the invention contributes to user-friendliness of information management and retrieval systems based on ordered lists.

[0011] In one embodiment according to the present invention, a consumer electronics device comprises an information rendering device and a force-sensitive interface. The force-sensitive interface is operative to enable a user to scroll through an order list on the information-rendering device. A feature of this embodiment is that the jog/shuttle