

devices; (J) Transitioning between regular operation and EZ Access operation should be seamless; and (K) Adding accessibility features should not significantly add to the cost of the device.

[0016] Another implementation is described in a document entitled, "Use of audio-haptic interface techniques to allow nonvisual access to touchscreen appliances"; Available from http://trace.wisc.edu/docs/audio_haptic_interfaces/audio_h.html. The document notes various elements and principles for audio-haptic interface techniques. The document describes various approaches by which a Talking Finger Technique (many ways similar to the techniques in Vanderheiden I, II and III above) can be made more usable by visually impaired people. Most of the techniques address the layout of options on a touch screen, audio augmentations as a user moves finger around the screen, organization of different accesses, etc. However, a visually impaired person may continue to spend substantial amount of time in locating a desired choice of interest.

[0017] In another prior approach, a speech recognition apparatus may be used to enable a visually impaired person to simply speak the choices of interest, and the speech recognition apparatus processes the sounds to recognize the choice spoken. Unfortunately, speech recognition systems may not accurately decipher the accents of various people and may thus not be considered acceptable at least in some environments. In addition, the systems may be expensive to purchase/implement.

[0018] In another alternative approach, a braille key board may be provided along with transaction kiosks. Such keyboards may be available from www.keyboards.com. as described in a news release entitled, "New Braille Keyboard designed for kiosks and ATMs", as noted at URL—<http://www.kiosks.org/articles/pr12040a.html>. Unfortunately not all visually impaired people may be trained in braille, and thus the solution may not be acceptable in several situations.

[0019] What is therefore needed is touch screen based selection apparatus which is user-friendly for visually challenged people.

SUMMARY OF THE INVENTION

[0020] A system provided according to an aspect of the present invention includes a touch screen containing multiple touch buttons, and a guide structure disposed along the multiple touch buttons. The guide structure may contain multiple touch points which provide a different sensation when a person guides an object along the guide structure. A touch point may correspond to a specific one of the touch buttons.

[0021] A processor may cause multiple choices to be displayed on the touch screen, with each choice being displayed associated with a corresponding one of the touch buttons. A person can slide a finger along the guide structure to determine a touch point. The touch button corresponding to the touch point may then be easily located.

[0022] As the guide structure can be implemented cost-effectively, the marginal additional cost for facilitating the selection, may be minimal. In addition, the selection of choices may be simplified as a person merely needs to guide a finger (object) along the guide structure to at least position the finger close to the selection choices. Additional cost

savings can be recognised as the amount of touch area on a touch screen can be reduced due to the simplification of the manner in which a person is able to locate the choices presented.

[0023] In an embodiment, the system further contains multiple exits, with each exit being designed to lead the object from a corresponding touch point to a corresponding touch button. Thus, a person can identify a location corresponding to a touch button by first identifying a touch point based on the different sensation and then use the corresponding exit to locate the corresponding touch button.

[0024] The guide structure may further contain a reference point. An audio enhancement (e.g., a speaker and an audio controller) may be designed to read out the choices presently displayed on a display area, with each choice being associated with a number which represents a number of touch buttons a corresponding choice is located from the reference point.

[0025] As the selection of a desired choice is simplified according to various aspects of the present invention, the extent (total touch area) of the touch area can be reduced. The overall cost of implementing a system may also be reduced as a result.

[0026] The guide structure may be implemented with different shapes and structures. In an embodiment, the guide structure contains a groove and each touch point is implemented as a bump in the groove. In an alternative embodiment, the guide structure is implemented as a projected structure and each touch point is implemented as a depression.

[0027] Further features and advantages of the invention, as well as the structure and operation of various embodiments of the invention, are described in detail below with reference to the accompanying drawings. In the drawings, like reference numbers generally indicate identical, functionally similar, and/or structurally similar elements. The drawing in which an element first appears is indicated by the leftmost digit(s) in the corresponding reference number.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The present invention will be described with reference to the accompanying drawings, wherein:

[0029] FIG. (Fig.) 1 depicts portion 100 of a selection apparatus illustrating the manner in which a person may conveniently select a choice in a menu; and

[0030] FIG. 2 is a block diagram illustrating an example system in which the present invention can be implemented.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0031] 1. Overview and Discussion of the Invention

[0032] A touch screen based selection apparatus according to an aspect of the present invention contains a guide structure having multiple points ("touch points") which provide a different touch sensation when a user slides a finger along the guide structure. A convenient exit may be provided to a corresponding selection button (contained in the touch screen) from each point. Thus, a visually impaired person ("person") may slide a finger along the guide structure, feel