METHOD FOR ADJUSTING THE USER INTERFACE OF A DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/223,003 filed on 3 Jul. 2009, and 61/303,214 filed on 10 Feb. 2010, which are both incorporated in their entirety by this reference.

[0002] This application is related to U.S. application Ser. No. 11/969,848 filed on 4 Jan. 2008 and entitled "System and Method for Raised Touch Screens", and U.S. application Ser. No. 12/319,334 filed on 5 Jan. 2009 and entitled "User Interface System", which are both incorporated in their entirety by this reference.

TECHNICAL FIELD

[0003] This invention relates generally to touch sensitive user interfaces, and more specifically to a new and useful mountable systems and methods for selectively raising portions of touch sensitive displays.

BACKGROUND

[0004] The user interface system of U.S. application Ser. Nos. 11/969,848 and 12/319,334 is preferably used as the user interface for an electronic device, more specifically, in an electronic device that benefits from an adaptive user interface. The user interface system functions to provide a tactile guide and/or feedback to the user. Because of the variety of devices and uses that the user interface system may be used for, for example, an automotive console, a tablet computer, a smartphone, a personal navigation device, a personal media player, a watch, a remote control, a trackpad, or a keyboard, the user interface system must accommodate to each application to provide the user with the kind of tactile guide and/or feedback that facilitates the user in the operation of the device **10**. In addition, each user may have a different preference for the kind of tactile guide and/or feedback that is most useful to them in facilitating the operation of the device. For example, while some users may prefer a larger surface area of tactile guidance, others may prefer a larger degree of deformation of the surface area of tactile guidance. Because of the large range of usage scenarios, determining an average user interface system setting that may accommodate to a relatively large range of user preferences for each usage scenario requires a substantial amount of time and research. In addition, because of the large range of user preferences, configuring one set of settings for each use scenario may not provide a user with their preferred tactile guidance and/or feedback. This invention allows the user to adjust the characteristics of the user interface system in order to allow the user interface system to efficiently accommodate to both the usage scenario and the user in a large range of devices and usage scenarios.

BRIEF DESCRIPTION OF THE FIGURES

[0005] FIGS. **1** and **2** are a first and second variation of the method of the preferred embodiments, respectively.

[0006] FIG. **3** is a top view of the user interface system of a preferred embodiment.

[0007] FIGS. **4***a* and **4***b* are cross-sectional views of the tactile interface layer of a first and second variation, respectively.

[0008] FIGS. **5***a*, **5***b*, and **5***c* are cross-sectional views illustrating the operation of a particular region of the surface of the tactile interface layer in accordance to the preferred embodiments.

[0009] FIGS. **6***a* and **6***b* is a representation of a set of variations to the user interface system.

[0010] FIGS. **7-9** are examples of input interfaces provided to the user on the device.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] The following description of the preferred embodiments of the invention is not intended to limit the invention to these preferred embodiments, but rather to enable any person skilled in the art to make and use this invention.

[0012] As shown in FIGS. **1** and **2**, the method **S100** of the preferred embodiments for adjusting a user interface for a device preferably includes providing a user interface to retrieve a user input Step **S110**, providing a tactile interface layer that defines a surface and includes a volume of fluid and a displacement device that manipulates the volume of fluid to deform a particular region of the surface into a tactilely distinguishable formation Step **S120**, retrieving a user preference between a first choice of type, location, and/or timing and a second choice of kind, location, and/or timing through the user interface Step **S130**, and manipulating the volume of fluid to deform a particular region of the surface into a tactilely distinguishable formation of the chosen type, location, and/or timing Step **S140**. The tactile interface layer may also include a sensor that detects a user input at the tactilely distinguishable formation. In this variation, the step of retrieving a user preference **S130** may also include retrieving a user preference between a first sensitivity and a second sensitivity for the sensor through the user interface and the step of manipulating the volume of fluid to deform a particular region of the surface Step **S140** may include manipulating the volume of fluid to deform a particular region of the surface into one of a first embodiment of tactilely distinguishable formation for the first sensitivity for the sensor and a second embodiment of tactilely distinguishable formation for the second sensitivity of the sensor based on the user preference. The step of providing a user interface to retrieve a user input **S110** may include providing a user interface to retrieve a user input on the device, providing a user interface to retrieve a user input on the tactile interface layer, providing a user interface to retrieve a user input that is on both the device **10** and the tactile interface layer, providing a user interface on a remote control for the device **10** (for example, a wireless remote control), or providing a user interface in any other suitable arrangement.

1. Providing a Tactile Interface Layer

[0013] As shown in FIGS. **3** and **4**, the tactile interface layer too provided in Step **S120** of the preferred embodiment includes: a layer **110** defining a surface **115**, a substrate **120** supporting the layer **110** and at least partially defining a fluid vessel **127**, and a displacement device **130** coupled to the fluid vessel **127** that influences the volume of fluid **112** within the fluid vessel **127** to expand and retract at least a portion of the fluid vessel **127**, thereby deforming a particular region **113** of the surface **115**. The surface **115** is preferably continuous, such that when swiping a finger across the surface **115** a user would not feel any substantial seams or any other type of