METHOD FOR ACTUATING A TACTILE INTERFACE LAYER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/325,772, filed on 19 Apr. 2010, which is incorporated in its 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", U.S. application Ser. No. 12/319,334 filed on 5 Jan. 2009 and entitled "User Interface System", U.S. application Ser. No. 12/497,622 filed on 3 Jul. 2009 and "User Interface System and Method", which are all incorporated in their entirety by this reference.

TECHNICAL FIELD

[0003] This invention relates generally to tactile user interfaces, and more specifically to a new and useful mountable systems and methods for selectively raising portions of a surface of the user interface of a device.

BACKGROUND

[0004] As more devices utilize touch screen technology that does not provide physical buttons to a user, tactile interface layers that include deformable regions that function to provide tactile guidance and/or feedback to a user for a device become useful in bridging the need for the flexibility of a touch screen and the desire for tactile guidance in using the device. Such tactile interface layers (for example, the type described in U.S. application Ser. Nos. 11/969,848, 12/319,334, and 12/497,622) introduce a substantially different type of user experience from what is available in the field. Actuation of such tactile interface layers is substantially different from existing keypads seen in the field. This invention provides a new and useful method for interpreting gestures as commands for a tactile interface layer with a deformable region.

BRIEF DESCRIPTION OF THE FIGURES

[0005] FIG. **1** is a schematic representation of the method of the preferred embodiments.

[0006] FIG. **2** is a top view of a variation of the tactile interface layer.

[0007] FIG. **3** is a cross sectional view of a variation of the tactile interface layer.

[0008] FIG. **4** is a cross-sectional view illustrating the operation of a deformable region of a tactile interface layer.

[0009] FIG. **5** is a cross sectional view of a variation of the tactile interface layer with a valve.

[0010] FIG. **6** is a schematic representation of a variety of gestures and exemplary interpretations as commands.

[0011] FIGS. **7***a* and **7***b* are schematic representations of a swiping gesture and the elimination of a deformed region as applied to the variation of the tactile interface layer in FIGS. **2-4**.

[0012] FIGS. **8***a* and **8***b* are schematic representations of a pinch open gesture and the creation of a deformed region as applied to the variation of the tactile interface layer in FIGS. **2-4**.

[0013] FIGS. **9***a* and **9***b* and **10***a* and **10***b* are schematic representations of a pinch open gesture and a change of the deformable region in a first and second variation, respectively, as applied to the variation of the tactile interface layer in FIGS. **2-4**.

[0014] FIGS. **11***a* and **11***b* are schematic representations of a drag gesture and a change in location of the deformed region, as applied to the variation of the tactile interface layer in FIGS. **2-4**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] 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.

[0016] As shown in FIG. **1**, the method S**100** for actuating a tactile interface layer **100** of a device that defines a surface with a deformable region of the preferred embodiments includes: detecting a gesture of the user along the surface of the tactile interface layer that includes a movement of a finger of the user from a first location (**1**) to a second location (**2**) on the surface Step Silo; interpreting the gesture as a command for the deformable region Step S**120**; and manipulating the deformable region of the surface based on the command Step S**130**. The method S**100** for actuating a tactile interface layer **100** may also include the step of receiving a user input for a particular interpretation of a gesture as a command Step S**140**. The step of receiving a user input for a particular interpretation of a gesture as a command Step S**140** may include receiving a user input from the user of the device, but may alternatively include receiving a user input from a person remote from the device, for example, a third party such as the manufacturer or a second user. However, the user input for a particular interpretation of a gesture as a command may be received from any other suitable user. The method S**100** is preferably applied to a tactile interface layer **100** that is to be used with an electronic device and, more preferably, in an electronic device that benefits from an adaptive user interface. The electronic device may include a display and may include a touch sensor. For example, the electronic device may be an automotive console, a steering wheel, a desktop computer, a laptop computer, a tablet computer, a television, a radio, a desk phone, a mobile phone, a PDA, a personal navigation device, a personal media player, a camera, a watch, a remote control, a mouse, a trackpad, or a keyboard. The tactile interface layer **100** may, however, be used as the user interface for any suitable device that interfaces with a user in a tactile and/or visual manner. The tactile interface layer **100** is preferably integrated with the device, for example, in the variation wherein the tactile interface layer **100** includes a sensor **140**, the tactile interface layer **100** is preferably assembled into the device and presented to the user as one unit. Alternatively, the tactile interface layer **100** may function as an accessory to a device, the user may be presented the tactile interface layer **100** and the device as two separate units wherein, when coupled to each other, the tactile interface layer **100** functions to provide tactile guidance to the user and/or to receive user inputs. However, the method S**100** may be applied to any other suitable arrangement of the tactile interface layer **100**.

[0017] The method S**100** of the preferred embodiments is preferably applied to any suitable tactile interface layer that includes deformable regions. In particular, as shown in FIGS. **2-4**, the method S**100** of the preferred embodiments may be applied to the user interface system as described in U.S. application Ser. Nos. 11/969,848, 12/319,334, and 12/497,