

In the preferred embodiment, tactile information 31-34 is integrally connected to touch screen surface 30 by having it molded into touch screen surface 30 when this surface is initially manufactured. For example, if touch screen surface 30 is made of glass, molten glass is forced into a mold that includes tactile information 31-34, and is allowed to cool. After the molten glass solidifies, the mold is removed. An alternate method of integrally connecting tactile information 31-34 to touch screen surface 30 is by applying small drops of clear epoxy to touch screen surface 30 to make tactile information 31-34. For example, tactile information 31 can be made by placing five small drops of epoxy within touch sensing region 21, and allowing it to dry. This method is particularly useful in retrofitting existing touch screen displays already out in the field. All that is needed is a tube of epoxy, and preferably a mask to insure proper positioning of the tactile information on touch screen display 20. Devcon 5 Minute Epoxy, manufactured by the Devcon Corporation, Wood Dale, Ill., is preferred for this alternate method, although other types of epoxy or similar adhesive could also be used. Ideally, the epoxy selected will dry to a relatively transparent consistency so as not to unacceptably interfere with the appearance of any visual data underneath the tactile information. Lens effect errors are minimal as long as the tactile information does not get too large.

Another alternate method of integrally connecting tactile information 31-34 to touch screen surface 30 is by covering touch screen surface 30 with a clear plastic sheet having tactile information 31-34 molded or punched thereon. For example, the plastic sheet could be pressed in a mold containing the tactile information, heated to deform the plastic sheet to the shape of the mold, and allowed to cool. This plastic sheet can then cover all or some of the touch screen surface, affixed either by surface tension or adhesive. A plastic sheet preferred for this alternate method is Polyethylene Terephthalate Glycol (PETG) having an approximate thickness of 40 mils, although other materials having varied thicknesses could also be used.

Referring again to FIG. 1, a visually impaired user would approach ATM 10, and could quickly surmise by detecting the braille markings on touch screen display 20 that ATM 10 was specially designed or adapted for use by the visually impaired. Alternately, speaker 70 could announce that Braille or other symbols were available for the visually impaired. ATM 10 could also contain a brief description 80 in Braille (or equivalent) telling a visually impaired user about the function of the machine. A visually impaired user could read description 80, determine this was a "visually-impaired friendly" ATM that was affiliated with his bank, put in his bank card, and press touch sensing region 21 (underneath or closely associated with tactile information 31, the braille "1"), to withdraw money from his bank. Subsequent screens could use tactile information 31-34 for other purposes; for example, the next screen may assign tactile information 31 to a request to withdraw \$10. Speaker 70 is preferably employed to give the visually impaired user aural feedback of his actions. Tactile information 34, which may be a question mark sign or other symbol, such as a triangle, could be used to direct a visually impaired user to touch sensing region 24 associated with a "help" key.

Sighted users may also find the tactile information to improve the usability of touch screens for them, since it

helps give them feedback that they are touching in the correct area.

FIG. 3 is similar to FIG. 1, but shows touch screen display 20 used with a computer system in a public information kiosk application.

While this invention has been described with respect to the preferred and alternate embodiments, it will be understood by those skilled in the art that various changes in detail may be made therein without departing from the spirit, scope and teaching of the invention. For example, touch screen 20 could also be used as an information panel in consumer products, such as stereo equipment, or in transportation equipment, such as planes, trains, or automobiles. Other methods of integrally connecting tactile information to touch screen surface 30 could also be employed. For example, the tactile information could be drilled or molded into the touch screen surfaces. In this case, the "depth" of the tactile information is measured into the touch screen surface instead of out from the touch screen surface. Accordingly, the herein disclosed is to be limited only as specified in the following claims.

What is claimed is:

1. A touch sensitive screen display, comprising:

a touch sensitive screen surface having a height and a width;

tactile information integrally connected to at least one touch sensing region on said touch sensitive screen surface, said tactile information having a depth;

wherein said touch sensitive screen surface is relatively smooth except for said at least one touch sensing region; and

wherein said depth of said tactile information is sufficient to allow said tactile information to be perceived by human touch.

2. The touch sensitive screen display of claim 1, wherein said tactile information is comprised of one or more Braille characters.

3. The touch sensitive screen display of claim 1, wherein said tactile information is comprised of one or more symbols.

4. The touch sensitive screen display of claim 1, wherein said tactile information is composed of epoxy cement.

5. The touch sensitive screen display of claim 1, wherein said tactile information is contained on a sheet covering said touch sensitive screen surface.

6. The touch sensitive screen display of claim 1, wherein said tactile information is molded into said touch sensitive screen surface.

7. A computer system, comprising:

a processor;

memory, connected to said processor;

storage media, connected to said processor;

a touch sensitive screen display, further comprising: a touch sensitive screen surface having a height and a width;

tactile information integrally connected to at least one touch sensing region on said touch sensitive screen surface, said tactile information having a depth;

wherein said touch sensitive screen surface is relatively smooth except for said at least one touch sensing region; and

wherein said depth of said tactile information is sufficient to allow said tactile information to be perceived by human touch.