

[0029] FIG. 5 illustrates the use of a user interface for alerts that can be embodied in the mobile terminal of FIG. 2.

[0030] FIG. 6 illustrates the use of a user interface for activity monitoring that can be embodied in the mobile terminal of FIG. 2.

[0031] FIG. 7 is a flow chart illustrating a method according to an embodiment that can be executed in the mobile terminal of FIG. 2.

#### DETAILED DESCRIPTION OF EMBODIMENTS

[0032] The disclosed embodiments will now be described more fully hereinafter with reference to the accompanying drawings, in which certain embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided by way of example so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

[0033] FIG. 1 illustrates an example of a cellular telecommunication system in which the invention may be applied. In the telecommunication system of FIG. 1, various telecommunication services such as cellular voice calls, www/wap browsing, cellular video calls, data calls, facsimile transmissions, music transmissions, still image transmissions, video transmissions, electronic message transmissions and electronic commerce may be performed between a mobile terminal 100 according to the disclosed embodiments and other devices, such as another mobile terminal 106 or a stationary telephone 119. It is to be noted that for different embodiments of the mobile terminal 100 and in different situations, different ones of the telecommunication services referred to above may or may not be available; the invention is not limited to any particular set of services in this respect. The mobile terminal 100 is connected to local devices 101, e.g. a headset, using a local connection, e.g. Bluetooth™ or infrared light.

[0034] The mobile terminals 100, 106 are connected to a mobile telecommunications network 110 through RF links 102, 108 via base stations 104, 109. The mobile telecommunications network 110 may be in compliance with any commercially available mobile telecommunications standard, such as GSM, UMTS, D-AMPS, CDMA2000, FOMA and TD-SCDMA.

[0035] The mobile telecommunications network 110 is operatively connected to a wide area network 112, which may be Internet or a part thereof. A server 115 has a data storage 114 and is connected to the wide area network 112, as is an Internet client computer 116.

[0036] A public switched telephone network (PSTN) 118 is connected to the mobile telecommunications network 110 in a familiar manner. Various telephone terminals, including the stationary telephone 119, are connected to the PSTN 118.

[0037] An front view of an embodiment 200 of the mobile terminal 100 is illustrated in more detail in FIG. 2a. The mobile terminal 200 comprises a speaker or earphone 222, a microphone 225, a display 223 and a set of keys 224.

[0038] FIG. 2b is a side view of the mobile terminal 200, where the keypad 224 can be seen again. Furthermore, parts of a haptic array 226 can be seen on the back of the mobile terminal 200. It is to be noted that the haptic array 226 does not need to be located on the back of the mobile terminal 200; the haptic array 226 can equally be located on the front face,

next to the display 223 or on any of the side faces. Optionally, several haptic arrays 226 can be provided on one or more faces.

[0039] FIG. 2c is a back view of the mobile terminal 200. Here the haptic array 226 can be seen in more detail. This haptic array comprises a number of haptic elements 227, 228 arranged in a matrix. The state of each haptic element 227, 228 can be controlled by the controller (331 of FIG. 3) in at least a raised state and a lowered state. The haptic element 227 is in a raised state, indicated in FIG. 2c by a filled circle, and the haptic element 228 is in a lowered state, indicated in FIG. 2c by a circle outline. Optionally, as a further refinement, the haptic elements 227, 228 are controllable to states between the raised and the lowered states. As the user can feel the difference between a lowered and a raised element, output information can be conveyed to the user from the controller (331 of FIG. 3) by controlling the elements of the haptic array 226 in different combinations. Furthermore, user contact with haptic elements can be detected and fed to the controller (331 of FIG. 3). In other words, when the user presses or touches one or more haptic elements, this can be interpreted as user input by the controller, using information about which haptic element the user has pressed or touched. The user contact with the haptic element can be detected in any suitable way, e.g. mechanically, using capacitance, inductance, etc. The user contact can be detected in each haptic element or in groups of haptic elements. Optionally, the user contact can be detected by detecting a change, e.g. in resistance or capacitance, between a haptic element in question and one or more neighboring haptic elements. The controller can thus detect when the user presses haptic elements, and also which haptic elements that are affected. Optionally, information about intensity, e.g. pressure, is also provided to the controller.

[0040] The internal component, software and protocol structure of the mobile terminal 200 will now be described with reference to FIG. 3. The mobile terminal has a controller 331 which is responsible for the overall operation of the mobile terminal and is preferably implemented by any commercially available CPU ("Central Processing Unit"), DSP ("Digital Signal Processor") or any other electronic programmable logic device. The controller 331 has associated electronic memory 332 such as RAM memory, ROM memory, EEPROM memory, flash memory, hard drive, optical storage or any combination thereof. The memory 332 is used for various purposes by the controller 331, one of them being for storing data and program instructions for various software in the mobile terminal. The software includes a real-time operating system 336, drivers for a man-machine interface (MMI) 339, an application handler 338 as well as various applications. The applications can include a media player application 340, an alarm application 341, as well as various other applications 342, such as applications for voice calling, video calling, web browsing, messaging, document reading and/or document editing, an instant messaging application, a phone book application, a calendar application, a control panel application, one or more video games, a notepad application, etc.

[0041] The MMI 339 also includes one or more hardware controllers, which together with the MMI drivers cooperate with the haptic array 326, the display 323/223, keypad 324/224, as well as various other I/O devices 329 such as microphone, speaker, vibrator, ringtone generator, LED indicator, etc. As is commonly known, the user may operate the mobile terminal through the man-machine interface thus formed. The