of touch-sensitive interface **114**. For example, the processor may output a haptic effect that simulates the texture of sand to confirm that processor **110** has received the user input. In other embodiments, the processor may determine a different texture, for example, the texture of water, ice, oil, rocks, or skin. In some embodiments, the haptic effect may serve a different purpose, for example, alerting the user of boundaries on display **116**, or providing the user with haptic information about the image on display **116**. For example, in some embodiments, each icon on display **116** may comprise a different texture and when the user moves his/her finger from one icon to another, the processor will determine a haptic effect that simulates the texture of each icon. In further embodiments, the processor may change the texture when the user's finger moves from contact with an icon to contact with the background of the display, thus alerting the user that he/she is no longer touching the icon.

[0050] As shown in FIG. **1**, processor **110** is also in communication with speaker **120**. Speaker **120** is configured to receive audio signals from processor **110** and output them to the user. In some embodiments, the audio signals may be associated with the haptic effect output by actuator **118**, or the image output by display **116**. In other embodiments, the audio signal may not correspond to the haptic effect or the image.

[0051] In some embodiments, processor **110** may further comprise one or more sensors, for example, a GPS sensor, an imaging sensor, accelerometer, location sensor, rotary velocity sensor, light sensor, camera, microphone, or some other type of sensor. The sensor may be configured to detect changes in acceleration, inclination, inertia, or location. For example, messaging device **102** may comprise an accelerometer configured to measure the messaging device's acceleration. The sensor is configured to transmit sensor signals to processor **110**.

[0052] The sensor signals may comprise one or more parameters associated with a position, a movement, an acceleration, or a "jerk" (i.e. the derivative of acceleration) of the messaging device **102**. For example, in one embodiment, the sensor may generate and transmit a sensor signal comprising a plurality of parameters, each parameter associated with a movement along or about one measured translational or rotational axis. In some embodiments, the sensor outputs voltages or currents that processor **110** is programmed to interpret to indicate movement along one or more axes.

[0053] In some embodiments, processor **110** will receive the sensor signal and determine that it should activate a virtual workspace and interpret sensed movement of the messaging device **102** in an X, Y, or Z direction as corresponding to a virtual movement "within" the virtual workspace. The user may then move device **102** within the virtual workspace to select functions or files, by gesturing within the virtual space. For example, by moving the messaging device **102** in the Z-Axis overtop of a function within the virtual workspace. In some embodiments, the user may use gestures within the virtual workspace to modify the haptic effects output by messaging device **102**.

[0054] FIG. **2** is an illustration of a system for a texture engine according to one embodiment of the present invention. FIG. **2** comprises a messaging device **200**, such as a mobile phone, PDA, portable media player, portable gaming device, or mobile computer. The messaging device **200** is configured to send and receive signals, such as voicemail, text messages, and other data messages, over a network such as a cellular network or the Internet. The messaging device **200** may comprise a wireless network interface and/or a wired network interface (not shown in FIG. **2**). Although the device **200** is illustrated as a handheld messaging device in FIG. **2**, other embodiments may comprise different devices, such as video game systems and/or personal computers.

[0055] As shown in FIG. **2**, the messaging device **200** comprises a housing **202** and a display **216**. In some embodiments, display **216** may comprise an LCD display. In other embodiments, display **216** may comprise a plasma display, or other type of display known in the art. Display **216** is configured to receive a display signal and output an image associated with that display signal. In some embodiments, the display signal may comprise a vga, hdmi, svga, video, s-video, or other type of display signal known in the art. In the embodiment shown in FIG. **2**, display **216** comprises a textured ball **204**. Display **216** further comprises texture selection icons **206**, which comprise the textures of rocks, sand, and water.

[0056] Referring still to FIG. **2**, the messaging device **200** further comprises a manipulandum **214**. In the embodiment shown in FIG. **2**, the manipulandum **214** comprises a roller ball and buttons. The messaging device **200** also comprises a touch-sensitive interface **218**. In the embodiment shown in FIG. **2**, touch-sensitive interface **218** comprises a touch-screen positioned overtop of display **216**. In some embodiments, display **216** and the touch-screen may comprise a single integrated component, such as a touch-screen display.

[0057] Manipulandum **214** and touch-sensitive interface **218** are configured to detect user interaction and transmit interface signals corresponding to the user interaction to the processor. In some embodiments, the user interaction is associated with a graphical user interface shown on display **216**. In such an embodiment, the processor receives the interface signal and, based at least in part on the interface signal, manipulates the graphical user interface. For example, in the embodiment shown in FIG. **2**, the user may use either manipulandum **214** or touch-sensitive interface **218** to select one of texture selection icons **206**. Once the user has selected a texture for textured ball **204**, its appearance on the screen may change to correspond to that texture. For example, if the user selects the sand texture icon, the processor may manipulate the display to give textured ball **204** the appearance of a sandy surface, and further determine a haptic effect that causes the user to feel a sandy texture when interacting with textured ball **204**. Or, in another embodiment, if the user selects the rocky texture icon, the processor may determine a haptic effect that causes the user to feel a rocky texture when the user interacts with textured ball **204**.

[0058] Messaging device **200** further comprises an actuator configured to receive a haptic signal and output a haptic effect (not shown in FIG. **2**). In some embodiments, the haptic effect comprises a vibrotactile texture felt by the user of messaging device **200**. Processor **110** is configured to determine a haptic effect and transmit a haptic signal corresponding to the haptic effect to the actuator. In some embodiments, determining a haptic effect may comprise a series of calculations to determine the haptic effect. In other embodiments, determining the haptic effect may comprise accessing a lookup table to determine the appropriate haptic effect. In still other embodiments, determining the haptic effect may comprise using a combination of lookup tables and algorithms. Once processor **110** determines the haptic effect, it transmits a haptic signal associated with the haptic effect to the actuator. The actuator receives the haptic signal from processor **110** and generates the haptic effect. The user may feel the haptic effect via the