[0025] FIG. **9** illustrates a user interface system according to another embodiment of the present invention; and

[0026] FIG. **10** illustrates a user interface system according to still another embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The embodiments are described below to explain the present invention by referring to the figures.

[0028] The present invention is described hereinafter with reference to flowchart illustrations of user interfaces, methods, and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations, and combinations of blocks in the flowchart illustrations, can be implemented by computer program instructions. These computer program instructions can be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions specified in the flowchart block or blocks.

[0029] These computer program instructions may also be stored in a computer usable or computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer usable or computer-readable memory produce an article of manufacture including instruction means that implement the function specified in the flowchart block or blocks.

[0030] The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions that execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the flowchart block or blocks.

[0031] Each block of the flowchart illustrations may represent a module, segment, or portion of code, which comprises one or more executable instructions for implementing the specified logical function(s). It should also be noted that in some alternative implementations, the functions noted in the blocks may occur in a different order. For example, two blocks shown in succession may in fact be executed substantially concurrently or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved.

[0032] FIG. **1** is a block diagram of a user interface system **100** according to an embodiment of the present invention.

[0033] Referring to FIG. **1**, the user interface system **100** according to an embodiment of the present invention includes an interface device module **110**, which contacts a user's body and is operated by the user; and a host device **120**, which moves a graphic object according to the user's operation input through the interface device module **110**, converts surface information of another graphic object into a vibration signal with respect to a motion of the graphic object, and provides the vibration signal to the interface device module **110**.

[0034] The host device **120** includes a control module **130**, a drive module **150**, a display module **170**, and a storage module **190**.

[0035] The term 'module', as used herein, means, but is not limited to, a software or hardware component, such as a Field Programmable Gate Array (FPGA) or Application Specific Integrated Circuit (ASIC), which performs certain tasks. A module may advantageously be configured to reside on the addressable storage medium and configured to execute on one or more processors. Thus, a module may include, by way of example, components, such as software components, object-oriented software components, class components and task components, processes, functions, attributes, procedures, subroutines, segments of program code, drivers, firmware, microcode, circuitry, data, databases, data structures, tables, arrays, and variables. The functionality provided for in the components and modules may be combined into fewer components and modules or further separated into additional components and modules.

[0036] The control module **130** outputs a graphic screen and graphic objects through the display module **170** and controls a motion of a graphic object moving according to user operation information received from a user through the interface device module **110**. Hereinafter, a graphic object that moves according to the user operation information and indicates the user's position on a graphic screen is referred to as an "interface object" and is distinguished from other graphic objects on the graphic screen. The detailed structure of the control module **130** will be described with reference to FIG. **2** later.

[0037] The storage module **190** stores information on various graphic screens and graphic objects displayed through the display module **170** and particularly stores attribute information of each of the graphic objects.

[0038] The drive module **150** receives attribute information of a graphic object corresponding to a result of interaction between the interface object and the graphic object from the control module **130**, converts the attribute information into a vibration signal, and provides the vibration signal to the interface device module **110**. The detailed structure of the drive module **150** will be described with reference to FIG. **3** later.

[0039] The operation of the user interface system **100** will be described with an assumption that a graphic screen and graphic objects stored in the storage module **190** are displayed through the display module **170** of the host device **120** and one object among the displayed graphic object is an interface object.

[0040] The graphic objects include a two- or three-dimensional graphic object and each of the graphic objects has attribute information on its surface. The attribute information may include information on roughness or smoothness which may be expressed by amplitude of vibration. When a user operates the interface device module **110** in a certain direction, the control module **130** moves the interface object in the certain direction on a screen displayed by the display module **170**. Here, the interface device module **110** may include an input device such as four direction buttons to move the interface object up, down, to the left, and to the right, number buttons to move the interface object in certain directions, a touch screen, or a mouse. For example, when a