user presses a down button among the four direction buttons, the interface object moves down by a predetermined distance on the displayed screen according to control of the control module **130**.

[0041] When the interface object moves and contacts a graphic object, attribute information of the graphic object is transmitted to the drive module **150** and the attribute information is converted into a vibration signal. The vibration signal is transmitted to the interface device module **110**. Then, the user can feel the vibration signal through the interface device module **110**. Here, the vibration signal felt by the user is different from each other according to a motion of the interface object. In other words, interaction between the interface object and other graphic objects is different from each other according to a moving speed of the interface object. As a result, the vibration signal felt by the user is different. For example, a frequency of the vibration signal is different according to the moving speed of the interface object and attributes of a graphic object contacting the interface object.

[0042] The drive module **150** is included in the host device **120** in the embodiment illustrated in FIG. **1**, but the present invention is not restricted thereto. The drive module **150** may not be included in the host device **120** but may be integrated into the interface device module **110**.

[0043] FIG. **2** is a block diagram of a control module **130** included in a host device **150**, according to an embodiment of the present invention.

[0044] Referring to FIG. **2**, the control module **130** included in the host module **120** includes a device information processing module **132**, a rendering module **134**, a graphic object information processing module **136**, and a graphic processing module **138**.

[0045] The device information processing module **132** analyzes operation information regarding an interface object, which is received from a user through the interface device module **110**, and provides an analysis result to the rendering module **134** and the graphic processing module **138**. Here, the operation information is about a motion of the interface object and includes information such as a position and a speed of the interface object. The amount of the motion of the interface object may be expressed by a vibration frequency.

[0046] The graphic object information processing module **136** provides graphic screens and graphic objects including the interface object, which are stored in the storage module **190**, to the graphic processing module **138** and provides attribute information on each of the graphic objects to the rendering module **134**. The attribute information may include information indicating roughness or smoothness or information indicating a state of a road surface or the rise and fall of the road surface. A magnitude of such attribute included in the attribute information may be expressed using amplitude of vibration.

[0047] The graphic processing module **138** generates and outputs a graphic signal based on the information on the motion of the interface object, which is received from the device information processing module **132**, and the graphic screens and the graphic objects, which are received from the graphic object information processing module **136**. The graphic signal is transmitted to the display module **170** and displayed. Here, the interface object is moved corresponding to the user's operation.

[0048] The rendering module **134** generates a rendering signal based on the motion information of the interface object and the attribute information of a graphic object. The rendering signal is input to the drive module **150** to provide a haptic signal such as a vibration signal corresponding to interaction between the interface object and the graphic object. In other words, a signal to provide information needed to determine a frequency and amplitude of vibration expressing the interaction between the interface object and the graphic object is the rendering signal.

[0049] The rendering signal is input to the drive module **150**. FIG. **3** illustrates the detailed structure of the drive module **150** according to an aspect of the present invention.

[0050] Referring to FIG. **3**, the drive module **150** in the host device **120** includes a drive circuit module **152** and a vibration generation module **154**.

[0051] The drive circuit module **152** converts the rendering signal received from the rendering module **134** into a drive signal for generating vibration. The vibration generation module **154** generates vibration based on the drive signal and transmits the vibration to the interface device module **110**.

[0052] When the rendering signal can be directly used as the drive signal for driving the vibration generation module **154** generating vibration, the drive circuit module **152** may be eliminated.

[0053] The vibration generation module **154** may generate vibration using a vibration motor, a solenoid module, a piezo module, or an electroactive polymer (EAP). EAPs are polymers that have a wide range of physical and electrical properties.

[0054] Upon application of an electrical current, EAPs exhibit a considerable displacement or strain, generally called deformation. Such strain may differ depending on the length, width, thickness, or radial direction of a polymer material, and it is known that the strain is in a range of 10% to 50%, which is a very characteristic feature compared to a piezoelectric element which exhibits a strain only as high as about 3%. Therefore, it is advantageous in that the EAP can be almost completely controlled by a suitable electric system.

[0055] Since the EAP outputs an electric signal corresponding to an external physical strain applied, if any, it can be used as sensor as well. Since materials of EAP typically generate a potential difference that can be electrically measured, the EAP can be used as a sensor of force, location, speed, accelerated speed, pressure, and so on. In addition, since the EAP has a bidirectional property, it can also be used as a sensor or an actuator.

[0056] FIG. **4** is a flowchart of a user interface method according to an embodiment of the present invention.

[0057] Referring to FIG. **4**, when an interface object and other graphic objects are displayed on a screen through the display module **170** in operation S**410**, a user moves a position of the interface object using an interface device.

[0058] In operation S**420**, the control module **130** obtains motion information of the moving interface object. The motion information includes information on a position and a moving speed of the interface object and also provides frequency information necessary for the generation of vibration.

[0059] Thereafter, as the interface object moves, interaction between the interface object and another graphic object occurs. In operation S**430**, attribute information of the