

wherein one of the pairs of electrodes is disposed in each of the regions into which the haptic button is divided by the at least one separator.

13. The haptic button of claim 12, wherein the sensor includes a contact switch or a touch pad.

14. The haptic button of claim 12, wherein voltage is applied to each pair of electrodes in each region in a unique manner to change texture of the haptic button.

15. The haptic button of claim 12, wherein voltage is applied to at least some of pairs of electrodes included in the regions in a unique manner to change texture of the haptic button.

16. The haptic button of claim 12, wherein the separator is moved in the widthwise direction, thereby changing a shape of each region and changing a stimulation provided from the electro-active polymer layer to the user.

17. A haptic device comprising:

a contact surface to physically contact a user;

an actuator to provide a displacement or a force to the contact surface;

a sensor to sense a button input from a user; and

a controller to control an operation of the actuator by applying a voltage,

wherein the actuator comprises an electro-active polymer layer and at least a pair of electrodes to which the voltage is applied and which contact the electro-active polymer layer, and

wherein stimulation provided from the electro-active polymer layer of the haptic button to the user is changed by changing a waveform of the voltage.

18. The haptic device of claim 17, wherein the actuator further comprises a fixing portion which fixes the electro-active polymer layer so that a part of the electro-active polymer layer is not expanded.

19. The haptic device of claim 17, wherein the change in the stimulation is change in stiffness of the haptic button.

20. The haptic device of 17, wherein the actuator further comprises a metal dome providing a bias stiffness to the user, wherein one of the at least one pair of electrodes at least partially contacts an upper curve of the metal dome.

21. The haptic device of claim 17, wherein the waveform of the voltage is changed according to a current application status.

22. The haptic device of claim 17, wherein the sensor includes a contact switch or a touch pad.

23. The haptic button of claim 12, wherein voltage is applied to one of pairs of electrodes in one of the regions in a unique manner to change texture of the haptic button.

24. A haptic button comprising:

an electro-active polymer layer;

a pair of electrodes which partially contact two sides of the electro-active polymer layer;

a power supply to supply a voltage to the pair of electrodes;

a sensor to sense a button input from a user; and

a fixing portion which fixes the electro-active polymer layer so that a part of the electro-active polymer layer is not expanded,

wherein another part of the electro-active polymer layer expands when voltage is applied.

25. The haptic button of claim 24, wherein the expansion of the another part of the electro-active polymer layer increases the stiffness of the haptic button.

26. The haptic button of claim 25, wherein the stiffness of the haptic button increases as the level of voltage applied to the electro-active polymer layer increases.

27. The haptic button of claim 25, wherein the stiffness of the haptic button decreases as the level of voltage applied to the electro-active polymer layer decreases.

28. The haptic button of claim 24, wherein the voltage has a waveform and the stiffness of the haptic button is changed by changing the waveform of the voltage.

29. The haptic button of claim 24, the waveform of the voltage is changed according to a current application status.

30. A method for changing at least one of stiffness and texture in a haptic button having an electro-polymer layer which contacts at least one pair of electrodes on opposite sides of the electro-polymer layer, the method comprising:

generating a voltage having a waveform; and

supplying the voltage to the at least one pair of electrodes to expand the electro-polymer layer to change at least one of stiffness and texture of the haptic button.

31. At least one computer readable medium storing instructions that control at least one processor to perform a method for changing at least one of stiffness and texture in a haptic button having an electro-polymer layer which contacts at least one pair of electrodes on opposite sides of the electro-polymer layer, the method comprising”

generating a voltage having a waveform; and

supplying the voltage to the at least one pair of electrodes to expand the electro-polymer layer to change at least one of stiffness and texture of the haptic button.

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