

What is claimed is:

1. A computer-implemented method for receiving user input to a touchscreen interface, the method comprising:

5 providing a representation of a device comprising a virtual knob on the touchscreen interface for adjusting a parameter associated with the virtual knob;
detecting a selection of the virtual knob, the virtual knob occupying a first graphical area on the touchscreen
10 interface;
in response to detecting the selection of the virtual knob, displaying an annular input icon around the virtual knob, the annular input icon occupying a second graphical area on the touchscreen interface having a larger area than the
15 first graphical area of the virtual knob;
detecting a user input corresponding to motion around the annular input icon; and
adjusting the parameter associated with the virtual knob of the device according to the user input.

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2. The computer-implemented method of claim 1, wherein the device comprises a vehicle instrument, and wherein the touchscreen interface is associated with a vehicle simulator.

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3. The computer-implemented method of claim 1, wherein detecting the user input corresponding to the annular input icon comprises detecting an arcuate contact on a surface of the touchscreen interface within the annular input icon.

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4. The computer-implemented method of claim 1, wherein the representation of the device further comprises a plurality of virtual knobs, and

wherein detecting the selection of the virtual knob comprises detecting a first tap on a surface of the touchscreen interface at a position proximate to the virtual knob of the plurality of virtual knobs.

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5. The computer-implemented method of claim 4, further comprising:

detecting an extended contact on the surface of the touchscreen interface at a position proximate to a virtual

10 knob of the plurality of virtual knobs, and

in response to detecting the extended contact, changing a state of the device from a first state to a second state corresponding to the virtual knob proximate to the position of the extended contact,

15 wherein adjusting the device according to the user input comprises adjusting the device according to the second state and the user input.

6. The computer-implemented method of claim 5, further comprising:

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detecting a second tap on the surface of the touchscreen interface at the position proximate to the virtual knob associated with the first tap; and

in response to detecting the second tap of the virtual knob,

25 removing the annular input icon from around the virtual knob.

7. The computer-implemented method of claim 4, further comprising:

30 determining whether the virtual knob proximate to the position of the first tap on the surface of the touchscreen interface may be adjusted;

if the virtual knob proximate to the position of the first tap on the surface of the touchscreen interface may be adjusted, displaying the annular input icon around the virtual knob proximate to the position of the first tap; and
5 if the virtual knob proximate to the position of the first tap on the surface of the touchscreen interface may not be adjusted, displaying the annular input icon around an alternative virtual knob of the plurality of virtual knobs that may be adjusted.

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8. The computer-implemented method of claim 1, wherein detecting the selection of the virtual knob comprises detecting an extended contact on a surface of the touchscreen interface at a position proximate to the virtual
15 knob,

wherein in response to detecting the selection of the virtual knob further comprises changing a state of the device from a first state to a second state corresponding to the virtual knob, and

20 wherein adjusting the device according to the user input comprises adjusting the device according to the second state and the user input.

9. The computer-implemented method of claim 1, wherein the
25 annular input icon is at least partially translucent such that the representation of the device underlying the annular input icon is visible through the annular input icon.

10. The computer-implemented method of claim 1, further
30 comprising providing feedback to the user in response to the selection of the virtual knob or in response to the user input.

11. The computer-implemented method of claim 10, wherein the feedback comprises a vibration.

12. The computer-implemented method of claim 10, wherein
5 the feedback comprises an aural response.

13. A computer-implemented method for receiving user input to a touchscreen interface, the method comprising:
providing a representation of a device comprising a
10 plurality of virtual knobs on the touchscreen interface;
detecting a first selection of a virtual knob of the plurality of virtual knobs;
in response to the first selection, changing a state of the device;
15 detecting a second selection of a virtual knob of the plurality of virtual knobs for adjusting a parameter associated with the virtual knob;
in response to the second selection, determining a virtual knob to receive user input, the virtual knob occupying a first graphical area on the touchscreen;
20 displaying an annular input icon around the virtual knob to receive user input, the annular input icon occupying a second graphical area on the touchscreen interface having a larger area than the first graphical area of the virtual
25 knob;
detecting the user input corresponding to motion around the annular input icon; and
adjusting the parameter associated with the virtual knob of the device according to the user input.

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14. The computer-implemented method of claim 13,

wherein detecting the first selection of a virtual knob comprises detecting a tap on a surface of the touchscreen interface at a position proximate to a virtual knob, and wherein detecting a second selection of a virtual knob
5 comprises detecting an extended contact on the surface of the touchscreen interface at a position proximate to a virtual knob.

15. The computer-implemented method of claim 14, wherein
10 determining the virtual knob to receive user input comprises:

determining whether the virtual knob proximate to the position of the tap on the surface of the touchscreen interface may be adjusted according to the state of the

15 device;

if the virtual knob proximate to the position of the tap on the surface of the touchscreen interface may be adjusted according to the state of the device, determining that the virtual knob proximate to the position of the tap is the
20 virtual knob of the plurality of virtual knobs to receive user input; and

if the virtual knob proximate to the position of the tap on the surface of the touchscreen interface may not be adjusted according to the state of the device, determining whether
25 each of the other virtual knobs of the plurality of virtual knobs may be adjusted according to the state of the device, and determining that each virtual knob that may be adjusted according to the state of the device is the virtual knob to receive user input.

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16. The computer-implemented method of claim 13, wherein the device comprises a vehicle instrument, wherein the touchscreen interface is associated with a vehicle

simulator, and wherein detecting the user input corresponding to the annular input icon comprises detecting an arcuate contact on a surface of the touchscreen interface within the annular input icon.

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17. The computer-implemented method of claim 13, further comprising providing feedback to the user in response to the first selection of the virtual knob, the second selection of the virtual knob, or in response to the user input.

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18. A computer-readable storage medium having computer-executable instructions stored thereupon which, when executed by a computer, cause the computer to:

15 provide a representation of a device comprising a plurality of virtual knobs on a touchscreen interface;

detect a selection of a virtual knob of the plurality of virtual knobs for adjusting a parameter associated with the virtual knob;

20 in response to the selection of the virtual knob, determine a virtual knob to receive user input, the virtual knob occupying a first graphical area on the touchscreen;

display an annular input icon around the virtual knob to receive user input, the annular input icon occupying a second graphical area on the touchscreen interface having a larger area than the first graphical area of the virtual knob;

25 detect the user input corresponding to motion around the annular input icon; and

adjust the parameter associated with the virtual knob of the device according to the user input.

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19. The computer-readable storage medium of claim 18, wherein detecting the selection of the virtual knob

comprises detecting a tap on a surface of the touchscreen interface at a position proximate to a virtual knob of the plurality of virtual knobs, and wherein the computer-readable storage medium has further computer-executable instructions stored thereupon which, when executed by the computer, cause the computer to:

determine whether the virtual knob proximate to the position of the tap on the surface of the touchscreen interface may be adjusted;

if the virtual knob proximate to the position of the tap on the surface of the touchscreen interface may be adjusted, display the annular input icon around the virtual knob proximate to the position of the tap; and

if the virtual knob proximate to the position of the tap on the surface of the touchscreen interface may not be adjusted, display the annular input icon around an alternative virtual knob of the plurality of virtual knobs that may be adjusted.

20. The computer-readable storage medium of claim 18, having further computer-executable instructions stored thereupon which, when executed by the computer, cause the computer to:

detect an extended contact on the surface of the touchscreen interface at a position proximate to a virtual knob of the plurality of virtual knobs; and

in response to detecting the extended contact, change a state of the device from a first state to a second state corresponding to the virtual knob proximate to the position of the extended contact,

wherein adjusting the device according to the user input comprises adjusting the device according to the second state and the user input.