

VIRTUAL BUTTON CONTROL METHOD AND APPARATUS, AND STORAGE MEDIUM AND ELECTRONIC DEVICE

RELATED APPLICATION

[0001] This application claims priority to Chinese Patent Application No. 202310541399.3, entitled "METHOD AND APPARATUS FOR CONTROLLING VIRTUAL BUTTONS, STORAGE MEDIUM, AND ELECTRONIC DEVICE" filed with the China National Intellectual Property Administration on May 12, 2023, which is incorporated herein by reference in its entirety.

FIELD OF THE TECHNOLOGY

[0002] This application relates to the field of computer technologies, and specifically, to a method and an apparatus for controlling virtual buttons, a storage medium, and an electronic device.

BACKGROUND OF THE DISCLOSURE

[0003] Virtual buttons (also referred to as virtual keys) are physical keys simulated on a mobile device such as a mobile phone by using software.

[0004] The virtual buttons are an alternative solution to the physical keys, and are used in a manner similar to that of the physical keys, but the virtual buttons do not have actual physical structures. The virtual buttons are implemented on a screen, and various operations are completed by touching the screen. When a user taps on a virtual button, a system may trigger a corresponding operation or function, and display a corresponding response on the screen. For example, in some games, the virtual button may be configured for controlling a movement and attack action of a game character.

SUMMARY

[0005] Embodiments of this application provide a method and an apparatus for controlling virtual buttons, a storage medium, and an electronic device, to at least resolve the technical problem that displaying of virtual buttons is not intuitive enough.

[0006] An embodiment of this application provides a method for controlling virtual buttons, including: displaying at least two virtual buttons in a virtual scene, each of the at least two virtual buttons being displayed in an inactive form or a selectable form, each of the at least two virtual buttons being configured to trigger a virtual character to perform an interaction operation on an interaction object associated with the respective virtual button, and the at least two virtual buttons

being associated with different interaction objects; in response to a determination that an initial condition for allowing the virtual character to trigger an interaction operation of a virtual character associated with a virtual button in the inactive form of the at least two virtual buttons is satisfied, switching the virtual button from the inactive form to the selectable form; and in response to a determination that a target condition of the virtual character triggering an interaction operation of a virtual character associated with a virtual button in the selectable form is satisfied, switching the virtual button from the selectable form to an activated form, and controlling the virtual character to perform the interaction operation on the interaction object associated with the virtual button.

[0007] An embodiment of this application further provides an apparatus for controlling virtual buttons, including: a first display unit, configured to display at least two virtual buttons in a virtual scene, each of the at least two virtual buttons being displayed in an inactive form or a selectable form, each of the at least two virtual buttons being configured to trigger a virtual character to perform an interaction operation on an interaction object associated with the virtual button, and the at least two virtual buttons being associated with different interaction objects; a second display unit, configured to: in response to a determination that an initial condition for allowing the virtual character to trigger an interaction operation of a virtual character associated with a virtual button in the inactive form of the at least two virtual buttons is satisfied, switching the virtual button from the inactive form to the selectable form; and a third display unit, configured to: in response to a determination that a target condition of the virtual character triggering an interaction operation of a virtual character associated with a virtual button in the selectable form is satisfied, switch the virtual button from the selectable form to an activated form, and control the virtual character to perform the interaction operation on the interaction object associated with the virtual button.

[0008] An embodiment of this application further provides a computer program product or a computer program, the computer program product or the computer program including computer instructions, the computer instructions being stored in a computer-readable storage medium. A processor of a computer device reads the computer instructions from the computer-readable storage medium, and executes the computer instructions, to cause the computer device to perform the foregoing method for controlling virtual buttons.

[0009] An embodiment of this application provides an electronic device, including a memory, a processor, and a computer program stored on the memory and executable on the processor, the processor performing the foregoing method for controlling virtual buttons by using the computer program.

[0010] An embodiment of this application further provides a computer-readable storage medium, the computer-readable storage medium including a program stored therein, the program, when executed by an electronic device, performing the foregoing method for controlling virtual buttons.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a schematic diagram of an application environment of a method for controlling virtual buttons according to an embodiment of this application.

[0012] FIG. 2 is a schematic flowchart of a method for controlling virtual buttons according to an embodiment of this application.

[0013] FIG. 3 is a schematic diagram of a method for controlling virtual buttons according to an embodiment of this application.

[0014] FIG. 4 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0015] FIG. 5 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0016] FIG. 6 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0017] FIG. 7 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0018] FIG. 8 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0019] FIG. 9 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0020] FIG. 10 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0021] FIG. 11 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0022] FIG. 12 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0023] FIG. 13 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0024] FIG. 14 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0025] FIG. 15 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0026] FIG. 16 is a schematic diagram of another method for controlling virtual buttons according to an embodiment of this application.

[0027] FIG. 17 is a schematic diagram of an apparatus for controlling virtual buttons according to an embodiment of this application.

[0028] FIG. 18 is a schematic structural diagram of an electronic device according to an embodiment of this application.

DESCRIPTION OF EMBODIMENTS

[0029] To make a person skilled in the art better understand the solutions of this application, the following clearly and completely describes the technical solutions in the embodiments of this application with reference to the accompanying drawings in the embodiments of this application. Apparently, the described embodiments are only some of the embodiments of this application rather than all of the embodiments. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of this application without creative efforts shall fall within the protection scope of this application.

[0030] Terms "first", "second", and the like in the specification, the claims, and the above drawings of the embodiments of this application are intended to distinguish between similar objects, rather than describe a specific sequence or order. Such used data is interchangeable where appropriate so that the embodiments of this application described here can be implemented in an order other than those illustrated or described here. Moreover, the terms "include", "contain" and any other variants mean to cover the non-exclusive inclusion, for example, a process, method, system, product, or device that includes a list of steps or units is not necessarily limited to those expressly listed steps or units, but may include other steps or units not expressly listed or inherent to such a process, method, product, or device.

[0031] In some methods, in a scenario in which an operation is triggered by using a virtual button, especially, a triggered operation type is relatively complex, for example, an operation type

that interaction operations need to be performed with a plurality of interaction objects, it is quite difficult for a user to determine which virtual button to be used and on which interaction object an interaction operation is to be performed, and it is more difficult to clearly determine whether a current virtual button can perform the interaction operation on the interaction object, further resulting in the difficulty in triggering the operation by using the virtual button and the reduction of the user experience. The reason for this is that displaying of the virtual buttons by using these methods is not intuitive enough.

[0032] A method for controlling virtual buttons provided in embodiments of this application may be applied to, but is not limited to, an environment shown in FIG. 1. The environment may include, but is not limited to, user equipment 102. The user equipment 102 may include, but is not limited to, a display 104, a processor 106, and a memory 108.

[0033] Specific processes are as following operations.

[0034] Operations S102 to S106: User equipment 102 displays, by using a processor 106, at least two virtual buttons on a display 104, each of the at least two virtual buttons being displayed in an inactive form or a selectable form; in response to a determination that an initial condition for allowing the virtual character to trigger an interaction operation of a virtual character associated with a virtual button in the inactive form of the at least two virtual buttons is satisfied, switches the virtual button from the inactive form to the selectable form; and in response to a determination that a target condition of the virtual character triggering an interaction operation of a virtual character associated with a virtual button in the selectable form is satisfied, switches the virtual button from the selectable form to an activated form, and controls the virtual character to perform the interaction operation on the interaction object associated with the virtual button.

[0035] In addition to the example shown in FIG. 1, the user equipment 102 includes, but is not limited to, a handheld device (such as a mobile phone), a laptop, a tablet, a desktop computer, an on-board device, a smart TV set, and the like. The specific implementations of the user equipment 102 are not limited in this application.

[0036] In some embodiments, as shown in FIG. 2, the method for controlling virtual buttons may be performed by an electronic device, for example, the user equipment shown in FIG. 1. Specific operations include:

[0037] S202: Display at least two virtual buttons in a virtual scene, each of the at least two virtual buttons being displayed in an inactive form or a selectable form, each of the at least two virtual buttons being configured to trigger an interaction operation of a virtual character on an

interaction object associated with the virtual button, and the at least two virtual buttons being associated with different interaction objects.

[0038] S204: in response to a determination that an initial condition for allowing the virtual character to trigger an interaction operation of a virtual character associated with a virtual button in the inactive form of the at least two virtual buttons is satisfied, switch the virtual button from the inactive form to the selectable form.

[0039] S206: In response to a determination that a target condition of the virtual character triggering an interaction operation of a virtual character associated with a virtual button in the selectable form is satisfied, switch the virtual button from the selectable form to an activated form, and control the virtual character to perform the interaction operation on the interaction object associated with the virtual button.

[0040] In some embodiments, the foregoing method for controlling virtual buttons may be, but is not limited to, applied to a virtual game. For example, in a running process of a round of a virtual game, a user controls, by using a virtual button, a virtual character to perform an interaction operations on interaction objects, and distinguishes, by using different forms of the virtual button, which interaction object that an interaction operation can be currently performed on, whether the interaction operation is successfully performed, and the like. For example, a virtual button in a inactive form indicates that an interaction operation may not be currently performed on an interaction object associated with the virtual button, a virtual button in a selectable form indicates that an interaction operation may be currently performed on an interaction object associated with the virtual button, and a virtual button in an activated form indicates that an interaction operation is currently being performed on an interaction object associated with the virtual button.

[0041] In some embodiments, the virtual character may be, but is not limited to, a virtual character manipulated by using a virtual button, for example, a first-person virtual character or a third-person virtual character. In some embodiments, the interaction object may be, but is not limited to, a virtual object that allows triggering execution of an interaction operation with a virtual character, for example, a virtual character, a virtual prop, or a virtual building.

[0042] In addition, in some embodiments, the interaction object may alternatively be, but is not limited to, a virtual object obtained by a virtual character by performing an associated operation. For example, the virtual character releases (the associated operation) a target prop (the interaction object), and further performs a detonation operation (the interaction operation) on the target prop, to detonate the target prop, thereby further causing ranged damage. However, when the interaction object is one of the cases listed in the foregoing embodiments, a user not only needs to perform the

release operation (the associated operation) of releasing the target prop, but also needs to perform the interaction operation of detonating the target prop, resulting in the increase of the probability of misoperations of the user. However, in some scenarios having a high requirement on a time limit, for example, in a scenario in which an interaction operation can be better performed only by aiming at the target prop within a short preset time after a virtual character releases or throws a target prop, a user not only needs to perform the release operation of releasing the target prop, but also needs to perform the interaction operation of aiming the target prop to detonate same within a short time, further resulting in the increase of the probability of misoperations of the user and reduction of the execution accuracy of the interaction operation.

[0043] In this embodiment, a trigger button of the interaction operation is set to a particular virtual button, so that after performing the release operation, the user may quickly perform the corresponding interaction operation by using the virtual button. Not only the execution efficiency of the interaction operation is increased, but also the probability of misoperations of the user is reduced after the release operation and the interaction operation are decoupled, and further the execution accuracy of the interaction operation is increased.

[0044] In some embodiments, the virtual button is configured for triggering an interaction operation performed by a virtual character on an interaction object associated with the virtual button. Interaction objects corresponding to virtual buttons among at least two virtual buttons are different and are different from general buttons. In this embodiment, the virtual buttons are in one-to-one mapping with the interaction objects. That is, one virtual button may be, but is not limited to, corresponding to triggering of an interaction operation of one interaction object or one type of interaction objects. Moreover, the general buttons may be, but are not limited to, corresponding to triggering of an interaction operation of a plurality of interaction objects or a plurality of types of interaction objects, or in addition to an interaction operation, the general buttons may be further configured for triggering other operations.

[0045] Further, for example, a button "jump" is configured for triggering a virtual character to perform a jumping operation. When the virtual character is located near any interaction object "wall" that can be crossed over, the foregoing button "jump" may further be configured for triggering a wall-crossing operation (the interaction operation) performed by the virtual character on the foregoing interaction object "wall", and further the foregoing button "jump" may be determined as a general button. The virtual button in this embodiment may be, but is not limited to, only configured for triggering a wall-crossing operation (the interaction operation) performed by the

virtual character on the interaction object "wall" and not additionally for triggering another operation.

[0046] In addition, when the virtual character is not located near any interaction object "wall" that can be crossed over, the virtual button is displayed in a inactive form, and when the virtual character is located near any interaction object "wall" that can be crossed over, the virtual button is displayed in a selectable form, so that the user can more intuitively clarify an execution state of the wall-crossing operation by observing a display form of the virtual button.

[0047] In some embodiments, virtual buttons among the at least two virtual buttons may simultaneously present different forms, for example, a virtual button A among the at least two virtual buttons presents a inactive form, a virtual button B among the at least two virtual buttons presents a selectable form, and a virtual button C among the at least two virtual buttons presents an activated form. In addition, to highlight the differences between different states, the inactive form, the selectable form, and the activated form may be set to, but are not limited to, forms having large difference in displaying. As shown in FIG. 3, a virtual button A among at least two virtual buttons 302 presents a inactive form (pure white filled), a virtual button B among the at least two virtual buttons 302 presents a selectable form (light shaded), and a virtual button C among the at least two virtual buttons 302 presents an activated form (dark shaded).

[0048] In some embodiments, that interaction objects corresponding to virtual buttons among the at least two virtual buttons are different may be, but is not limited to, that one virtual button corresponds to one interaction object or one type of interaction objects. As shown in FIG. 4, the virtual button A among the at least two virtual buttons 302 corresponds to an interaction object A among interaction objects 402, the virtual button B among the at least two virtual buttons 302 corresponds to an interaction object B among the interaction objects 402, and the virtual button C among the at least two virtual buttons 302 corresponds to an interaction object C among the interaction objects 402.

[0049] In some embodiments, the determining whether the initial condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied may include, but is not limited to, being based on parameter information associated with the virtual character. The parameter information includes related information (for example, holding an interaction prop) of the virtual character, and may further include relative information (for example, a relative distance) between the virtual character and the interaction object associated with the virtual button.

[0050] In some embodiments, the determining whether the target condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied may include, but is not limited to, being based on an associated operation performed on the virtual button in the selectable form. The associated operation may be a select operation, a press-and-hold operation, a slide operation, a voice control operation, a release operation, or the like.

[0051] Different virtual buttons are provided to trigger interaction operations performed by a virtual character on different interaction objects, so that the accuracy of triggering interaction operations by using virtual buttons is improved. Representation manners of the inactive form, the selectable form, and the activated form are further used to help the user determine which trigger stages the interaction operations are currently in, to intuitively present the virtual buttons in different trigger states, so that the technical effect of improving the intuitiveness of displaying the virtual buttons is achieved.

[0052] Further, for example, as shown in FIG. 5(a), at least two virtual buttons 502 in a inactive form (pure white filled) are displayed. The at least two virtual buttons 502 are configured for triggering interaction operations (for example, an interaction operation 510 performed on an interaction object 506) performed by a virtual character 504 on interaction objects (for example, the interaction object 506). Virtual buttons among the at least two virtual buttons 502 correspond to different interaction objects. For example, a virtual button A, a virtual button B, and a virtual button C correspond to different interaction objects. Further, as shown in FIG. 5(b), for a virtual button 508 (the virtual button C) in the inactive form, when an initial condition corresponding to the interaction operation 510 performed by the virtual character 504 on the interaction object 506 is satisfied, the virtual button 508 is switched to the selectable form (light shaded). The interaction object 506 is an interaction object associated with the virtual button 508. Further, as shown in FIG. 5(c), for the virtual button 508 in the selectable form, when a target condition corresponding to the interaction operation 510 performed by the virtual character 504 on the interaction object 506 is satisfied, the virtual button 508 is switched to the activated form (dark shaded), and the virtual character 504 is controlled to perform the interaction operation 510 on the interaction object 506.

[0053] According to the embodiments provided in this application, at least two virtual buttons are displayed in a virtual scene, each of the at least two virtual buttons being displayed in a inactive form or a selectable form, each of the at least two virtual buttons being configured for triggering a virtual character to perform an interaction operation on an interaction object associated with the virtual button, and interaction objects corresponding to virtual buttons among the at least

two virtual buttons being different; for a virtual button in the inactive form, the virtual button is switched to the selectable form when an initial condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied; and for the virtual button in the selectable form, when a target condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied, the virtual button is switched to the activated form, and the virtual character is controlled to perform the interaction operation on the interaction object associated with the virtual button. Different virtual buttons are provided to trigger interaction operations performed by a virtual character on different interaction objects, so that the accuracy of triggering interaction operations by using virtual buttons is improved. Representation manners of the inactive form, the selectable form, and the activated form are further used to help the user determine which trigger stages the interaction operations are currently in, to intuitively present virtual buttons in different trigger states, so that the technical effect of improving the intuitiveness of displaying the virtual buttons is achieved, and the technical problem that displaying of the virtual buttons is not intuitive enough is solved.

[0054] In some embodiments, the displaying at least two virtual buttons includes:

[0055] displaying a first virtual button having a first mark, and a second virtual button having a second mark, the first mark being displayed over the first virtual button, the second mark being displayed over the second virtual button, the first mark indicating a first interaction object associated with the first virtual button, and the second mark indicating a second interaction object associated with the second virtual button.

[0056] In some embodiments, a mark is configured for representing an interaction object corresponding to a virtual button. For example, a mark A is configured for representing an interaction object A corresponding to a virtual button, a mark B is configured for representing an interaction object B corresponding to a virtual button, a mark C is configured for representing an interaction object C corresponding to a virtual button. As shown in FIG. 5, the interaction object 506 associated with the virtual button 508 having the mark C may be, but is not limited to, the interaction object C.

[0057] A mapping relationship between the virtual button and the interaction object may be indicated more intuitively by means of marking, thereby further improving the intuitiveness of displaying the virtual button.

[0058] According to the embodiments provided by this application, a first virtual button and a second virtual button are displayed, a first mark being displayed on the first virtual button, a

second mark being displayed on the second virtual button, the first mark being configured for representing a first interaction object corresponding to the first virtual button, and the second mark being configured for representing a second interaction object corresponding to the second virtual button, so that the purpose of indicating a mapping relationship between the virtual button and the interaction object more intuitively by means of marking can be achieved, thereby further improving the intuitiveness of displaying the virtual button.

[0059] In some embodiments, the displaying a first virtual button having a first mark, and a second virtual button having a second mark includes:

[0060] displaying the first virtual button having the first mark before the second virtual button having the second mark when a first display order of the first mark is before a second display order of the second mark, the display orders of the first mark and the second mark being determined according to a sorting rule corresponding to mark types to which the first mark and the second mark pertain.

[0061] In some embodiments, marks capable of indicating the display orders, such as a mark 1, a mark 2, and a mark 3, are marks of a numeral type, and the display orders corresponding to the mark 1, the mark 2, and the mark 3 may be determined according to sorting rule of an ascending order of numerals. Still for example, a mark A, a mark B, and a mark C are marks of a letter type, and the display orders corresponding to the mark A, the mark B, and the mark C may be determined according to a sorting rule of an alphabetical order of 26 alphabets. Still for example, a mouse mark, an ox mark, and a tiger mark are marks of a Chinese Zodiac type, and the display orders corresponding to the mouse mark, the ox mark, and the tiger mark may be determined according to a sorting rule of the twelve animals in the Chinese Zodiac.

[0062] Further, for example, as shown in FIG. 6, a plurality of virtual buttons 602 (for example, a virtual button 2, a virtual button 1, and a virtual button 3, where the numerals are configured for representing the marks in the virtual buttons) are displayed and sorted according to the numerals. For example, the virtual button 602 having the mark 1 is displayed before the virtual button 602 having the mark 2, and the virtual button 602 having the mark 2 is displayed before the virtual button 602 having the mark 3.

[0063] By using a plurality of virtual buttons corresponding to different interaction objects, the accuracy of triggering, by using the virtual buttons, interaction operations performed on interaction objects can be improved. However, an excessively large number of virtual buttons may increase the execution difficulty for a user, increase the probability of misoperations, and reduce the accuracy of triggering, by using virtual buttons, interaction operations performed on interaction

objects. In this embodiment, the virtual buttons are displayed and sorted by using marks in an order, and a user may determine, based on an arrangement order of different virtual buttons, which interaction operation is triggered by each virtual button, so that the probability of misoperations is reduced, and the accuracy of triggering, by using virtual button, interaction operations performed on interaction objects is improved.

[0064] According to this embodiment provided in this application, when the display order corresponding to the first mark is before the display order corresponding to the second mark, the first virtual button having the first mark is displayed before the second virtual button having the second mark, so that the purpose of reducing the probability of misoperations can be reduced, and the technical effect of improving the accuracy of triggering, by using virtual buttons, interaction operations performed on interaction objects is achieved.

[0065] In some embodiments, the displaying a first virtual button having a first mark, and a second virtual button having a second mark includes:

[0066] when the first interaction object and the second interaction object are of a same object type, displaying the first virtual button in a first form and having the first mark, and the second virtual button in the first form and having a second mark, the first form indicating the object type of the first interaction object and the second interaction object; or

[0067] when the first interaction object and the second interaction object are of different object types, displaying a first virtual button in a second form and having a first mark, and a second virtual button in a third form and having a second mark, the second form indicating an object type of the first interaction object, and the third form indicating an object type of the second interaction object.

[0068] In some embodiments, the forms of the virtual buttons are configured for representing the object types to which the interaction objects associated with the virtual buttons pertain. For example, a virtual button in a form A corresponds to an interaction object of an object type A, a virtual button in a form B corresponds to an interaction object of an object type B, and a virtual button in a form C corresponds to an interaction object of an object type C. The forms may include, but are not limited to, a color, a shape, a special effect, a pattern, and the like.

[0069] A relationship between a form and a mark may be, but is not limited to, that when the interaction objects are of a single object type, the interaction objects may be, but are not limited to, indicated by using marks; however, when interaction objects are of a plurality of object types, the object types to which the interaction objects pertain cannot be intuitively indicated if marks are

used only, and when there are a relatively large number of interaction objects, different marks cause memorization difficulty for a user, which is not beneficial to intuitive expression of the virtual buttons; further, when the interaction objects are of a plurality of object types, the object types to which the interaction objects pertain are intuitively indicated by combining forms and marks. In addition, different marks are displayed under a same object type, and a same mark may be displayed under different object types. The number of redundant marks can be reduced, to further reduce the memorization difficulty for the user, and further the intuitiveness of displaying the virtual buttons is increased.

[0070] Further, for example, as shown in FIG. 7, virtual buttons among a plurality of virtual buttons 702 correspond to different interaction objects among a plurality of interaction objects 704. For example, a virtual button 702 in blue (the color is indicated by literal text in the figure) and having a mark 1 corresponds to an interaction object 1 of a building type, a virtual button 702 in blue (the color is indicated by literal text in the figure) and having a mark 2 corresponds to an interaction object 2 of a building type, and a virtual button 702 in green (the color is indicated by literal text in the figure) and having a mark 1 corresponds to an interaction object 1 of a prop type.

[0071] According to the embodiments provided in this application, a first virtual button in a first form and having a first mark, and a second virtual button in the first form and having a second mark are displayed when the first interaction object and the second interaction object pertain to a same object type, the first form being configured for representing an object type to which the first interaction object and the second interaction object pertain; or a first virtual button in a second form and having a first mark, and a second virtual button in a third form and having a second mark are displayed when the first interaction object and the second interaction object are in different object types, the second form being configured for representing an object type to which the first interaction object pertains, and the third form being configured for representing an object type to which the second interaction object pertains, so that the purposes of intuitively indicating the object types to which the interaction objects pertain, and reducing the number of redundant marks to further reduce the memorization difficulty of the user when there are a relatively large number of interaction objects are achieved, and further the technical effect of increasing the intuitiveness of displaying the virtual buttons is achieved.

[0072] In some embodiments, the first virtual button in the first form and having the first mark and the second virtual button in the first form and having the second mark may be displayed in a same area when the first interaction object and the second interaction object are of the same object type.

[0073] In some embodiments, the first virtual button in the second form and having the first mark and the second virtual button in the third form and having the second mark are displayed in different areas when the first interaction object and the second interaction object are of different object types.

[0074] By using a plurality of virtual buttons corresponding to different interaction objects, the accuracy of triggering, by using the virtual buttons, interaction operations performed on interaction objects can be improved. However, an excessively large number of virtual buttons may increase the execution difficulty for a user, increase the probability of misoperations, and reduce the accuracy of triggering, by using virtual buttons, interaction operations performed on interaction objects. In this embodiment, by performing centralized sorting on the virtual buttons according to a same mark and/or form, a user can easier memorize trigger targets associated with the virtual buttons, that is, the user can easier clarify which interaction operation is to be triggered by a virtual button, so that the probability of misoperations is reduced, and the accuracy of triggering, by using virtual buttons, interaction operations performed on interaction objects is improved.

[0075] Further, for example, as shown in FIG. 8, for a plurality of virtual buttons 802 (for example, a virtual button 2 in blue, a virtual button 1 in blue, and a virtual button 1 in green, where the numerals are configured for representing marks in the virtual buttons), the virtual buttons are collectively sorted according to forms. For example, the virtual button 2 in blue and the virtual button 1 in blue are centralized in a same area, and the virtual button 1 in green is arranged in another area.

[0076] In this embodiment provided in this application, the first virtual button in the first form and having the first mark and the second virtual button in the first form and having the second mark are displayed in the same area. The first virtual button in the second form and having the first mark and the second virtual button in the third form and having the second mark are displayed in different areas, so that the purpose of reducing the probability of misoperations can be reduced, and the technical effect of improving the accuracy of triggering, by using virtual buttons, interaction operations performed on interaction objects is achieved.

[0077] In some embodiments, before the switching the virtual button to the activated form, and controlling the virtual character to perform the interaction operation on the interaction object associated with the virtual button, the method further includes:

[0078] S1-1: Obtain a first select operation performed on the virtual button in the selectable form.

[0079] S1-2: Determine that the target condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied in response to obtaining a first release operation performed on the virtual button in the selectable form after obtaining the first selection operation.

[0080] In some embodiments, the target condition may include, but is not limited to, a limiting condition for the first select operation on the virtual button. Assuming that the first select operation is a click/tap operation, the target condition may include, but is not limited to, a first release operation on the virtual button, a number of times of execution of the click/tap operation on the virtual button, a tap force of the click/tap operation, a duration of the click/tap operation, and the like.

[0081] Further, for example, as shown in FIG. 5(c), the select operation performed on the virtual button 508 in the selectable form is obtained, and then, when a release operation performed on the virtual button 508 in the selectable form is obtained, the virtual button 508 in the activated form is displayed.

[0082] In some embodiments, after the obtaining the first select operation performed on the virtual button in the selectable form, the method further includes:

[0083] S2-1: Generate and display a candidate interaction operation sub-interface when the number of candidate interaction operations performable by the virtual character on the interaction object associated with the virtual button is greater than or equal to 2, operation identifiers of the candidate interaction operations performable by the virtual character on the interaction object associated with the virtual button being displayed on the candidate interaction operation sub-interface.

[0084] S2-2: Obtain a second select operation performed on a target operation identifier displayed on the candidate interaction operation sub-interface, the target operation identifier being an operation identifier of a target candidate interaction operation performable by the virtual character on the interaction object associated with the virtual button.

[0085] S2-3: Determine that the target condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied in response to obtaining a second release operation performed on the target operation identifier is obtained after obtaining the second select operation.

[0086] In some embodiments, the candidate interaction operation may be, but is not limited to, an interaction operation that may be triggered by a virtual button and that is performed by a

virtual character on an interaction object associated with the virtual button. For example, the virtual button may trigger an interaction operation A, an interaction operation B, and an interaction operation C that are performed by the virtual character on the interaction object associated with the virtual button, so that after the first select operation performed on the virtual button in the selectable form is obtained, a candidate interaction operation sub-interface is displayed, and operation identifiers of the interaction operation A, the interaction operation B, and the interaction operation C are displayed on the candidate interaction operation sub-interface.

[0087] In some embodiments, the target condition may include, but is not limited to, a limiting condition for a second select operation on the target operation identifier. Assuming that the second select operation is a click/tap operation, the target condition may include, but is not limited to, a second release operation on the target operation identifier, a number of times of execution of the click/tap operation on the target operation identifier, a tap force of the click operation, a duration of the click/tap operation, and the like.

[0088] In some embodiments, the switching the virtual button to the activated form, and controlling the virtual character to perform the interaction operation on the interaction object associated with the virtual button includes: switching the virtual button from the selectable form to the activated form, and performing, by the virtual character, the target candidate interaction operation on the interaction object associated with the virtual button.

[0089] In some embodiments, to further improve the convenience of the select operation, the first select operation may be, but is not limited to, a press-and-hold operation, and in a process of executing the press-and-hold operation, the candidate interaction operation sub-interface is generated and displayed, so that the user may change an operation position of the press-and-hold operation, that is, obtain the operation position of the press-and-hold operation and adjust the operation position from the target virtual button to the target operation identifier displayed on the candidate interaction operation sub-interface, to determine that the second select operation is obtained.

[0090] Further, for example, continuously referring to FIG. 9 based on the scenario shown in FIG. 3, a press-and-hold operation (a first select operation) performed on the virtual button C is obtained, and a candidate interaction operation sub-interface 902 is generated and displayed. A plurality of operation identifiers such as an operation identifier C1, an operation identifier C2, and an operation identifier C3 are displayed on the candidate interaction operation sub-interface 902. Further, after obtaining that the operation position of the press-and-hold operation is adjusted from the virtual button C to the operation identifier C3 displayed on the candidate interaction operation

sub-interface 902, and it is further determined that the second select operation performed on the operation identifier C3 is obtained.

[0091] In some embodiments, to further improve the convenience of the select operation, the first select operation may be, but is not limited to, a press-and-hold operation, and in a process of executing the press-and-hold operation, the candidate interaction operation sub-interface is displayed, so that the user may change an operation direction of the press-and-hold operation, to correspond to an operation identifier displayed on the candidate interaction operation sub-interface, for example, obtain a slide operation in the process of executing the press-and-hold operation, and determine a slide direction of the slide operation. Assuming that the operation identifiers displayed on the candidate interaction operation sub-interface have been associated with different slide directions in advance, for example, the operation identifier A is associated with an upward direction, and the operation identifier B is associated with a downward direction, the operation identifier A is further determined as the target operation identifier when the slide direction is upward.

[0092] Considering that a number of interaction operations that can be triggered by a virtual button and that are performed by a virtual character on an interaction object associated with the virtual button may be not unique, if the solution of one select operation is used, the user may not select which interaction operation to perform. Further, this embodiment provides candidate options of a plurality of select operations, to help the user to clearly select which interaction operation to perform.

[0093] According to this embodiment provided in this application, after the first select operation performed on the virtual button in the selectable form is obtained, an candidate interaction operation sub-interface is generated and displayed when a number of candidate interaction operations performed by the virtual character on the interaction object associated with the virtual button is greater than or equal to 2, operation identifiers corresponding to the candidate interaction operations performed by the virtual character on the interaction object associated with the virtual button being displayed on the candidate interaction operation sub-interface. A second select operation performed on a target operation identifier displayed on the candidate interaction operation sub-interface is obtained, the target operation identifier being an operation identifier corresponding to a target candidate interaction operation performed by the virtual character on the interaction object associated with the virtual button. When a second release operation performed on the target operation identifier is obtained, that the target condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied is determined. By switching to the activated form and controlling the virtual character to

perform a target candidate interaction operation on the interaction object associated with the virtual button, the purpose of clearly selecting which interaction operation to be performed is achieved, and the technical effect of improving the accuracy of triggering interaction operations by using virtual buttons is achieved.

[0094] In some embodiments, after the switching the virtual button to the activated form, and controlling the virtual character to perform the interaction operation on the interaction object associated with the virtual button, the method further includes:

[0095] stopping displaying the virtual button and the interaction object associated with the virtual button in the virtual scene.

[0096] To improve the intuitiveness of UI (design) displaying, after switching to the activated form and controlling a virtual character to perform an interaction operation on an interaction object associated with the virtual button, redundant UI elements (the virtual button and the interaction object associated with the virtual button) on the interface are removed, and a virtual button on which an interaction operation has not been triggered and an interaction object on which an interaction operation has not been performed are reserved.

[0097] According to this embodiment provided in this application, by stopping displaying the virtual button and the interaction object associated with the virtual button displayed in the virtual scene, the purpose of removing redundant UI elements on the interface can be achieved, thereby implementing the technical effect of improving the intuitiveness of UI.

[0098] In some embodiments, before the stopping displaying the virtual button and the interaction object associated with the virtual button that are displayed in the virtual scene, the method further includes at least one of the following:

[0099] displaying a first special effect on the virtual button in the activated form, the first special effect providing feedback to the interaction operation performed by the virtual character on the interaction object associated with the virtual button; and

[0100] or, displaying a second special effect on the interaction object associated with the virtual button, the second special effect indicating a release state (which may be represented by a release progress table) of the interaction object associated with the virtual button.

[0101] In some embodiments, after a virtual button is activated to instruct a virtual character to perform an interaction operation with an interaction object associated with the virtual button, to improve the intuitiveness of operation experience brought by performing the interaction operation, a first special effect is displayed on the virtual button in the activated form, and a second special

effect is displayed on the interaction object associated with the virtual button. A display duration of the first special effect/the second special effect may be, but is not limited to, in a positive correlation with a display duration of the interaction operation performed by the virtual character and the interaction object associated with the virtual button.

[0102] To help the user clarify related information of the interaction operation, the interaction operation performed by the virtual character on the interaction object associated with the virtual button is fed back in a first special effect mode. In addition, to enable the user to clarify a related presentation after the interaction operation is performed on the interaction object associated with the virtual button, the release state of the interaction object associated with the virtual button is prompted to the user in a second special effect mode, thereby improving the user experience.

[0103] According to this embodiment provided in this application, a first special effect is displayed on the virtual button in the activated form, the first special effect being configured for feeding back the interaction operation performed by the virtual character on the interaction object associated with the virtual button. A second special effect is displayed on the interaction object associated with the virtual button, the second special effect being configured for prompting a release state of the interaction object associated with the virtual button, so as to clarify related information of the interaction operation and clarify related performance after the interaction operation is performed on the interaction object associated with the virtual button, thereby achieving the technical effect of improving the user experience.

[0104] In some embodiments, the displaying at least two virtual buttons includes: displaying the at least two virtual buttons in a preset area, positions of the at least two virtual buttons in the preset area being arranged to be centered around a center of the preset area.

[0105] In some embodiments, the center of the preset area may be, but is not limited to, a center point of the preset area, or a center line of the preset area. The center line of the preset area may further include a center line of the preset area in the vertical direction, or a center line of the preset area in the horizontal direction, or a center line of the preset area in another direction.

[0106] After the stopping displaying the virtual button and the interaction object associated with the virtual button that are displayed in the virtual scene, the method further includes:

[0107] S3-1: Arrange remaining virtual buttons of the at least two virtual buttons to be centered in the preset area, to obtain updated position information.

[0108] S3-2: Display, in the preset area according to the updated position information, the remaining virtual button.

[0109] In some embodiments, based on the scenario shown in FIG. 3, still as shown in FIG. 10, a plurality of virtual buttons 302 are placed in a preset area 1002. The virtual buttons among the plurality of virtual buttons 302 are arranged according to a center of the preset area 1002. The center of the preset area 1002 may be, but is not limited to, a center point of the preset area 1002, or a center line of the preset area 1002. The center line of the preset area 1002 may further include a center line of the preset area 1002 in a vertical direction, a center line of the preset area 1002 in a horizontal direction, or a center line of the preset area 1002 in another direction.

[0110] After a virtual button displayed in a virtual scene is eliminated, display of the virtual button is vacant, and arrangement appropriateness is lacked. Further, the user may habitually tap on the vacant position to trigger an original interaction operation, causing the problem of misoperations. To avoid the problem that the user does not adapt to an existing virtual button position because the displayed virtual button is eliminated, in this embodiment, after the displayed virtual button and the interaction object associated with the virtual button are eliminated, virtual buttons that are still displayed among the at least two virtual buttons are centrally arranged according to the center of the preset area, to obtain updated position information, and further the virtual buttons that are still displayed are displayed in the preset area according to the updated position information.

[0111] Further, for example, continuously referring to FIG. 11 based on the scenario shown in FIG. 3, after displaying of the virtual button B among the plurality of virtual buttons 302 is canceled, positions of the virtual button A and the virtual button C are sorted again, so as to make up for a display vacancy of the virtual button B.

[0112] In this embodiment provided in this application, the at least two virtual buttons are displayed in a preset area, positions of virtual buttons among the at least two virtual buttons in the preset area being arranged to be centered around a center of the preset area. The remaining virtual button(s) of the at least two virtual buttons are arranged to be centered around the center of the preset area, to obtain updated position information. The virtual buttons that are still displayed are displayed in the preset area according to the updated position information, so as to avoid the problem that the user does not adapt to existing positions of the virtual buttons due to elimination of virtual buttons displayed in the virtual scene, thereby achieving the technical effect of improving allocation and appropriateness of the positions of the virtual buttons.

[0113] In this embodiment provided in this application, the at least two virtual buttons are displayed in a preset area, positions of virtual buttons among the at least two virtual buttons in the

preset area being arranged to be centered around a center of the preset area, thereby achieving the technical effect of improving the arrangement appropriateness of the positions of the virtual buttons.

[0114] In some embodiments, before the switching the virtual button to the selectable form, the method further includes at least one of the following:

[0115] determining that the initial condition is satisfied when a distance between the virtual character and the interaction object associated with the virtual button is less than or equal to a first preset threshold;

[0116] or determining that the initial condition is satisfied when a number of obstacles between the virtual character and the interaction object associated with the virtual button is less than 1, or an obstacle between the virtual character and the interaction object associated with the virtual button does not meet a blocking condition;

[0117] or determining that the initial condition is satisfied when the virtual character holds an interaction trigger prop associated with the interaction object associated with the virtual button;

[0118] or determining that the initial condition is satisfied when the virtual character is in an interaction trigger state associated with the interaction object associated with the virtual button; and

[0119] or determining that the initial condition is satisfied when a target attribute value of the virtual character is greater than or equal to a second preset threshold associated with the interaction object associated with the virtual button.

[0120] In some embodiments, as shown in FIG. 5(a), an obstacle exists between the interaction object 506 and the virtual character 504, and further, the virtual button C corresponding to the interaction object 506 is still in an inactive form.

[0121] In some embodiments, in an execution process of some virtual tasks, an interaction operation performed on an interaction object may be triggered in modes including, but being not limited to, an interaction trigger prop, an interaction trigger state, and a target attribute value, so as to complete the virtual task.

[0122] In some embodiments, before the displaying at least two virtual buttons, the method further includes: displaying at least one general button configured to trigger at least two types of operations including the interaction operation performed by the virtual character on the interaction object in the virtual scene.

[0123] The displaying at least two virtual buttons includes: in response to a virtual button activation request, displaying the at least two virtual buttons in a virtual scene, and prohibiting the

general button from triggering the interaction operation of the virtual character on the interaction object in the virtual scene.

[0124] After the displaying at least two virtual buttons, the method further includes: in response to a virtual button deactivation request, stopping displaying the at least two virtual buttons in the virtual scene, and enabling the general button to trigger the interaction operation of the virtual character on the interaction object in the virtual scene.

[0125] Considering that operation levels or habits of users are different. For example, a user having a relatively high operation skill is accustomed to using virtual buttons, to improve the execution accuracy of interaction operations. However, for some users having low operation skills and accustomed to using general buttons, the use of the virtual buttons reduces the operation efficiency of such the users. Further, the use of the virtual buttons is selectively provided for the users in a prohibit/allow mode, to improve the triggering flexibility of the virtual buttons.

[0126] In this embodiment provided by this application, in response to a virtual button activation request, at least two virtual buttons are displayed in a virtual scene, and a general button is prohibited from triggering an interaction operation performed by the virtual character on the interaction object in the virtual scene; and in response to a virtual button deactivation request, the at least two virtual buttons displayed in the virtual scene are eliminated, and the general button is allowed to trigger the interaction operation performed by the virtual character on the interaction object in the virtual scene, so that use of the virtual buttons can be selectively provided for users in a prohibit/allow mode, thereby improving the flexibility of triggering the virtual buttons.

[0127] In some embodiments, for ease of understanding, the foregoing method for controlling virtual buttons is applied to a virtual game scene. In this embodiment, regular interaction buttons (virtual buttons) are used to rapidly interact (an interaction operation) with a plurality of articles (interaction objects) in the scenario. Interaction articles in the scenario are arranged and displayed in an operation hot area, so that a player of the virtual game can rapidly interact with the articles.

[0128] In some embodiments, when there are only a plurality of interaction articles of one type, as shown in FIG. 12, the purple ellipse is an interaction article. When the interaction article is located behind a wall, interaction cannot be performed, and only a UI (interaction article 1) is displayed. The interaction articles in the scenario are annotated by using the UI according to a sequential order of placing the interaction articles. The interaction buttons can alternatively be arranged on the bottom of the screen from left to right according to the sequential order of placing the interaction articles, for example, an interaction button 1, an interaction button 2, and an

interaction button 3. The interaction articles are in one-to-one correspondence with the interaction buttons. When an interaction article meets an interaction condition, a corresponding (interaction) button is lighted up. When an interaction article is located behind a wall and does not meet an interaction condition, a corresponding (interaction) button is set gray. When a player taps on the (interaction) button, a corresponding interaction article is lighted up, helping the player to determine whether the interaction article is correct. As shown in FIG. 13, when a button 3 is tapped on, a purple interaction article 3 is lighted up. After being triggered, a dynamic effect is used in the interaction button for representing a release state of the object. When the interaction article leaves a field of view range, the player can still obtain a state of the interaction article. For example, the button 3 shown in FIG. 13 may be, but is not limited to, that after being triggered, the button 3 is lighted up.

[0129] In some embodiments, when there are a plurality of interaction articles of a plurality of types, based on numerals, article types are additionally distinguished by using colors. As shown in FIG. 14, two interaction articles are both marked with a numeral 1, but are distinguished by using purple and red. In addition, interaction buttons of interaction articles in a same type are placed together, and are arranged left and right according to a placement sequence. This helps the player quickly locate the interaction article that the player wants to trigger.

[0130] In some embodiments, when an interaction article has a plurality of interaction modes, a slide selection trigger mode is added to an interaction button, and corresponding selection content is displayed on a screen in a form of a wheel. Based on the scenario shown in FIG. 13, still as shown in FIG. 15, a wheel is triggered for display by using a button 3, and an candidate interaction operation option associated with the interaction article 3 is displayed on the wheel, so that a player can quickly select a trigger mode of an interaction article when there are a plurality of articles in the scene, and the article has a plurality of interaction modes. For example, a slide operation in a downward direction is performed on the button 3, to further trigger a select operation for the candidate interaction operation option A matched in the downward direction.

[0131] The interaction buttons of the interaction articles in the scene are resident below the screen, a plurality of interaction buttons may be displayed simultaneously, and the interaction objects are classified by using icons and colors. The player can complete the interaction with only one operation, which is beneficial for the player to rapidly complete the interaction with an article in a battle with a tense rhythm.

[0132] Further, for example, as shown in FIG. 16, and specific operations are as follows:

[0133] Operation 1: First determine whether there is an article meeting an interaction condition in a scene, and if yes, perform operation 2, or otherwise, perform operation 3. Determining of whether an article is interactive needs to be performed according to a limiting condition of an actual article type. First, whether an article within a field of view range is within an interaction range is determined. Second, due to the fact that some articles cannot interact if there is a partition wall, whether an article is blocked by a building needs to be determined.

[0134] Operation 2: Light up a corresponding interaction button, and perform operation 4. The corresponding interaction button is a button capable of controlling an article in the scene to be released. The player places an article in the scene, displays a corresponding UI icon and a marked numeral above the article according to a displayed article type, and generates a corresponding interaction button below the screen. Content displayed by the interaction button includes the icon of the article, an operation content description, and a marked numeral the same as that of the article. Different types of articles in a scene use scene icons of different colors, and articles of a same type are marked with numerals according to a placement sequence. Corresponding interaction buttons use a same color and a same numeral, and interaction buttons of articles of a same type are arranged together. Interaction buttons of all articles are arranged in a line and are displayed in the center of the articles on the whole.

[0135] Operation 3: Set the interaction button to gray. As shown in FIG. 15, an article 1 is placed behind a wall, and the article 1 is an article that cannot interact if there is a partition wall. Therefore, both the article UI and the interaction button are in a gray state.

[0136] Operation 4: A player presses and holds the interaction button that is lighted up, and perform operation 5.

[0137] Operation 5: Determine whether the selected article has a plurality of interaction modes. If the article has a plurality of interaction modes, perform operation 6; or otherwise, perform operation 7.

[0138] Operation 6: Present both the interaction button that is pressed and held and the article UI in the scene in a selected state, expand a wheel, and hide marked numerals. The wheel presents a plurality of interaction modes according to a number of article interaction modes, and operation 8 is performed.

[0139] Operation 7: When determining that the article only has one interaction mode, present both the interaction button that is pressed and held and the UI of the article in the scene in a

selected state. The hand is loosened (that is, the selected interaction button is released) and operation 11 is performed.

[0140] Operation 8: Determine whether the player slides to the wheel area, and if the player does not slide to the wheel area, loosen the hand to perform operation 9; or otherwise, perform operation 10.

[0141] Operation 9: Loosen the hand to cancel the interaction with the article, and restore the article UI and the interaction button to a normal state.

[0142] Operation 10: Present selected interaction mode in a selected state, and loosen the hand to perform operation 11. The sliding direction of the interaction button relative to the wheel has a mapping relationship with a distance, that is, if the player presses the button and slides up, an interaction mode above the wheel is selected.

[0143] Operation 11: Loosen the hand to complete the interaction with the article, and determine whether the article generates continuous feedback, that is, whether the feedback is instant or continuous. If the feedback is continuous, perform operation 12; or otherwise, perform operation 13.

[0144] Operation 12: Continuous dynamic effect performance is presented on the interaction button, and a duration of the dynamic effect is consistent with a release time of the article. After the releasing of the article is completed, operation 13 is performed.

[0145] Operation 13: After the releasing of the article is completed, the article UI and the corresponding interaction button disappear, adjust spacings among the remaining interaction buttons below, the buttons on the whole being adaptively centered.

[0146] In some technical solutions, a player needs to spend a lot of time or energy. Especially, in an FPS game having character skills, a battle rhythm is relatively fast, and if a player spends an excessive time in assisting in a battle operation, the player can be easily killed by an enemy, causing a relatively strong feeling of frustration. However, according to this embodiment provided in this application, in a game in which a player releases a plurality of interaction articles, an operation on an article is simplified into one operation, so that the problem of complex operations during interactions of a player with articles is solved. The player can quickly release the auxiliary skill during the battle, so that the effectiveness of skill release and the feeling of smoothness of the battle can be improved.

[0147] In the specific implementation of this application, relevant data such as user information is involved. When the foregoing embodiments of this application are applied to a

specific product or technology, a permission or consent of a user is required, and collection, use, and processing of the related data need to comply with relevant laws, regulations, and standards of relevant countries and regions.

[0148] For ease of description, the foregoing method embodiments are described as a series of action combinations. However, a person skilled in the art is to know that this application is not limited to the described order of the actions because some operations may be performed in another order or performed at the same time according to this application. In addition, a person skilled in the art also knows that all embodiments described in the specification are exemplary embodiments, and the related actions and modules are not necessarily required by this application.

[0149] This application further provides an apparatus for controlling virtual buttons for implementing the foregoing method for controlling virtual buttons. As shown in FIG. 17, the apparatus includes:

[0150] a first display unit 1702, configured to display at least two virtual buttons in a virtual scene, each of the at least two virtual buttons being displayed in an inactive form or a selectable form, each of the at least two virtual buttons being configured to trigger an interaction operation of a virtual character on an interaction object associated with the virtual button, and the at least two virtual buttons being associated with different interaction objects;

[0151] a second display unit 1704, configured to: in response to a determination that an initial condition for allowing the virtual character to trigger an interaction operation of a virtual character associated with a virtual button in the inactive form of the at least two virtual buttons is satisfied, switch the virtual button from the inactive form to the selectable form; and

[0152] a third display unit 1706, configured to: in response to a determination that a target condition of the virtual character triggering an interaction operation of a virtual character associated with a virtual button in the selectable form is satisfied, switch the virtual button from the selectable form to an activated form when a target condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied, and control the virtual character to perform the interaction operation on the interaction object associated with the virtual button.

[0153] For specific embodiments, refer to the example shown in the foregoing method for controlling virtual buttons, which is not described again in this example.

[0154] An embodiment of this application further provides an electronic device for implementing the method for controlling virtual buttons. The electronic device may be, but is not

limited to, the user equipment 102 or the server 112 shown in FIG. 1. In this embodiment, for example, the electronic device is the user equipment 102. Further, as shown in FIG. 18, the electronic device includes a memory 1802 and a processor 1804. The memory 1802 stores a computer program. The processor 1804 is configured to perform the operations in any one of the foregoing method embodiments through the computer program.

[0155] In some embodiments, the foregoing electronic device may be located in at least one of a plurality of network devices in a computer network.

[0156] In some embodiments, the foregoing processor may be configured to use the computer program to perform the following operations:

[0157] S1: Display at least two virtual buttons in a virtual scene, each of the at least two virtual buttons being displayed in an inactive form or a selectable form, each of the at least two virtual buttons being configured for triggering a virtual character to perform an interaction operation on an interaction object associated with the virtual button, and interaction objects corresponding to virtual buttons among the at least two virtual buttons being different.

[0158] S2: For a virtual button in the inactive form, switch the virtual button to the selectable form when an initial condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied.

[0159] S3: For the virtual button in the selectable form, switch the virtual button to the activated form when a target condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied, and control the virtual character to perform the interaction operation on the interaction object associated with the virtual button.

[0160] A person of ordinary skill in the art may understand that the structure shown in FIG. 18 is only schematic, and does not limit the structure of the foregoing electronic device. For example, the electronic device may further include more or fewer components (for example, a network interface) than those shown in FIG. 18, or has a configuration different from that shown in FIG. 18.

[0161] The memory 1802 may be configured to store a software program and a module, for example, program instructions/modules corresponding to the method and apparatus for controlling virtual buttons in the embodiments of this application. The processor 1804 runs the software program and the module stored in the memory 1802, to implement various functional applications and data processing, that is, implement the foregoing method for controlling virtual buttons. The

memory 1802 may include a high-speed random memory, and may also include a non-volatile memory, for example, one or more magnetic storage apparatuses, a flash memory, or another nonvolatile solid-state memory. In some embodiments, the memory 1802 may further include memories remotely disposed relative to the processor 1804, and these remote memories may be connected to the electronic device through a network. Examples of the network include, but are not limited to, the Internet, an intranet, a local area network, a mobile communication network, and a combination thereof. The memory 1802 may be specifically, but is not limited to, configured to store information such as, a virtual button, an interaction object, and an interaction operation. For an example, as shown in FIG. 18, the memory 1802 may include, but is not limited to, the first display unit 1702, the second display unit 1704, and the third display unit 1706 in the foregoing apparatus for controlling virtual buttons. In addition, the memory 1802 may further include, but is not limited to, another module unit in the foregoing apparatus for controlling virtual buttons. This is not described again in this example.

[0162] In some embodiments, the foregoing transmission apparatus 1806 is configured to receive or transmit data through a network. Specific instances of the foregoing network may include a wired network and a wireless network. In an example, the transmission apparatus 1806 includes a network interface controller (NIC). The NIC may be connected to another network device and a router by using a network cable, so as to communicate with the Internet or a local area network. In an example, the transmission apparatus 1806 is a radio frequency (RF) module, which communicates with the Internet in a wireless manner.

[0163] In addition, the foregoing electronic device further includes: a display 1808, configured to display information such as the foregoing virtual button, interaction object, and interaction operation; and a connection bus 1810, configured to connect various module components in the foregoing electronic device.

[0164] In some other embodiments, the foregoing user equipment or server may be a node in a distributed system. The distributed system may be a blockchain system, the blockchain system may be a distributed system formed by connecting a plurality of nodes through network communication. A peer-to-peer (P2P for short) network may be formed between the nodes, and any form of computing device, for example, electronic devices, such as a server or user equipment, may be used as a node in the blockchain system by adding the peer-to-peer network.

[0165] According to an embodiment of this application, a computer program product is provided. The computer program product includes a computer program/instructions, and the computer program/instructions includes program code configured for performing the method shown

in the flowchart. In such an embodiment, the computer program may be downloaded and installed from the network through a communication part, and/or may be installed from a removable medium. When the computer program is executed by a central processing unit, the computer program executes functions provided in the embodiments of this application.

[0166] The sequence numbers of the foregoing embodiments of this application are merely for description purpose but do not imply the preference among the embodiments.

[0167] The computer system of the electronic device shown is merely an example, and does not constitute any limitation on functions and use ranges of the embodiments of this application.

[0168] The computer system includes a central processing unit (CPU), which can perform various suitable actions and processing according to a program stored in a read-only memory (ROM) or a program loaded from a storage part into a random access memory (RAM). The random access memory further stores various programs and data required for system operations. The central processing unit, the read-only memory, and the random access memory are connected to each other through a bus. An input/output interface (that is, an I/O interface) is also connected to the bus.

[0169] The following components are connected to the input/output interface: an input part including a keyboard, a mouse, or the like; an output part including a cathode ray tube (CRT), a liquid crystal display (LCD), a speaker, or the like; the storage part including a hard disk, or the like; and a communication part including a network interface card such as a local area network card, a modem, or the like. The communication part performs communication processing by using a network such as the Internet. A driver is also connected to the input/output interface as needed. A removable medium, such as a magnetic disk, an optical disc, a magneto-optical disk, or a semiconductor memory, is installed on the driver as required, so that a computer program read from the removable medium is installed into the storage part as required.

[0170] Particularly, according to the embodiments of this application, the processes described in the various method flowcharts may be implemented as computer software programs. For example, this embodiment of this application includes a computer program product, the computer program product includes a computer program carried on a computer-readable medium, and the computer program includes program code configured for performing the methods shown in the flowcharts. In such an embodiment, the computer program may be downloaded and installed from the network through a communication part, and/or may be installed from a removable medium. When the computer program is executed by the central processing unit, the various functions defined in the system of this application are executed.

[0171] An embodiment of this application further provides a computer-readable storage medium. A processor of a computer device reads computer instructions from the computer-readable storage medium. The processor executes the computer instructions, to enable the computer device to perform the method provided in the foregoing various implementations.

[0172] In some embodiments, the computer-readable storage medium may be configured to store a computer program configured for performing the following operations:

[0173] S1: Display at least two virtual buttons in a virtual scene, each of the at least two virtual buttons being displayed in an inactive form or a selectable form, each of the at least two virtual buttons being configured for triggering a virtual character to perform an interaction operation on an interaction object associated with the virtual button, and interaction objects corresponding to virtual buttons among the at least two virtual buttons being different.

[0174] S2: For a virtual button in the inactive form, switch the virtual button to the selectable form when an initial condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied.

[0175] S3: For the virtual button in the selectable form, when a target condition corresponding to the interaction operation performed by the virtual character on the interaction object associated with the virtual button is satisfied, switch the virtual button to the activated form, and control the virtual character to perform the interaction operation on the interaction object associated with the virtual button.

[0176] In some embodiments, a person of ordinary skill in the art may understand that all or some operations in the methods of the foregoing embodiments may be performed by a program instructing relevant hardware of the electronic device. The program may be stored in a computer-readable storage medium. The storage medium may include: a flash drive, a Read-Only Memory (ROM), a Random Access Memory (RAM), a magnetic disk, an optical disc, and the like.

[0177] The sequence numbers of the foregoing embodiments of this application are merely for description purpose but do not imply the preference among the embodiments.

[0178] When the integrated unit in the foregoing embodiments is implemented in a form of a software functional unit and sold or used as an independent product, the integrated unit may be stored in the foregoing computer-readable storage medium. Based on such an understanding, the technical solutions of this application essentially, or a part contributing to the related art, or all or a part of the technical solution may be implemented in a form of a software product. The computer software product is stored in a storage medium and includes several instructions for instructing one

or more computer devices (which may be a PC, a server, a network device or the like) to perform all or some of steps of the methods in the embodiments of this application.

[0179] In the foregoing embodiments of this application, the descriptions of the embodiments have respective focuses. For a part that is not described in detail in an embodiment, refer to related descriptions in other embodiments.

[0180] In the several embodiments provided in this application, the disclosed user equipment may be implemented in another manner. The apparatus embodiments described above are merely exemplary. For example, the division of the units is merely the division of logic functions, and may use other division manners during actual implementation. For example, a plurality of units or components may be combined, or may be integrated into another system, or some features may be omitted or not performed. In addition, the coupling, or direct coupling, or communication connection between the displayed or discussed components may be the indirect coupling or communication connection by means of some interfaces, units, or modules, and may be electrical or of other forms.

[0181] The units described as separate components may or may not be physically separated, and the components displayed as units may or may not be physical units, and may be located in one place or may be distributed over a plurality of network units. Some or all of the units may be selected according to actual needs to achieve the objectives of the solutions of this embodiment.

[0182] In addition, functional units in the embodiments of this application may be integrated into one processing unit, or each of the units may be physically separated, or two or more units may be integrated into one unit. The integrated unit may be implemented in the form of hardware, or may be implemented in a form of a software functional unit.

[0183] The foregoing descriptions are merely exemplary implementations of this application. A person of ordinary skill in the art may further make several improvements and modifications without departing from the principle of this application, and the improvements and modifications fall within the protection scope of this application.

CLAIMS

What is claimed is:

1. A method for controlling virtual buttons, comprising:

displaying at least two virtual buttons in a virtual scene, each of the at least two virtual buttons being displayed in an inactive form or a selectable form, each of the at least two virtual buttons being configured to trigger an interaction operation of a virtual character on an interaction object associated with the respective virtual button, the at least two virtual buttons being associated with different interaction objects;

in response to a determination that an initial condition for allowing the virtual character to trigger an interaction operation of a virtual character associated with a virtual button in the inactive form of the at least two virtual buttons is satisfied, switching the virtual button from the inactive form to the selectable form;

in response to a determination that a target condition of the virtual character triggering an interaction operation of a virtual character associated with a virtual button in the selectable form is satisfied, switching the virtual button from the selectable form to an activated form, and controlling the virtual character to perform the interaction operation on the interaction object associated with the virtual button.

2. The method according to claim 1, wherein the displaying at least two virtual buttons comprises:

displaying a first virtual button and a second virtual button of the at least two virtual buttons, a first mark being displayed over the first virtual button, a second mark being displayed over the first virtual button, the first mark indicating a first interaction object associated with the first virtual button, and the second mark indicating a second interaction object associated with the second virtual button.

3. The method according to claim 2, wherein the displaying a first virtual button and a second virtual button comprises:

when a first display order of the first mark is before a second display order of the second mark, displaying the first virtual button with the first mark before the second virtual button with the second mark in response to the first display order being before the second display order, the first display order of the first mark and the second display order of the second mark being determined

based on a sorting rule corresponding to mark types of the first mark and the second mark.

4. The method according to claim 2, wherein the displaying a first virtual button and a second virtual button comprises:

when the first interaction object and the second interaction object are of a same object type, displaying the first virtual button in a first form and displaying the second virtual button in the first form, the first form indicating the object type of the first interaction object and the second interaction object; and

when the first interaction object and the second interaction object are of different object types, displaying the first virtual button in a second form and displaying the second virtual button in a third form, the second form indicating an object type of the first interaction object, the third form indicating an object type of the second interaction object.

5. The method according to claim 4, wherein:

when the first interaction object and the second interaction object are of a same object type, displaying the first virtual button in the first form and the second virtual button in the first form in a same area; and

when the first interaction object and the second interaction object are of different object types, displaying the first virtual button in the second form and the second virtual button in the third form in different areas.

6. The method according to claim 1, further comprising: before switching the virtual button from the selectable form to the activated form and controlling the virtual character to perform the interaction operation on the interaction object associated with the virtual button,

obtaining a first select operation performed on the virtual button in the selectable form;

determining that the target condition is satisfied in response to obtaining a first release operation performed on the virtual button in the selectable form after obtaining the first selection operation.

7. The method according to claim 6, further comprising:

after obtaining the first select operation performed on the virtual button in the selectable form,

generating and displaying a candidate interaction operation sub-interface when a number of

candidate interaction operations performable by the virtual character on the interaction object associated with the virtual button is greater than or equal to 2, wherein operation identifiers of the candidate interaction operations are displayed on the candidate interaction operation sub-interface;

obtaining a second select operation performed on a target operation identifier of the operation identifiers, the target operation identifier being an operation identifier of a target candidate interaction operation performable by the virtual character on the interaction object associated with the virtual button; and

determining that the target condition is satisfied in response to obtaining a second release operation performed on the target operation identifier is obtained after obtaining the second select operation;

wherein switching the virtual button from the selectable form to the activated form and controlling the virtual character to perform the interaction operation on the interaction object associated with the virtual button comprise: switching the virtual button from the selectable form to the activated form, and controlling the virtual character to perform the target candidate interaction operation on the interaction object associated with the virtual button.

8. The method according to claim 1, further comprising: after switching the virtual button from the selectable form to the activated form and controlling the virtual character to perform the interaction operation on the interaction object associated with the virtual button,

stopping displaying the virtual button and the interaction object associated with the virtual button in the virtual scene.

9. The method according to claim 8, wherein before stopping displaying the virtual button and the interaction object associated with the virtual button in the virtual scene, the method further comprises at least one of:

displaying a first special effect on the virtual button in the activated form, the first special effect providing feedback to the interaction operation performed on the interaction object associated with the virtual button; or

displaying a second special effect on the interaction object associated with the virtual button, the second special effect indicating a release state of the interaction object associated with the virtual button.

10. The method according to claim 8, wherein the displaying at least two virtual buttons comprises:

displaying the at least two virtual buttons in a preset area, positions of the at least two virtual buttons in the preset area being arranged to be centered around a center of the preset area.

11. The method according to any one of claims 1 to 10, wherein the displaying at least two virtual buttons comprises:

displaying the at least two virtual buttons in a preset area, positions of the at least two virtual buttons in the preset area being arranged to be centered around a center of the preset area; and

wherein after stopping displaying the virtual button and the interaction object associated with the virtual button, the method further comprises:

arranging remaining virtual buttons of the at least two virtual buttons to be centered in the preset area to obtain updated position information; and

displaying the remaining virtual buttons in the preset area according to the updated position information.

12. The method according to any one of claims 1 to 10, wherein before switching the virtual button from the inactive form to the selectable form, the method further comprises at least one of:

determining that the initial condition is satisfied when a distance between the virtual character and the interaction object associated with the virtual button is less than or equal to a first preset threshold;

determining that the initial condition is satisfied when a number of obstacles between the virtual character and the interaction object associated with the virtual button is less than one, or an obstacle between the virtual character and the interaction object associated with the virtual button does not meet a blocking condition;

determining that the initial condition is satisfied when the virtual character holds an interaction trigger prop associated with the interaction object associated with the virtual button;

determining that the initial condition is satisfied when the virtual character is in an interaction trigger state associated with the interaction object associated with the virtual button; or

determining that the initial condition is satisfied when a target attribute value of the virtual character is greater than or equal to a second preset threshold associated with the interaction object associated with the virtual button.

13. The method according to any one of claims 1 to 10, further comprising:

before displaying the at least two virtual buttons, displaying a general button configured to trigger at least two types of operations including the interaction operation performed by a virtual character on the interaction object in the virtual scene;

wherein the displaying at least two virtual buttons comprises: in response to a virtual button activation request, displaying the at least two virtual buttons and prohibiting the general button from triggering the interaction operation of the virtual character on the interaction object; and

wherein the displaying at least two virtual buttons comprises: in response to the virtual button deactivation request, stopping displaying the at least two virtual buttons in the virtual scene and enabling the general button to trigger the interaction operation of the virtual character on the interaction object.

14. An apparatus for controlling virtual buttons, comprising:

a first display unit, configured to: display at least two virtual buttons in a virtual scene, each of the at least two virtual buttons being displayed in an inactive form or a selectable form, each of the at least two virtual buttons being configured to trigger an interaction operation of a virtual character on an interaction object associated with the respective virtual button, the at least two virtual buttons being associated with different interaction objects;

a second display unit, configured to: in response to a determination that an initial condition for allowing the virtual character to trigger an interaction operation of a virtual character associated with a virtual button in the inactive form of the at least two virtual buttons is satisfied, switching the virtual button from the inactive form to the selectable form; and

a third display unit, configured to: in response to a determination that a target condition of the virtual character triggering an interaction operation of a virtual character associated with a virtual button in the selectable form is satisfied, switch the virtual button from the selectable form to an activated form, and control the virtual character to perform the interaction operation on the interaction object associated with the virtual button.

15. A computer-readable storage medium, the computer-readable storage medium having a program stored therein, the program, when run by an electronic device, performing the method according to any one of claims 1 to 13.

16. A computer program product, comprising a computer program/instructions, the computer program/instructions, when executed by a processor, performing operations of the method

according to any one of claims 1 to 13.

17. An electronic device, comprising a memory and a processor, the memory having a computer program stored therein, and the processor being configured to perform the method according to any one of claims 1 to 13 by using the computer program.