

# METHOD AND DEVICE FOR INPUTTING PASSWORD IN VIRTUAL REALITY SCENE

## TECHNICAL FIELD

[0001] The present application relates to the field of network technologies, and in particular, to a method and a device for inputting a password in a virtual reality (VR) scene.

## BACKGROUND

[0002] VR is a computer simulation system that can be used to create and experience a virtual world. VR generates a simulated environment by using a computer, and is a system simulation of multi-source information integration, an interactive three-dimensional dynamic vision, and entity behavior, so that a user can be immersed in the environment. Currently, the VR technology has been widely used in many fields such as games, industry, and shopping. In some application scenarios, a password needs to be input. For example, when some functions are enabled in a VR scene, password verification can be performed.

[0003] A method for inputting a password in the existing technology can be as follows: A virtual keyboard is presented in front of the user in the VR scene, and if a gaze focus of the user stays at a character on the keyboard for more than a certain time, it indicates that the character is input. However, a disadvantage of the method is that a misoperation is easily performed, for example, a misoperation is easily performed when the user is thinking or when the focus of the user accidentally stays at a virtual key in a process of taking off a VR device. In addition, a password input time is long in the method. When a password of the user includes relatively more characters, the user needs to perform a plurality of times of input. In addition, because the user needs to make the focus stay at a virtual key for a specific time before the user triggers input, if a stay time determining threshold is relatively small, a misoperation probability is relatively high; or if a stay time determining threshold is relatively large, an input process is relatively slow.

## SUMMARY

[0004] In view of this, the present application provides a method and a device for inputting a password in a virtual reality (VR) scene, so that a password can be input quickly and accurately.

5 [0005] The present application is implemented by using the following technical solutions.

[0006] According to a first aspect, a method for inputting a password in a VR scene is provided, where the method includes: presenting an interactive input interface in a VR scene, where the interactive input interface includes a plurality of input units  
10 used for overall input, and where each input unit includes at least one input element; determining that a user scene focus in the VR scene is placed at one of the input units and the user scene focus performs focus movement on the input unit; and when determining that a movement track of the focus movement satisfies an input condition, determining to use all input elements in the input unit as a part of an input password.

15 [0007] According to a second aspect, a device for inputting a password in a VR scene is provided, where the device includes: an interface presentation module, configured to present an interactive input interface in a VR scene, where the interactive input interface includes a plurality of input units used for overall input, and where each input unit includes at least one input element; a focus identification  
20 module, configured to determine that a user scene focus in the VR scene is placed at one of the input units and the user scene focus performs focus movement on the input unit; and an input determining module, configured to: when determining that a movement track of the focus movement satisfies an input condition, determine to use all input elements in the input unit as a part of an input password.

25 [0008] According to a third aspect, a VR device is provided, where the VR device includes a memory, a processor, and a computer instruction that is stored in the memory and can run on the processor, and the processor executes the instruction to implement the following steps: presenting an interactive input interface in a VR scene, where the interactive input interface includes a plurality of input units used for overall  
30 input, and where each input unit includes at least one input element; determining that a user scene focus in the VR scene is placed at one of the input units and the user scene focus performs focus movement on the input unit; and when determining that a movement track of the focus movement satisfies an input condition, determining to

use all input elements in the input unit as a part of an input password.

[0009] According to the method and the device for inputting a password in a VR scene in the present application, selection of an input element is determined by using an interactive action of a user in the interactive input interface. Compared with the gaze-based selection method in the existing technology, a misoperation probability can be reduced, and a password can be accurately input.

## BRIEF DESCRIPTION OF DRAWINGS

[0010] FIG. 1 is a schematic diagram illustrating a password input interface, according to an implementation of the present application;

10 [0011] FIG. 2 is a flowchart illustrating password input, according to an implementation of the present application;

[0012] FIG. 3 is a schematic diagram illustrating a password input interaction method, according to an implementation of the present application; and

15 [0013] FIG. 4 is a structural diagram illustrating a device for inputting a password in a VR scene, according to an implementation of the present application.

## DESCRIPTION OF IMPLEMENTATIONS

[0014] With the gradual development, the virtual reality (VR) technology has been widely used in many fields such as games, industry, and shopping. In addition, a password needs to be input in some scenarios. VR shopping is used as an example. A previous method is as follows: A user views a product in a VR environment, memorizes a model after selecting the product, takes off VR glasses, and purchases the product on a computer or a mobile phone, where VR is only a method for displaying the product. To facilitate a user operation and improve user experience, payment can be directly performed in the VR environment. Therefore, password input is involved when payment is performed in the VR environment. The present application provides a method for inputting a password in a VR scene. However, it can be understood that the VR shopping is only one application of password input, and the method can also be applied to another scenario.

20 [0015] The VR scene is a virtual three-dimensional space world simulated by using a three-dimensional computer technology, and it integrates a visual simulated

environment, an auditory simulated environment, a tactile simulated environment, and other sensory simulated environments, so that an operator can have immersive experience and complete an operation by using VR software and hardware. In the solutions of the present application, an interactive input interface can be presented in three-dimensional space of the VR scene. The interactive input interface here can have at least two features. First, the interface is used for password input, and therefore is referred to as an input interface. Second, the interface is interactive, that is, the user can perform an operation in the interface, and the interface can obtain the operation of the user and identify a corresponding operation intent.

**[0016]** Input of a six-digit password is used as an example. Referring to FIG. 1, to implement input of the six-digit password (for example, 199320), interactive input interface 11 including a plurality of input units can be displayed in the VR scene, for example, interactive input interface 11 can include input unit 12, input unit 13, etc. In an example, when the input units are presented in the VR three-dimensional space, the input units can be displayed based on a predetermined arrangement order. For example, as shown in FIG. 1, the input units can be displayed in ascending order of 000 to 999. However, the arrangement order in FIG. 1 is not limited, and the input units can be arranged based on an order that can help the user quickly find a target digit that the user expects to input.

**[0017]** When inputting the password, the user can perform an interactive operation by using the input units in the interactive input interface, and each input unit can be used for overall input. Input unit 12 is used as an example. If the user selects input unit 12, the user can input three digits "000" at a time. If the user selects input unit 13, the user can input three digits "102" at a time. That is, all input elements in each input unit can be used as a part of the password through overall input.

**[0018]** In the example shown in FIG. 1, all the input elements in the input unit are digits. In another example, the input element can be a character such as A or b, or can be an image or other forms. In addition, in the example in FIG. 1, one input unit includes three input elements. In another example, each input unit can include at least one input element. The six-digit password in FIG. 1 is still used as an example. Two digits can be set in each input unit; or some input units include two digits, some input units include three digits, and even some input units include four digits. In the example in the present application, a form or a quantity of the input element in the input unit is not strictly limited. However, when there are at least two input elements

in one input unit, the user can input at least two elements at a time during input, so that input efficiency can be improved compared with that in a method for inputting a single-digit password.

**[0019]** The interactive input interface can be displayed by a device for inputting a password in the present application. In an example, the device for inputting a password can be implemented in a form of software. The device can further identify interaction between the user and the interactive input interface, and implement password input based on the interaction. FIG. 2 shows a password input procedure executed by the device for inputting a password in the present example. The procedure can include the steps below.

**[0020]** Step 201. Present an interactive input interface in a VR scene.

**[0021]** For example, as shown in FIG. 1, a plurality of input units can be presented in VR three-dimensional space.

**[0022]** Step 202. Identify that a user scene focus in the VR scene is placed at one of the input units and the user scene focus performs focus movement on the input unit.

**[0023]** In the present step, the user scene focus in the VR scene can be a gaze focus of a user, or can be a device control focus controlled by using a VR input device. For example, the gaze focus can be a dot drawn in the VR scene, for example, focus 14 in FIG. 1. The dot represents the gaze focus of the user. Focus 14 can be initially placed at a random location in the three-dimensional space, and the user can move the focus by turning around, raising the head, lowering the head, etc. For another example, the user can control focus 14 to move by using an input device such as a matching handle or controller provided by some dedicated VR devices.

**[0024]** The user can control focus 14 to be placed at one of the input units through gazing or by using the input device, and can further control the user scene focus to perform focus movement on the input unit. There can be a plurality of focus movement methods here, for example, controlling the focus to rotate clockwise or to rotate counterclockwise, or drawing a predetermined graphic around the input unit. No limitation is imposed on the focus movement method.

**[0025]** However, in the present step, that the user scene focus is placed at on one of the input units can be as follows: When the user expects to input some elements in a password input process, the user places the focus at an input unit that includes the element. For example, when the user expects to input 000, the user can control, through gazing or by using the input device, focus 14 in FIG. 1 to be placed at input

unit 12. In addition, if the user performs focus movement on an input unit, it can indicate that the user expects, through the interactive movement, to select and input an element in the input unit as a part of a password. The device for inputting a password can identify the interactive movement. For details, references can be to step 203 below.

**[0026]** Step 203. When determining that a movement track of the focus movement satisfies an input condition, determine to use all input elements in the input unit as a part of an input password.

**[0027]** In the present example, the input condition can be set. When the focus movement track in step 202 satisfies the input condition, it is determined that the user expects to input all the input elements in the input unit. For example, the input condition can be that the movement track is a circular track around all the input elements in the input unit. Referring to an example in FIG. 3, the user can control focus 14 to rotate clockwise to complete selection. When focus 14 rotates around "199" in an input unit, it can be determined that the user needs to input "199" as a part of the password.

**[0028]** In another example, the focus movement track limited by the input condition can be in other forms, for example, a square track and a triangular track. No limitation is imposed.

**[0029]** In addition, in a password input process, a multi-digit password can be split into several segments, so that the user inputs one segment through one time of interaction. A six-digit password is used as an example. Assume that the password is 199320. The password can be split into two three-digit numbers: "199" and "320". Both the two three-digit numbers can be found, selected, and input by using the input unit in the example in FIG. 1. Alternatively, the password can be split into three two-digit numbers: "19", "93", and "20", and the three numbers are simultaneously displayed in the interactive input interface. An input unit including a two-digit number can be displayed in the VR three-dimensional space, that is, each input unit in FIG. 1 can be replaced with a unit including a two-digit number such as "00", "01", or "02", or even some input units include a two-digit number (for example, "19" or "02") and some input units include a three-digit number (for example, "338" or "390"), provided that the user can find an input unit including password content that the user expects to input.

**[0030]** Input of the password 199320 is still used as an example. The device for

inputting a password in the present application can identify that the user selects at least two input units, and obtain all input elements in the at least two input units. The device for inputting a password can combine all the input elements based on an order of obtaining the at least two input units, to obtain the input password. For example, if the user first selects "199" and then selects "320", the password "199320" can be obtained based on the order. If the user first inputs "320" by using the movement track and then inputs "199", an obtained password is "320199".

**[0031]** In the method for inputting a password in the present example, selection of an input element is determined by using an interactive action of the user in the interactive input interface. Compared with the gaze-based selection method in the existing technology, a misoperation probability can be reduced, and a password can be accurately input. In addition, each input unit includes at least one input element, so that the password can be input more quickly. Furthermore, compared with long-time gazing in the gaze-based selection method, a speed of an input process can also be improved in the interactive selection and input method. It should be worthwhile to further note that, in the method for inputting a password in the present example, the user scene focus can be the gaze focus or the device control focus, so that the method is applicable to both a VR scene with an input device and a VR scene without an input device, and an application range is relatively wide.

**[0032]** An execution sequence of the steps in the procedure shown in FIG. 2 is not limited to a sequence in the flowchart. In addition, descriptions of the steps can be implemented in a form of software, hardware, or a combination thereof. For example, a person skilled in the art can implement the descriptions in a form of software code, and the code can be a computer executable instruction that can implement logical functions corresponding to the steps. When the descriptions are implemented in the form of software, the executable instruction can be stored in a memory and executed by a processor in a device.

**[0033]** For example, corresponding to the method, the present application also provides a VR device. The device can include a processor, a memory, and a computer instruction that is stored in a memory and can run on the processor. The processor executes the instruction to implement the following steps: presenting an interactive input interface in a VR scene, where the interactive input interface includes a plurality of input units used for overall input, and where each input unit includes at least one input element; determining that a user scene focus in the VR scene is placed at one of

the input units and the user scene focus performs focus movement on the input unit; and when determining that a movement track of the focus movement satisfies an input condition, determining to use all input elements in the input unit as a part of an input password.

5    **[0034]**     The present application further provides a device for inputting a password in a VR scene. As shown in FIG. 4, the device for inputting a password can include an interface presentation module 41, a focus identification module 42, and an input determining module 43.

10   **[0035]**     The interface presentation module 41 is configured to present an interactive input interface in a VR scene, where the interactive input interface includes a plurality of input units used for overall input, and where each input unit includes at least one input element.

15   **[0036]**     The focus identification module 42 is configured to determine that a user scene focus in the VR scene is placed at one of the input units and the user scene focus performs focus movement on the input unit.

**[0037]**     The input determining module 43 is configured to: when determining that a movement track of the focus movement satisfies an input condition, determine to use all input elements in the input unit as a part of an input password.

20   **[0038]**     In an example, the input determining module 43 is configured to: when determining that the movement track is a circular track around all the input elements in the input unit, determine that the movement track of the focus movement satisfies the input condition.

25   **[0039]**     In an example, the input determining module 43 is further configured to: in a password input process, identify that a user selects at least two input units, and obtain all input elements in the at least two input units; and combine all the input elements based on an order of obtaining the input elements by the at least two input units, to obtain the input password.

**[0040]**     In an example, the user scene focus includes a gaze focus of a user or a device control focus controlled by using a VR input device.

30   **[0041]**     The apparatuses or modules described in the previous implementations can be implemented by a computer chip or an entity, or can be implemented by a product with a certain function. A typical implementation device is a computer, and the computer can be a personal computer, a laptop computer, a cellular phone, a camera phone, a smartphone, a personal digital assistant, a media player, a navigation device,

an email sending/receiving device, a game console, a tablet computer, a wearable device, or any combination of these devices.

5 [0042] For ease of description, the previous apparatus is described by dividing the apparatus into various modules based on functions. Certainly, when the present application is implemented, the functions of the modules can be implemented in one or more pieces of same software and/or hardware.

10 [0043] In addition, the password input procedure shown in FIG. 2 can be further included in a computer readable storage medium. The medium stores a machine readable instruction corresponding to password input control logic, the medium can be connected to a processing device that executes the instruction, and the instruction stored in the medium can be executed by the processing device.

15 [0044] In the present application, the computer readable storage medium can be in a plurality of forms. In different examples, the machine readable storage medium can be a random access memory (RAM), a volatile memory, a non-volatile memory, a flash memory, a storage drive (such as a hard disk drive), a solid state drive, any type of storage disk (such as an optical disc or a DVD) or a similar storage medium, or a combination of the devices. In particular, the computer readable medium can also be a paper or another suitable medium that can print a program. When the media are used, these programs can be obtained electrically (for example, through optical scanning),  
20 can be compiled, interpreted, and processed by using a suitable method, and then can be stored in a computer medium.

25 [0045] The previous descriptions are merely examples of implementations of the present application, but are not intended to limit the present application. Any modification, equivalent replacement, or improvement made without departing from the spirit and principle of the present application should fall within the protection scope of the present application.

## CLAIMS

What is claimed is:

1. A computer-implemented method, comprising:
  - presenting an interactive input interface in a virtual reality (VR) scene for a user of a VR device, wherein the interactive input interface comprises a plurality of input units used for an overall input, and wherein each input unit of the plurality of input units comprises one or more input elements;
  - in a password input process, identifying that the user selects at least two input units of the plurality of input units;
  - obtaining input elements in the at least two input units of the plurality of input units;
  - and
  - combining, based on an order of obtaining the at least two input units of the plurality of input units, the input elements in the at least two input units of the plurality of input units to obtain an input password.
2. The computer-implemented method of claim 1, wherein each input unit of the plurality of input units comprises at least three input elements.
3. The computer-implemented method of claim 1, wherein an input element of the one or more input elements includes at least one of a digit, a character, or an image.
4. The computer-implemented method of claim 1, wherein the input password is split into a plurality of segments, and wherein each segment of the plurality of segments is input through a single interaction.
5. The computer-implemented method of claim 1, wherein presenting the interactive input interface in the VR scene comprises:

presenting the plurality of input units used for the overall input in a three-dimensional space of the VR scene based on a predetermined arrangement order.

6. The computer-implemented method of claim 1, further comprising:

determining that a user scene focus in the VR scene is on a selected input unit of the plurality of input units;

determining that a movement track of the user scene focus on the selected input unit of the plurality of input units satisfies an input condition; and

in response to determining that the movement track of the user scene focus on the selected input unit of the plurality of input units satisfies the input condition, using the input elements in the selected input unit of the plurality of input units as a part of the input password.

7. The computer-implemented method of claim 6, wherein the movement track includes at least one of a circular track, a square track, a triangular track, and a drawing of a predetermined graphic.

8. The computer-implemented method of claim 6, wherein determining that the movement track of the user scene focus on the selected input unit of the plurality of input units satisfies the input condition comprises:

determining that the movement track is a circular track around all the input elements in the selected input unit of the plurality of input units, wherein the circular track is a clockwise track or a counterclockwise track.

9. The computer-implemented method of claim 6, wherein the user scene focus comprises a gaze focus of the user.

10. The computer-implemented method of claim 6, wherein the user scene focus comprises a device control focus controlled by using an input device of the VR device.

11. A device for inputting a password in a virtual reality (VR) scene, the device comprising a plurality of modules configured to perform the method of any one of claims 1 to 10.