METHOD, APPARATUS, DEVICE AND STORAGE MEDIUM FOR INTERACTING WITH VIRTUAL OBJECT

[0001] The present application claims priority to Chinese Patent Application No. 202410256850.1, filed on March 6, 2024 and entitled "METHOD, APPARATUS, DEVICE AND STORAGE MEDIUM FOR INTERACTING WITH VIRTUAL OBJECT", which is incorporated herein by reference in its entirety.

FIELD

[0002] Example embodiments of the present disclosure generally relate to the field of computers, and in particular, to a method, an apparatus, a device, and a computer-readable storage medium for interacting with a virtual object.

BACKGROUND

[0003] With the development of computer technologies, the Internet has become an important platform for people to exchange information. In some platforms, a user is allowed to create or configure a corresponding virtual object, for example, a virtual avatar, a digital assistant, or the like. Such a virtual object may interact with other users, for example, to help the user perform a specific task or acquire specific information.

SUMMARY

[0004] In a first aspect of the present disclosure, a method for interacting with a virtual object is provided. The method includes presenting an access entry associated with a target user; and presenting an interaction interface with a virtual object based on a selection of the access entry, the virtual object corresponding to the target user, where a current interaction modality of a current user with the virtual object in the interaction interface is determined from a plurality of preset interaction modalities based on at least one of: platform configuration information associated with the access entry, or an entry type of the access entry.

[0005] In a second aspect of the present disclosure, an apparatus for interacting with a virtual object is provided. The apparatus includes an entry presenting module configured to present an access entry associated with a target user; and an interface presenting module configured to present an interaction interface with a virtual object based on a selection of the access entry, the virtual object corresponding to the target user, where a current interaction modality of a current user with the virtual object in the interaction interface is determined from a plurality of preset interaction modalities based on at least one of: platform configuration information associated with the access entry, or an entry type of the access entry.

[0006] In a third aspect of the present disclosure, an electronic device is provided. The device includes at least one processing unit; and at least one memory coupled to the at least one processing unit and storing instructions executable by the at least one processing unit. The instructions, when executed by the at least one processing unit, cause the device to perform the method of the first aspect.

[0007] In a fourth aspect of the present disclosure, a computer-readable storage medium is provided. The computer-readable storage medium has a computer program stored thereon, the computer program being

executable by a processor to implement the method of the first aspect.

[0008] It would be appreciated that the content described in the Summary section of the present disclosure is neither intended to identify key or essential features of the embodiments of the present disclosure, nor is it intended to limit the scope of the present disclosure. Other features of the present disclosure will be readily envisaged through the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The above and other features, advantages and aspects of the embodiments of the present disclosure will become more apparent in combination with the drawings and with reference to the following detailed description. In the drawings, the same or similar reference symbols refer to the same or similar elements, where:

[0010] Fig. 1 shows a schematic diagram of an example environment in which the embodiments according to the present disclosure may be implemented;

[0011] Fig. 2A to Fig. 2D show example interfaces according to some embodiments of the present disclosure;

[0012] Fig. 3 shows a flowchart of an example process of interacting with a virtual object according to some embodiments of the present disclosure;

[0013] Fig. 4 shows a schematic structural block diagram of an apparatus for interacting with a virtual object according to some embodiments of the present disclosure; and

[0014] Fig. 5 shows a block diagram of an electronic device capable of implementing multiple embodiments of the present disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS

[0015] The embodiments of the present disclosure will be described in more detail below with reference to the drawings. Although some embodiments of the present disclosure are shown in the drawings, it would be appreciated that the present disclosure may be implemented in various forms and should not be construed as limited to the embodiments set forth herein. On the contrary, these embodiments are provided for a more thorough and complete understanding of the present disclosure. It would be appreciated that the drawings and embodiments of the present disclosure are only for exemplary purposes and are not intended to limit the protection scope of the present disclosure.

[0016] It should be noted that the titles of any sections/subsections provided herein are not restrictive. Various embodiments are described throughout this article, and any type of embodiment may be included under any section/subsection. In addition, the embodiments described in any section/subsection may be combined with any other embodiments described in the same section/subsection and/or different sections/subsections in any manner.

[0017] In the description of the embodiments of the present disclosure, the term "include/comprise" and similar terms thereto should be understood as open-ended inclusions, that is, "include/comprise but not limited to". The term "based on" should be understood as "at least partially based on". The term "one embodiment" or "the embodiment" should be understood as "at least one embodiment". The term "some embodiments" should be understood as "at least some embodiments". Other definitions, either explicit or implicit, may also be included below. The terms "first", "second", etc. may refer to different or same objects. Other definitions, either explicit or implicit, may also be included below.

[0018] The embodiments of the present disclosure may involve user data, data acquisition and/or use, etc. These aspects all comply with corresponding laws, regulations and related provisions. In the embodiments of the present disclosure, all data collection, acquisition, processing, machining, forwarding, use, etc. are carried out on the premise that the user is aware and confirms. Accordingly, when implementing the embodiments of the present disclosure, the user should be informed of the type, range of use, use scenarios, etc. of data or information that may be involved and the authorization of the user should be obtained in an appropriate manner in accordance with relevant laws and regulations. The specific manner of informing and/or authorizing may vary according to the actual situation and application scenarios, and the scope of the present disclosure is not limited in this regard.

[0019] If the solutions in this specification and embodiments involve personal information processing, the processing will be carried out on the premise that there is a legal basis (for example, the consent of the personal information subject is obtained, or it is necessary to perform a contract, etc.), and the processing will only be carried out within a specified or agreed scope. If the user refuses to process personal information other than the necessary information required for the basic functions, it will not affect the user's use of the basic functions.

[0020] As discussed above, in some platforms, a user is allowed to create or configure a corresponding virtual object, for example, a virtual avatar, a digital assistant, or the like. In the process of interaction between other users and the virtual object, such interaction is usually based on a preset interaction modality. However, different users or the same user in different situations may have different interaction expectations, and a fixed interaction modality is difficult to meet such interaction needs.

[0021] The embodiments of the present disclosure provide a solution to interact with a virtual object. According to the solution, an access entry associated with a target user may be presented. Further, an interaction interface with a virtual object may be presented based on a selection of the access entry, the virtual object corresponding to the target user, where a current interaction modality of a current user with the virtual object in the interaction interface is determined from a plurality of preset interaction modalities based on at least one of: platform configuration information associated with the access entry, or an entry type of the access entry.

[0022] In this way, the embodiments of the present disclosure are capable of supporting interaction with the virtual object in different modalities in different situations, so that the interaction modality is more in line with the user's expectations, thereby enhancing the interaction experience.

[0023] Various example implementations of the solution are described in detail below in further conjunction with the drawings.

Example Environment

[0024] Fig. 1 shows a schematic diagram of an example environment 100 in which the embodiments of the present disclosure may be implemented. As shown in Fig. 1, the example environment 100 may include an electronic device 110.

[0025] In this example environment 100, the electronic device 110 may run an application 120 supporting interface interaction. The application 120 may be any appropriate type of application for interface interaction, examples of which may include but not limited to: a video application, a social application, or other appropriate applications. A user 140 may interact with the application 120 via the electronic device 110 and/or its attached devices.

[0026] In the environment 100 of Fig. 1, if the application 120 is active, the electronic device 110 may present an interface 150 for supporting interface interaction through the application 120.

[0027] In some embodiments, the electronic device 110 communicates with a server 130 to implement the provision of services of the application 120. The electronic device 110 may be any type of mobile terminal, fixed terminal or portable terminal, including a mobile phone, a desktop computer, a laptop computer, a notebook computer, a netbook computer, a tablet computer, a media computer, a multimedia tablet, a palmtop computer, a portable game terminal, a VR/AR device, a personal communication system (Personal Communication System, PCS) device, a personal navigation device, a personal digital assistant (Personal Digital Assistant, PDA), an audio/video player, a digital camera/video camera, a positioning device, a television receiver, a radio broadcast receiver, an e-book device, a game device, or any combination of the foregoing, including the fittings and peripherals of these devices or any combination thereof. In some embodiments, the electronic device 110 may also support any type of user-specific interface (such as a "wearable" circuit, etc.).

[0028] The server 130 may be an independent physical server, a server cluster or a distributed system composed of multiple physical servers, or a cloud server that provides basic cloud computing services such as cloud services, cloud databases, cloud computing, cloud functions, cloud storage, network services, cloud communications, middleware services, domain name services, security services, content delivery networks, and big data and artificial intelligence platforms. The server 130 may include, for example, a computing system/server, such as a mainframe, an edge computing node, a computing device in a cloud environment, and the like. The server 130 may provide background services for the application 120 supporting the virtual scene in the electronic device 110.

[0029] A communication connection may be established between the server 130 and the electronic device 110. The communication connection may be established in a wired or wireless manner. The communication connection may include but not limited to a Bluetooth connection, a mobile network connection, a universal serial bus (Universal Serial Bus, USB) connection, a wireless fidelity (Wireless Fidelity, WiFi) connection, etc., and the embodiments of the present disclosure are not limited in this regard. In the embodiments of the present disclosure, the server 130 and the electronic device 110 may implement signaling interaction through the communication connection therebetween.

[0030] It would be appreciated that the structure and function of each element in the environment 100 are described for exemplary purposes only, without suggesting any limitation to the scope of the present disclosure.

[0031] Some example embodiments of the present disclosure will be described below with continued reference to the drawings.

Example Interaction

[0032] The following describes example interactions according to some embodiments of the present disclosure in conjunction with Fig. 2A to Fig. 2D. Fig. 2A to Fig. 2D show example interfaces 200A to 200D according to some embodiments of the present disclosure. The interfaces 200A to 200D may be provided by, for example, the electronic device 110 shown in Fig. 1.

[0033] As shown in Fig. 2A, Fig. 2A shows an interface 200A associated with a target user (for example, user X). For example, the interface 200A may be a personal page of "user X" for displaying the user's information,

works, or the like.

[0034] In some embodiments, the interface 200A may include, for example, an access entry 205 associated with the target user. After receiving the selection of the access entry, the electronic device 110 may present an interface 200B as shown in Fig. 2B.

[0035] As shown in Fig. 2B, the interface 200B may be an interaction interface with a virtual object. The virtual object may correspond to "user X". For example, the virtual object may be created based on a configuration operation of "user X", so that the virtual object may interact with other users based on specific data and/or knowledge. In some scenarios, the virtual object may also be referred to as a virtual avatar or a digital assistant, etc. The present disclosure is not intended to limit a specific creation manner of the virtual object.

[0036] In some embodiments, the electronic device 110 may determine a current interaction modality of a current user with the virtual object in the interface 200B.

[0037] In some embodiments, the virtual object may be configured to support multiple preset interaction modalities, for example, a text interaction modality, a voice interaction modality, a video interaction modality, etc.

[0038] In some embodiments, such an interaction modality may indicate a message type of a first message input by the current user. For example, in the text interaction modality, an initial input manner of the user is, for example, text input.

[0039] In some embodiments, such an interaction modality may also indicate a message type of a second message provided by the virtual object. For example, in the voice interaction modality, the virtual object may output a message by voice. Such a message may include, for example, a greeting message or a reply message to the message input by the user.

[0040] It would be appreciated that in a case where the interaction modality indicates both the message type of the first message input by the current user and the message type of the second message provided by the virtual object, the message type of the first message may be different from the message type of the second message. For example, in a case where the user uses a headset, an interaction modality of text input and voice output may be supported.

[0041] In some embodiments, the plurality of preset interaction modalities supported by the virtual object may be determined based on a configuration operation of the target user (for example, user X). For example, "user X" may configure the virtual object to support the text interaction modality and the voice interaction modality.

[0042] In some embodiments, the electronic device 110 may determine a current interaction modality in the interface 200B based on platform configuration information associated with the access entry 205.

[0043] As an example, such platform configuration information may indicate that a playback mode of a platform associated with the access entry 205 is a silent mode or a sound mode. For example, the platform may be, for example, a media playback platform, and the platform configuration information may indicate that media content in the platform is played in the silent mode.

[0044] In some embodiments, if the platform configuration information indicates that the media content in the platform is played in the silent mode, the current interaction modality in the interface 200B may be determined as the text interaction modality. For example, the virtual object will be configured to provide a text message, and the initial input mode of the user may be a text input mode.

[0045] In some embodiments, if the platform configuration information indicates that the media content in the platform is played in the sound mode, the current interaction modality in the interface 200B may be determined as the voice interaction modality. For example, as shown in Fig. 2B, the virtual object will be configured to provide a voice message, and the initial input mode of the user may be a voice input mode.

[0046] In some embodiments, the electronic device 110 may further determine the current interaction modality based on, for example, historical interaction between the current user and the virtual object. Specifically, if the platform configuration information indicates that the media content in the platform is played in the sound mode, the electronic device 110 may determine a historical interaction modality in the historical interaction between the current user and the virtual object as the current interaction modality.

[0047] For example, if the historical interaction modality when the current user exited the interaction interface with the virtual object last time is the text interaction modality, the electronic device 110 may determine the text interaction modality as the current interaction modality.

[0048] In some embodiments, the electronic device 110 may determine the current interaction modality in the interface 200B based on an entry type of the access entry 205. In some embodiments, the type of the access entry 205 may indicate a type of the interface where the access entry 205 is located.

[0049] Taking Fig. 2A as an example, if the interface 200A is a personal homepage of the target user, the electronic device 110 may determine an interaction modality corresponding to the type of personal homepage, for example, the voice interaction modality.

[0050] In some embodiments, if the current user enters the interaction interface 200B through a work viewing page of the target user, the electronic device 110 may determine an interaction modality corresponding to the type of work viewing page, for example, the video interaction modality.

[0051] In some embodiments, the electronic device 110 may determine the current interaction modality in the interface 200B based on the correlation between different entry types and the preset interaction modalities. In some embodiments, such correlation may include a preset correlation. Alternatively, such correlation may also be determined based on the configuration operation of the target user. For example, the target user may configure the interaction modality supported by the interaction interface entered through the access entry in the personal homepage to be the voice interaction modality.

[0052] In some embodiments, the type of the access entry may be further divided into two categories, for example. For example, a first entry type may be an access entry of a first interface, where the first interface is specific to the target user. For example, such a first interface may include a personal homepage, a work viewing page of the target user, a private chat page with the target user, and the like.

[0053] As another example, a second entry type may correspond to an access entry in a second interface, where the second interface is independent of the target user. For example, such a second interface may include a search page provided in the platform. Such a search page provides information about the target user based on user input information, and provides the access entry associated with the target user.

[0054] As another example, such a second interface may include an aggregate information page, for example, a recommendation page. Such a recommendation page may provide, for example, information about multiple users, and may provide the access entry associated with the target user.

[0055] In some embodiments, the first entry type and the second entry type may correspond to different

interaction modalities. That is, the current interaction modalities supported by the interaction interfaces entered through different types of access entries may be different.

[0056] For example, the first entry type has a higher correlation with the target user, and the user may expect to obtain richer interaction experience. Correspondingly, the first entry type may correspond to, for example, the voice interaction modality or the video interaction modality.

[0057] As another example, the second entry type has a relatively lower correlation with the target user, and the user may not expect to be disturbed too much. Correspondingly, the second entry type may correspond to, for example, the text interaction modality.

[0058] In this way, the embodiments of the present disclosure may provide the user with an interaction modality that better meets interaction expectations, thereby improving the user's interaction experience.

[0059] In some embodiments, the electronic device 110 may further support the user to adjust the interaction modality in the interface 200B. For example, the electronic device 110 may adjust the current interaction modality of the current user with the virtual object in the interface based on a preset operation of the current user in the interface 200B.

[0060] Taking Fig. 2B as an example, the current interaction modality is, for example, the voice interaction modality. As shown in the figure, the electronic device 110 may display a visual element 210 (for example, an avatar or a three-dimensional model, etc.) of the virtual object in the interface 200B.

[0061] Additionally, the electronic device 110 may output the greeting message of the virtual object by voice. Alternatively, the electronic device 110 may also display the text content 220 corresponding to the voice message by means of subtitles, for example.

[0062] Further, in the current interaction modality, the default message input mode in the interface 200B is the voice input mode. The electronic device 110 may acquire the voice message input by the user based on the user's selection of a voice control 225, for example.

[0063] In some embodiments, the electronic device 110 may further provide an adjustment control 215 for adjusting the type of the message output by the virtual object. As an example, after receiving the user's selection of the adjustment control 215, the electronic device 110 may display an interface 200C as shown in Fig. 2C.

[0064] As shown in Fig. 2C, the electronic device 110 may accordingly change the interaction modality, and change the type of the message output by the virtual object from the voice message to the text message. For example, after receiving a message 235 (for example, a voice message) input by the user, the electronic device 110 may provide a text message 240 as a reply to the message 235 based on the current interaction modality.

[0065] Similarly, in a case where the initial interaction modality is the text interaction modality and the virtual object supports the voice interaction modality or the video interaction modality, the electronic device 110 may also switch the current interaction modality to another modality, for example, the voice interaction modality or the video interaction modality, through an operation.

[0066] In some embodiments, the electronic device 110 may further support the user to separately change the type of the input message, for example, to adjust the current interaction modality. For example, after receiving the selection of a text control 230 shown in Fig. 2C, the electronic device 110 may present an interface 200D shown in Fig. 2D.

[0067] In the interface 200D, the electronic device 110 may provide a text input component 245 to support the

user to input text content. Additionally, the electronic device 110 may also support the user to switch the type of the input message from the text message to the voice message by clicking a voice control 250.

[0068] In some embodiments, as shown in Fig. 2B to Fig. 2D, in the case where the interaction modality changes, the interface layout of the interaction interface may also be changed accordingly. For example, Fig. 2B corresponds to the voice interaction modality, and Fig. 2D corresponds to the text interaction modality.

[0069] As shown in Fig. 2B, in the voice interaction modality, a message window of the interface 200B may present the visual element 210 associated with the virtual object. Correspondingly, as shown in Fig. 2D, in the text interaction modality, a message window of the interface 200D may hide the visual element associated with the virtual object.

[0070] In this way, the embodiments of the present disclosure are capable of supporting interaction with the virtual object in different modalities in different situations, so that the interaction modality is more in line with the user's expectations, thereby enhancing the interaction experience.

Example Process

[0071] Fig. 3 shows a flowchart of an example process 300 of interacting with a virtual object according to some embodiments of the present disclosure. The process 300 may be implemented at the electronic device 110. The process 300 is described below with reference to Fig. 1.

[0072] As shown in the figure, at block 310, the electronic device 110 presents an access entry associated with a target user.

[0073] At block 320, the electronic device 110 presents an interaction interface with a virtual object based on a selection of the access entry, the virtual object corresponding to the target user, where a current interaction modality of a current user with the virtual object in the interaction interface is determined from a plurality of preset interaction modalities based on at least one of: platform configuration information associated with the access entry, or an entry type of the access entry.

[0074] In some embodiments, the process 300 further includes determining a text interaction modality as the current interaction modality in response to the platform configuration information indicating that media content in a platform is played in a silent mode.

[0075] In some embodiments, the process 300 further includes determining a historical interaction modality in historical interaction between the current user and the virtual object as the current interaction modality in response to the platform configuration information indicating that the media content in the platform is played in a sound mode.

[0076] In some embodiments, the process 300 further includes determining, based on a correlation between a group of preset entry types and the plurality of preset interaction modalities, the current interaction modality matching the entry type of the access entry from the plurality of preset interaction modalities.

[0077] In some embodiments, the plurality of preset interaction modalities and/or the correlation are determined based on a configuration operation of the target user.

[0078] In some embodiments, the group of preset entry types include a first entry type and a second entry type. The first entry type corresponds to a first access entry of a first interface, and the first interface is specific to the target user. The second entry type corresponds to a second access entry in a second interface, and the second

interface is independent of the target user.

[0079] In some embodiments, the first access entry corresponds to a first interaction modality, the second access entry corresponds to a second interaction modality, and the first interaction modality is different from the second interaction modality.

[0080] In some embodiments, the interaction modality indicates at least one of a message type of a first message input by the current user or a message type of a second message provided by the virtual object.

[0081] In some embodiments, the process 300 further includes adjusting the current interaction modality of the current user with the virtual object in the interaction interface based on a preset operation of the current user in the interaction interface.

[0082] In some embodiments, an interface layout of the interaction interface is determined based on the current interaction modality.

[0083] In some embodiments, the interaction interface includes a message window for presenting an interaction message. In response to the current interaction modality being a voice interaction modality, the message window of the interaction interface presents a visual element associated with the virtual object. In response to the current interaction modality being a text interaction modality, the message window of the interaction interface hides the visual element associated with the virtual object.

Example Apparatus and Device

[0084] The embodiments of the present disclosure further provide a corresponding apparatus for implementing the above method or process. Fig. 4 shows a schematic structural block diagram of an apparatus 400 for interacting with a virtual object according to some embodiments of the present disclosure. The apparatus 400 may be implemented as or included in the electronic device 110. Each module/component in the apparatus 400 may be implemented by hardware, software, firmware, or any combination thereof.

[0085] As shown in Fig. 4, the apparatus 400 includes an entry presenting module 410 and an interface presenting module 420. The entry presenting module 410 is configured to present an access entry associated with a target user. The interface presenting module 420 is configured to present an interaction interface with a virtual object based on a selection of the access entry, the virtual object corresponding to the target user, where a current interaction modality of a current user with the virtual object in the interaction interface is determined from a plurality of preset interaction modalities based on at least one of: platform configuration information associated with the access entry, or an entry type of the access entry.

[0086] In some embodiments, the apparatus 400 further includes a first determination module configured to determine a text interaction modality as the current interaction modality in response to the platform configuration information indicating that media content in a platform is played in a silent mode.

[0087] In some embodiments, the apparatus 400 further includes a second determination module configured to determine a historical interaction modality in historical interaction between the current user and the virtual object as the current interaction modality in response to the platform configuration information indicating that the media content in the platform is played in a sound mode.

[0088] In some embodiments, the apparatus 400 further includes a third determination module configured to determine, based on a correlation between a group of preset entry types and the plurality of preset interaction

modalities, the current interaction modality matching the entry type of the access entry from the plurality of preset interaction modalities.

[0089] In some embodiments, the plurality of preset interaction modalities and/or the correlation are determined based on a configuration operation of the target user.

[0090] In some embodiments, the group of preset entry types include a first entry type and a second entry type. The first entry type corresponds to a first access entry of a first interface, and the first interface is specific to the target user. The second entry type corresponds to a second access entry in a second interface, and the second interface is independent of the target user.

[0091] In some embodiments, the first access entry corresponds to a first interaction modality, the second access entry corresponds to a second interaction modality, and the first interaction modality is different from the second interaction modality.

[0092] In some embodiments, the interaction modality indicates at least one of a message type of a first message input by the current user or a message type of a second message provided by the virtual object.

[0093] In some embodiments, the apparatus 400 further includes an adjustment module configured to adjust the current interaction modality of the current user with the virtual object in the interaction interface based on a preset operation of the current user in the interaction interface.

[0094] In some embodiments, an interface layout of the interaction interface is determined based on the current interaction modality.

[0095] In some embodiments, the interaction interface includes a message window for presenting an interaction message. In response to the current interaction modality being a voice interaction modality, the message window of the interaction interface presents a visual element associated with the virtual object. In response to the current interaction modality being a text interaction modality, the message window of the interaction interface hides the visual element associated with the virtual object.

[0096] Fig. 5 shows a block diagram of an electronic device 500 in which one or more embodiments of the present disclosure may be implemented. It would be appreciated that the electronic device 500 shown in Fig. 5 is only exemplary, without suggesting any limitation to the function and scope of the embodiments described herein. The electronic device 500 shown in Fig. 5 may be used to implement the electronic device 110 of Fig. 1.

[0097] As shown in Fig. 5, the electronic device 500 is in the form of a general electronic device. The components of the electronic device 500 may include but not limited to one or more processors or processing units 510, a memory 520, a storage device 530, one or more communication units 540, one or more input devices 550, and one or more output devices 560. The processing unit 510 may be an actual or virtual processor and may perform various processing based on the programs stored in the memory 520. In a multi-processor system, multiple processing units perform computer executable instructions in parallel to improve the parallel processing capability of the electronic device 500.

[0098] The electronic device 500 typically includes multiple computer storage medium. Such medium may be any available medium accessible by the electronic device 500, including but not limited to volatile and non-volatile medium, removable and non-removable medium. The memory 520 may be volatile memory (for example, a register, cache, a random access memory (RAM)), a non-volatile memory (such as a read-only memory (ROM), an electrically erasable programmable read-only memory (EEPROM), a flash memory), or any

combination thereof. The storage device 530 may be any removable or non-removable medium, and may include a machine-readable medium such as a flash drive, a disk, or any other medium, which may be used to store information and/or data and may be accessed within the electronic device 500.

[0099] The electronic device 500 may further include additional removable/non-removable, volatile/non-volatile memory medium. Although not shown in Fig. 5, it is possible to provide a disk driver for reading from or writing to a removable, non-volatile disk (such as a "floppy disk"), and an optical disk driver for reading from or writing to a removable, non-volatile optical disk. In these cases, each driver may be connected to the bus (not shown) by one or more data medium interfaces. The memory 520 may include a computer program product 525, which has one or more program modules configured to perform various methods or acts of the various embodiments of the present disclosure.

[0100] The communication unit 540 implements communication with other electronic devices through the communication medium. Additionally, the functions of the components of the electronic device 500 may be implemented by a single computing cluster or multiple computing machines, which may communicate through communication connections. Therefore, the electronic device 500 may use a logical connection with one or more other servers, a network personal computer (PC) or another network node to operate in a networked environment.

[0101] The input device 550 may be one or more input devices, such as a mouse, a keyboard, a tracking ball, etc. The output device 560 may be one or more output devices, such as a display, a speaker, a printer, etc. The electronic device 500 may further communicate with one or more external devices (not shown) through the communication unit 540 as needed, the external devices such as a storage device, a display device, etc., communicate with one or more devices that enable the user to interact with the electronic device 500, or communicate with any devices (for example, a network card, a modem, etc.) that enable the electronic device 500 to communicate with one or more other electronic devices. Such communication may be performed via input/output (I/O) interfaces (not shown).

[0102] According to an exemplary implementation of the present disclosure, there is provided a computer-readable storage medium having computer executable instructions stored thereon, where the computer executable instructions are executed by a processor to implement the method described above. According to an exemplary implementation of the present disclosure, there is further provided a computer program product tangibly stored on a non-transitory computer-readable medium and including computer executable instructions, where the computer executable instructions are executed by a processor to implement the method described above.

[0103] Various aspects of the present disclosure are described herein with reference to flowcharts and/or block diagrams of methods, apparatuses, devices and computer program products implemented according to the present disclosure. It would be appreciated that each block of the flowchart and/or block diagrams, and combinations of blocks in the flowchart and/or block diagrams, may be implemented by computer readable program instructions.

[0104] These computer readable program instructions may be provided to the processing unit of a general-purpose computer, a special-purpose computer, or other programmable data processing apparatus to produce a machine, such that when these instructions are executed by the processing unit of the computer or other programmable data processing apparatus, an apparatus for implementing the functions/actions specified in one

or more blocks of the flowchart and/or block diagrams is produced. These computer readable program instructions may also be stored in a computer-readable storage medium, these instructions make the computer, the programmable data processing apparatus and/or other devices work in a specific manner, and thus, the computer-readable medium storing the instructions includes a manufactured product, which includes instructions for implementing various aspects of the functions/actions specified in one or more blocks of the flowchart and/or block diagrams.

[0105] The computer readable program instructions may be loaded onto a computer, another programmable data processing apparatus, or other devices, so that a series of operation steps are performed on the computer, the other programmable data processing apparatus or the other devices to generate a computer-implemented process, thereby enabling the instructions executed on the computer, the other programmable data processing apparatus, or the other devices to implement the functions/actions specified in one or more blocks of the flowchart and/or block diagrams.

[0106] The flowchart and block diagrams in the drawings show the possibly implemented architectures, functions and operations of the system, method and computer program product according to multiple implementations of the present disclosure. In this regard, each block in the flowchart or block diagrams may represent a module, program segment or part of an instruction, and the module, program segment or part of an instruction contains one or more executable instructions for implementing the specified logical functions. In some alternative implementations, the functions marked in the blocks may also occur in an order different from that marked in the drawings. For example, two consecutive blocks may actually be performed substantially in parallel, or they may sometimes be performed in the reverse order, depending on the functions involved. It should also be noted that each block in the block diagrams and/or flowcharts, and the combination of blocks in the block diagrams and/or flowcharts may be implemented by a dedicated hardware-based system that executes specified functions or actions, or may be implemented by a combination of dedicated hardware and computer instructions.

[0107] The implementations of the present disclosure have been described above, and the above description is exemplary, non-exhaustive, and not limited to the disclosed implementations. Without departing from the scope and spirit of the described implementations, many modifications and changes will be apparent to those of ordinary skill in the art. The choice of terms used herein is intended to best explain the principles of the implementations, the actual applications or improvements to the technologies in the market, or to enable other ordinary skilled in the art to understand the implementations disclosed herein.

CLAIMS

1. A method for interacting with a virtual object, comprising:

presenting an access entry associated with a target user; and

presenting an interaction interface with a virtual object based on a selection of the access entry, the virtual object corresponding to the target user, wherein a current interaction modality of a current user with the virtual object in the interaction interface is determined from a plurality of preset interaction modalities based on at least one of: platform configuration information associated with the access entry, or an entry type of the access entry.

2. The method of claim 1, further comprising:

determining a text interaction modality as the current interaction modality in response to the platform configuration information indicating that media content in a platform is played in a silent mode.

3. The method of claim 2, further comprising:

determining a historical interaction modality in historical interaction between the current user and the virtual object as the current interaction modality in response to the platform configuration information indicating that the media content in the platform is played in a sound mode.

4. The method of claim 1, further comprising:

determining, based on a correlation between a group of preset entry types and the plurality of preset interaction modalities, the current interaction modality matching the entry type of the access entry from the plurality of preset interaction modalities.

5. The method of claim 4, wherein the plurality of preset interaction modalities and/or the correlation are determined based on a configuration operation of the target user.

6. The method of claim 4, wherein the group of preset entry types comprises:

a first entry type corresponding to a first access entry of a first interface, the first interface being specific to the target user; and

a second entry type corresponding to a second access entry in a second interface, the second interface being independent of the target user.

7. The method of claim 6, wherein the first access entry corresponds to a first interaction modality, the second access entry corresponds to a second interaction modality, and the first interaction modality is different from the second interaction modality.

8. The method of claim 1, wherein the interaction modality indicates at least one of:

a message type of a first message input by the current user; or

a message type of a second message provided by the virtual object.

9. The method of claim 1, further comprising:

adjusting the current interaction modality of the current user with the virtual object in the interaction interface based on a preset operation of the current user in the interaction interface.

10. The method of claim 1, wherein an interface layout of the interaction interface is determined based on the current interaction modality.

11. The method of claim 1, wherein the interaction interface comprises a message window for presenting an interaction message, and wherein:

the message window of the interaction interface presents a visual element associated with the virtual object in response to the current interaction modality being a voice interaction modality; and

the message window of the interaction interface hides the visual element associated with the virtual object in response to the current interaction modality being a text interaction modality.

12. An apparatus for interacting with a virtual object, comprising:

an entry presenting module configured to present an access entry associated with a target user; and

an interface presenting module configured to present an interaction interface with a virtual object based on a selection of the access entry, the virtual object corresponding to the target user, wherein a current interaction modality of a current user with the virtual object in the interaction interface is determined from a plurality of preset interaction modalities based on at least one of: platform configuration information associated with the access entry, or an entry type of the access entry.

13. An electronic device, comprising:

at least one processing unit; and

at least one memory coupled to the at least one processing unit and storing instructions for execution by the at least one processing unit, the instructions, when executed by the at least one processing unit, causing the electronic device to perform the method of any of claims 1 to 11.

14. A computer-readable storage medium having a computer program stored thereon, the computer program being executable by a processor to implement the method of any of claims 1 to 11.