METHOD AND APPARATUS FOR INTERACTION PROCESSING IN VIRTUAL SCENE, DEVICE, COMPUTER-READABLE STORAGE MEDIUM AND COMPUTER PROGRAM PRODUCT

RELATED APPLICATION

[0001] This application is based on Chinese Patent Application No. 202411670105.8 filed on November 20, 2024, and claim priority to the Chinese Patent Application, which is incorporated herein by reference in its entirety.

FIELD OF THE TECHNOLOGY

[0002] The present disclosure relates to human-computer interaction technologies, and in particular, to an interaction processing method and apparatus for a virtual scene, a device, a storage medium, and a program product.

BACKGROUND OF THE DISCLOSURE

[0003] Display technologies based on graphics processing hardware expand channels for environment sensing and information obtaining. In particular, virtual scene display technologies can achieve diversified interactions between virtual objects controlled by a user or artificial intelligence according to actual application demands, and are applicable to various typical application scenes. For example, the display technology can emulate a real battle process between virtual objects in a virtual scene such as a game.

[0004] In a process in which players control virtual objects to interact with each other in a virtual scene, in related technologies, interaction is typically performed between players. For example, a first player account controls a first virtual object to battle with a second virtual object controlled by a second player account, and an interaction manner is relatively monotonous.

SUMMARY

[0005] Embodiments of the present disclosure provide an interaction processing method and apparatus for a virtual scene, an electronic device, a computer-readable storage medium, and a computer program product, to enhance interaction diversity.

[0006] Technical solutions of the embodiments of the present disclosure are implemented as follows:

[0007] An embodiment of the present disclosure provides an interaction processing method for a virtual scene, including:

[0008] displaying, on an interface of a virtual scene, a first virtual object carrying a virtual vehicle;

[0009] controlling, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle, a movement range of the first virtual object carrying the virtual vehicle being larger than a movement range of the first virtual object not carrying the virtual vehicle;

[0010] activating, in response to a target virtual entity that is within the movement range of the first virtual object satisfying an activation condition, the target virtual entity in a movement process of the first virtual object, and controlling the target virtual entity to chase a second virtual object; and

[0011] controlling, in response to the target virtual entity catching the second virtual object, the target virtual entity to release a virtual skill to the second virtual object and change a state of the second virtual object.

[0012] An embodiment of the present disclosure provides an interaction processing apparatus for a virtual scene, including:

[0013] an object display module configured to display, on an interface of a virtual scene, a first virtual object carrying a virtual vehicle;

[0014] a movement control module configured to control, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle, a movement range of the first virtual object carrying the virtual vehicle being larger than a movement range of the first virtual object not carrying the virtual vehicle;

[0015] a first processing module configured to: activate, in response to a target virtual entity that is within the movement range of the first virtual object satisfying an activation condition, the target virtual entity in a movement process of the first virtual object, and control the target virtual entity to chase a second virtual object; and

[0016] a second processing module configured to: control, in response to the target virtual entity catching the second virtual object, the target virtual entity to release a virtual skill to the second virtual object and change a state of the second virtual object.

[0017] An embodiment of the present disclosure provides an electronic device, including:

[0018] a memory configured to store a computer-executable instruction or a computer program; and

[0019] a processor configured to implement, when executing the computer-executable instruction or the computer program stored in the memory, the interaction processing method for a virtual scene provided in the embodiment of the present disclosure.

[0020] An embodiment of the present disclosure further provides a computer-readable storage medium, having a computer-executable instruction or a computer program stored therein, the computer-executable instruction or the computer program, when executed by a processor, implementing the interaction processing method for a virtual scene provided in the embodiments of the present disclosure.

[0021] An embodiment of the present disclosure provides a computer program product, including a computer program or a computer-executable instruction, the computer program or the computer-executable instruction, when executed by a processor, implementing the interaction processing method for a virtual scene provided in the embodiments of the present disclosure.

[0022] The embodiments of the present disclosure have the following beneficial effects:

[0023] By applying the embodiments of the present disclosure, a player controls the first virtual object to move with the assistance of the virtual vehicle. In the movement process of the first virtual object, the target virtual entity can be activated when the target virtual entity within the movement range of the first virtual object satisfies the activation condition, and the target virtual entity can be controlled to chase the second virtual object. When the target virtual entity catches the second virtual object, the target virtual entity is controlled to release the virtual skill to the second virtual object and change the state of the second virtual object. In this way, in a case that the first virtual object cannot activate the target virtual entity because the first virtual object does not carry the virtual vehicle (if the target virtual entity is located at a relatively high position that cannot be touched by the first virtual object), since the movement range of the first virtual object carrying the virtual vehicle is larger than the movement range of the first virtual object not carrying the virtual vehicle, a possibility that the target virtual entity exists within the movement range of the first virtual object is expanded, thereby increasing a probability that the target virtual entity is activated. In addition, after the target virtual entity is activated, since the target virtual entity can chase the second virtual object in the virtual scene, and release the virtual skill to the second virtual object to change the state of the second virtual object, an interaction manner between the target virtual entity and the second virtual object is provided, thereby enriching diversity and interestingness of

interaction in the virtual scene, and helping enhance a retention rate of a product in the virtual scene by a player.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 is a schematic diagram of an architecture of an interaction processing system 100 for a virtual scene according to an embodiment of the present disclosure.

[0025] FIG. 2 is a schematic structural diagram of an electronic device 500 according to an embodiment of the present disclosure.

[0026] FIG. 3 is a flowchart of an interaction processing method for a virtual scene according to an embodiment of the present disclosure.

[0027] FIG. 4 is a schematic diagram of displaying of a virtual entity according to an embodiment of the present disclosure.

[0028] FIG. 5 is a schematic diagram of movement of a virtual object according to an embodiment of the present disclosure.

[0029] FIG. 6 is a schematic diagram of jumping of a virtual object according to an embodiment of the present disclosure.

[0030] FIG. 7 is a schematic diagram of chasing a target by a virtual entity according to an embodiment of the present disclosure.

[0031] FIG. 8 is a schematic diagram of releasing a virtual skill by a virtual entity according to an embodiment of the present disclosure.

[0032] FIG. 9 is a schematic diagram of chasing a target by a virtual entity according to an embodiment of the present disclosure.

[0033] FIG. 10 is a flowchart of an interaction processing method for a virtual scene according to an embodiment of the present disclosure.

DESCRIPTION OF EMBODIMENTS

[0034] To make the objectives, technical solutions, and advantages of the present disclosure clearer, the following describes the present disclosure in further detail with reference to the accompanying drawings. The described embodiments are not to be considered as a limitation to the present disclosure. All other embodiments obtained by a person of ordinary skill in the art without creative efforts shall fall within the protection scope of the present disclosure.

[0035] In the embodiments of the present disclosure, relevant data such as user information (for example, a trigger operation of a user, a team attribute, or a character feature) is involved. When the embodiments of the present disclosure are applied to specific products or technologies, user permission or consent is required, and collection, use, and processing of the relevant data need to comply with relevant laws, regulations, and standards.

[0036] In the following descriptions, related "some embodiments" describe a subset of all possible embodiments. However, the "some embodiments" may be the same subset or different subsets of all the possible embodiments, and may be combined with each other without conflict.

[0037] In the following descriptions, the related term "first, second, ..." is merely intended to distinguish between similar objects rather than represent a particular sequence of the objects. A particular sequence or a chronological order indicated by "first, second, ..." may be changed, so that the embodiments of the present disclosure described herein can be implemented in a sequence other than the sequence illustrated or described herein.

[0038] In the embodiments of the present disclosure, a term "module" or "unit" refers to a computer program having a predetermined function or a part of a computer program, and operates together with other relevant parts to achieve a predetermined objective, and may be all or partially implemented by using software, hardware (such as a processing circuit or a memory), or a combination thereof. Similarly, one processor (or a plurality of processors or memories) may be configured to implement one or more modules or units. In addition, each module or unit may be a part of an overall module or unit including a function of the module or unit.

[0039] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as those commonly understood by a person skilled in the art to which the present disclosure belongs. Terms used herein are merely intended to describe the embodiments of the present disclosure, but are not intended to limit the present disclosure.

[0040] Before the embodiments of the present disclosure are further described in detail, a description is made on nouns and terms in the embodiments of the present disclosure, and the nouns and terms in the embodiments of the present disclosure are applicable to the following explanations.

[0041] 1) Client: It is an application program run in a terminal to provide various services, such as a video playing client and a game client.

[0042] 2) Being in response to: It is configured for representing a condition or state on which a performed operation depends. When the dependent condition or state is satisfied, one or

more operations performed may be in real time or may have a set delay. Without being specifically stated, there is no limitation to the order in which the operations are performed.

[0043] 3) Virtual scene: It is a virtual scene displayed (or provided) when an application program is run on a terminal. The virtual scene can be a simulation environment of the real world, a semi-simulation and semi-fictitious virtual environment, or a purely fictitious virtual environment. The virtual scenario may be any one of a two-dimensional virtual scenario, a 2.5-dimensional virtual scenario, or a three-dimensional virtual scenario, and the dimension of the virtual scenario is not limited in the embodiments of the present disclosure. For example, a virtual scene may include a sky, a land, an ocean, and the like. The land includes environmental elements such as a desert and a city. A user can control a virtual player to move in the virtual scene.

[0044] 4) Virtual object: It represents images of various persons and things for interaction in a virtual scene, or movable objects in the virtual scene. The movable object may be a virtual character, a virtual animal, an animation character, and the like, such as a person and an animal displayed in the virtual scene. The virtual object may be a virtual image for representing a user in the virtual scene. The virtual scene may include a plurality of virtual objects, and each virtual object has a shape and a volume in the virtual scene, and occupies some spaces in the virtual scene.

[0045] In actual application, virtual objects may be classified into a player character and a non-player character based on whether the virtual objects are controlled by a user (or a player). The player character is a game character controlled by the user (or referred to as a player), and the non-player character is a game character not controlled by the user (or a player), such as an animal-type non-player character (NPC) (such as an elf or a pet). The player character and the non-player character may interact with each other in a virtual scene.

[0046] Embodiments of the present disclosure provide an interaction processing method and apparatus for a virtual scene, an electronic device, a computer-readable storage medium, and a computer program product, to enhance diversity of interaction manners. An exemplary application of an electronic device according to an embodiment of the present disclosure will be described below. The electronic device according to this embodiment of the present disclosure may be implemented as various types of user terminals such as a notebook computer, a tablet computer, a desktop computer, a set-top box, a mobile device (for example, a mobile phone, a portable music player, a personal digital assistant, a dedicated messaging device, or a portable game device), a smart phone, a smart speaker box, a smart watch, a smart TV, an in-vehicle terminal, an augmented reality (AR) device, or a virtual reality (VR), or may be implemented as a server. An exemplary application in which a device is implemented as a terminal device is described below.

[0047] FIG. 1 is a schematic diagram of an architecture of an interaction processing system 100 for a virtual scene according to an embodiment of the present disclosure. To support an exemplary application, a terminal (for example, a terminal 400-1 and a terminal 400-2 are shown) is connected to a server 200 through a network 300. The network 300 may be a wide area network, or a local area network, or a combination of the wide area network and the local area network, and uses a wireless or wired link for data transmission.

[0048] In some embodiments, the terminal is configured with a client, such as a video playback client, an instant messaging client, a game client, or a livestreaming client. The server 200 may be an independent physical server, or may be a server cluster or a distributed system formed by a plurality of physical servers, or may be a cloud server that provides basic cloud computing services such as a cloud service, a cloud database, cloud computing, a cloud function, cloud storage, a network service, cloud communication, a middleware service, a domain name service, a security service, a content delivery network (CDN), big data, and an AI platform. The terminal and the server may be connected directly or indirectly to the server in a wired or wireless communication protocol. This is not limited in the embodiments of the present disclosure.

[0049] In actual application, the terminal displays, on an interface of a virtual scene, a first virtual object carrying a virtual vehicle, and controls, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle, a movement range of the first virtual object carrying the virtual vehicle being larger than a movement range of the first virtual object not carrying the virtual vehicle. In a movement process of the first virtual object, the server 200 detects whether a target virtual physical body (for example, a target virtual entity) within the movement range of the first virtual object satisfies an activation condition, and returns a detection result to the terminal. When the detection result indicates that the target virtual entity within the movement range of the first virtual object satisfies the activation condition, the terminal activates the target virtual entity and controls the target virtual entity to chase a second virtual object. In response to the target virtual entity catching the second virtual object, the target virtual entity is controlled to release a virtual skill to the second virtual object and change a state of the second virtual object.

[0050] FIG. 2 is a schematic diagram of a structure of an electronic device 500 according to an embodiment of the present disclosure. An example in which the electronic device 500 is the terminal is used for description. The electronic device 500 shown in FIG. 2 includes: at least one processor 510, a memory 550, at least one network interface 520, and a user interface 530. The components in the electronic device 500 are coupled together by using a bus system 540. The bus

system 540 is configured to implement connection and communication between the components. In addition to a data bus, the bus system 540 further includes a power bus, a control bus, and a state signal bus. However, for clarity of description, all types of buses in FIG. 2 are marked as the bus system 540.

[0051] The processor 510 may be an integrated circuit chip having a signal processing capability, for example, a general purpose processor, a digital signal processor (DSP), another programmable logic device, discrete gate or transistor logic device, or discrete hardware component, or the like. The general purpose processor may be a microprocessor or any conventional processor, or the like.

[0052] The memory 550 includes a volatile memory or a non-volatile memory, or may include both a volatile memory and a non-volatile memory. The non-volatile memory may be a read only memory (ROM). The volatile memory may be a random access memory (RAM). The memory 550 described in this embodiment of the present disclosure is to include any other suitable types of memories. The memory 550 alternatively includes one or more storage devices away from the processor 510 in physical positions.

[0053] In some embodiments, the memory 550 may store data to support various operations. Examples of the data include a program, a module, and a data structure or other subsets or supersets, which are exemplified below.

[0054] An operating system 551 includes system programs for processing various basic system services and performing hardware-related tasks, such as a framework layer, a kernel library layer, and a drive layer, and is configured to implement various basic services and process hardware-based tasks. A network communication module 552 is configured to reach another computing device through one or more (wired or wireless) network interfaces 520. Exemplary network interfaces 520 include: Bluetooth, wireless compatible authentication (WiFi), a universal serial bus (USB), and the like.

[0055] In some embodiments, an interaction processing apparatus for a virtual scene according to the embodiments of the present disclosure may be implemented in a software manner. The interaction processing apparatus for a virtual scene according to the embodiments of the present disclosure may be provided in various software embodiments, including various forms such as an application program, software, a software module, a script, or a code. FIG. 2 shows the interaction processing apparatus 555 for a virtual scene stored in the memory 550. The interaction processing apparatus 555 may be software in a form of a program or a plug-in, and includes a series of modules, including an object display module 5551, a movement control module 5552, a first

processing module 5553, and a second processing module 5554. These modules are logic, and therefore may be randomly combined or further split according to implemented functions. Functions of the modules are described below.

[0056] In some other embodiments, the apparatus according to the embodiments of the present disclosure may be implemented in a hardware manner. For example, the apparatus according to the embodiments of the present disclosure may be a processor in the form of a hardware decoding processor, programmed to perform the interaction processing method for a virtual scene according to the embodiments of the present disclosure. For example, the processor in the form of the hardware decoding processor may use one or more application specific integrated circuits (ASIC), a DSP, a programmable logic device (PLD), a complex programmable logic device (CPLD), a field-programmable gate array (FPGA), or other electronic components.

[0057] In some embodiments, the terminal or the server may implement the interaction processing method for a virtual scene according to the embodiments of the present disclosure by executing various computer-executable instructions or computer programs. For example, the computer-executable instructions may be micro-program-level commands, machine instructions, or software instructions. The computer program may be an original program or a software module in an operating system. The computer program may be a native application (APP), i.e., a program that needs to be installed in the operating system to run, such as an instant messaging APP or a livestreaming APP. Alternatively, the computer program may be an applet embedded in any APP, that is, a program that can be run only when being downloaded into a browser environment. In a word, the above computer-executable instruction may be any form of instruction, and the above computer program can be any form of application program, module, or plug-in.

[0058] As mentioned above, the interaction processing method for a virtual scene according to the embodiments of the present disclosure may be implemented by various types of electronic devices. For example, the method may be performed independently by any one of the terminal and the server 200 in FIG. 1 or may be performed synergistically by the terminal and the server 200 in FIG. 1. Next, an example is used for explanation, in which the terminal in FIG. 1 independently performs the interaction processing method for a virtual scene according to the embodiments of the present disclosure. FIG. 3 is a flowchart of an interaction processing method for a virtual scene according to an embodiment of the present disclosure, which is explained in combination with operations shown in FIG. 3.

[0059] Operation 101: A terminal displays, on an interface of a virtual scene, a first virtual object carrying a virtual vehicle.

[0060] In actual application, a client supporting a virtual scene is installed on the terminal (for example, when the virtual scene is a game, the corresponding client may be a game APP). When a user initiates the client installed on the terminal and the terminal runs the client, an interface of the virtual scene may be displayed on the client, and the first virtual object controlled by a target account (i.e., an account currently corresponding to the terminal) is displayed on the interface of the virtual scene. The target account may control the first virtual object to perform various interactions in the virtual scene, for example, controlling the first virtual object to move, pick up a virtual prop, release a virtual skill, and the like in the virtual scene.

[0061] The first virtual object may be equipped with various virtual props, for example, a functional prop having particular functions (such as accelerating, increasing attack power, restoring hit points, and providing a special capability). Such virtual props include a virtual weapon (such as a sword, an arch, and a gun) that provides attack power, a virtual defense tool (such as an armor and a shield) that reduces damage to a player, a virtual accessory (such as a ring or an amulet) that provides special gains, a virtual item (such as a map or a compass) that provides special functions, and a virtual vehicle that provides a movement capability and assists in movement of the first virtual object. The virtual vehicle includes, but is not limited to: a virtual skateboard, virtual roller skates, a virtual surfboard, a virtual airship, a virtual paraglider, and the like.

[0062] In addition, a plurality of virtual physical bodies that interact with the first virtual object may further be displayed on the interface of the virtual scene. These virtual physical bodies have virtual skills. An activated virtual entity may assist in interaction of the first virtual object in the virtual scene. When a quantity of activated virtual physical bodies is accumulated to an extent, an additional gain can be brought to the first virtual object, thereby enhancing the skill of a player. There are various shapes of a virtual entity. For example, the virtual entity may be a geometrical extended shape such as a sphere, a polyhedron, a cylinder, or a cone, may be a natural giant image such as a biological form (such as a flying bird model or a plant model) or a daily item form (such as a virtual off-road vehicle or a virtual jet pack), or may be in another irregular shape. The shape of the virtual entity is not limited in this embodiment of the present disclosure.

[0063] In some embodiments, before a target virtual entity (which is any one or more of a plurality of virtual physical bodies in the virtual scene) is activated, the plurality of virtual physical bodies satisfy any one of the following (that is, the plurality of virtual physical bodies are displayed in any one of the following manners): the plurality of virtual physical bodies include at least two virtual physical bodies with different sizes, variations applied by the virtual physical bodies to a state of a chased target being in positive correlation to the sizes of the virtual physical bodies; the

plurality of virtual physical bodies include at least two different types of virtual physical bodies, the type of the state of the chased target changed by the virtual physical bodies being related to the types of the virtual physical bodies; the virtual physical bodies among the plurality of virtual physical bodies are dispersed at different positions in the virtual scene, a difficulty at which each virtual entity satisfies the activation condition being related to a position of the virtual entity, and a variation applied by the virtual entity to the state of the chased target being in positive correlation to the difficulty at which the virtual entity satisfies the activation condition; the plurality of virtual physical bodies include at least two virtual physical bodies having different effective durations; and the plurality of virtual physical bodies are periodically displayed in the virtual scene.

[0064] For example, FIG. 4 is a schematic diagram of displaying a virtual entity according to an embodiment of the present disclosure. An example in which a virtual entity is a virtual sphere and a virtual vehicle is a virtual skateboard. A plurality of virtual spheres 401 located at different positions and having different sizes and a first virtual object 403 mounted with a virtual skateboard 402 are displayed on an interface of a virtual scene. A player may control the first virtual object 403 mounted with the virtual skateboard 402 to move in the virtual scene, and activate a virtual sphere in a movement process.

[0065] In actual application, the terminal may periodically refresh and display a plurality of virtual physical bodies on the interface of the virtual scene. Difficulties at which different virtual physical bodies satisfy the activation condition are different due to different sizes, different positions, and the like of the different virtual physical bodies, that is, difficulties at which the first virtual object activates different virtual physical bodies are different. That is, the plurality of virtual physical bodies are dispersed at different positions (for example, at a high position, in a narrow channel, and a region far away from a main path) in the virtual scene, and an activation difficulty is directly related to a position (for example, a higher position or a more private position of a virtual entity indicates higher operation precision required for activating the virtual entity). Meanwhile, a variation of the state of a second virtual object is in positive correlation to the activation difficulty. Usually, after the first virtual object activates a virtual entity that is more difficultly activated, an assistance effect achieved by the activated virtual entity on the first virtual object is better. For example, an example in which an assistance effect achieved by the activated virtual entity on the first virtual object is to change a state of a chased target (for example, the second virtual object), a variation applied by the virtual entity to the state of the chased target is in positive correlation to the difficulty at which the virtual entity satisfies the activation condition. For example, a height of a virtual entity 1 in the virtual scene is greater than a height of a virtual entity 2. The first virtual object may activate the virtual entity 2 without being mounted with the virtual vehicle. The first

virtual object can only activate the virtual entity 1 when the first virtual object is assisted in jumping by the virtual skateboard. A difficulty of activating the virtual entity 1 is greater than a difficulty of activating the virtual entity 2. Therefore, after the virtual entity 1 and the virtual entity 2 are activated, a variation for the state of the second virtual object when the virtual entity 1 catches the second virtual object is greater than a variation for the state of the second virtual object when the virtual entity 2 catches the second virtual object. In this way, such a manner of "high difficulty and high return" motivates a player to use a movement advantage of the virtual vehicle (for example, crossing a landform and quickly reaching a special position) to challenge to activate a high-difficulty virtual entity. This not only verifies a manipulation skill of the player on the virtual vehicle, but also guides the player to explore an entire scene by differentiated reward, thereby enhancing the depth of interaction.

[0066] Different virtual physical bodies may have different sizes. The size of a virtual entity is in positive correlation to energy of a virtual skill possessed by the virtual entity. Usually, after a larger virtual entity is activated, when the virtual entity releases a virtual skill to the chased skill, a variation (such as damage, a slow percentage, or debuff strength) for the state of the chased target is larger. For example, if a volume of the virtual entity 1 is greater than a volume of the virtual entity 2, damage to the second virtual object by the activated virtual entity 2 is greater than damage to the second virtual object by the activated virtual entity 1. A slow percentage of the second virtual object by the activated virtual entity 2 is more significant than a slow percentage of the second virtual object by the activated virtual entity 1. In this way, the player needs to select, according to a battle requirement (for example, rapid suppression or continuous consumption), a virtual entity to be preferentially activated. Meanwhile, with reference to a movement capability (a large movement range) of the virtual vehicle, a balance is made between "rapidly activating a small-volume virtual entity" and "precisely positioning and activating a large-volume virtual entity", to enhance strategy decision-making property.

[0067] Different virtual physical bodies may have the same or different effective durations. After a virtual entity is displayed in the virtual scene, countdown for the virtual entity is displayed. Before the countdown returns to zero, the virtual entity may be activated. After the countdown returns to zero, the virtual entity disappears, and a fixed or random position in the virtual scene is refreshed to display a new virtual entity, and effective duration of the new entity may be the same as or different from the previous effective duration. In addition, a plurality of virtual physical bodies may further be displayed in a specified region (such as an aerial platform and a ground refresh point) of the virtual scene in batches or one by one based on a fixed cycle (such as every 30 seconds), and have limited display durations (for example, the plurality of virtual physical bodies

disappear after being displayed for 15 seconds until refreshing is performed within a next cycle). In this display manner, a time periodicity determines an activation obtaining window of a virtual entity. The player needs to complete activation within each cycle by the rapid movement capability of the virtual vehicle before the virtual entity disappears. By time limitation and cyclic refreshing, interaction with a virtual entity is no longer simply searching and activation, but a compound playing method in which a time pressure, a dynamic change, and strategic balance are integrated. It further intensifies demands placed on players in terms of a reaction speed, a resource planning ability, and a virtual vehicle manipulation skill, and can enhance a rapid manipulation ability (for example, predetermining a refreshing time point and planning a movement path) of the player on the virtual vehicle. Meanwhile, an interaction disorder caused by an excessive number of virtual physical bodies in the virtual scene is avoided, and the rhythm and tension of the playing method are maintained.

[0068] In addition, the effective duration of the virtual entity may further refer to duration during which the virtual entity continuously chases the second virtual object after being activated, or duration during which a skill released by the virtual entity affects the state of the second virtual object. A duration difference affects effect persistence. For example, a long-duration virtual entity 1 may chase the second virtual object for 10 seconds after being activated, or a skill of the long-duration virtual entity 1 slows down the second virtual object for continuous eight seconds. A short-duration virtual entity 2 chases the second virtual object for only three seconds after being activated, or a skill of the short-duration virtual entity 2 slows down the second virtual object for two seconds. In this way, the player needs to select a virtual entity with reference to the battle rhythm. If the second virtual object has a high movement speed, the second virtual object needs to be continuously suppressed, the long-duration virtual entity needs to be preferentially activated (which may need to move farther to be activated). If the second virtual object only needs to perform instantaneous interference, the short-duration virtual entity may be selected (which may be activated more easily), and a difficulty in determining an operation occasion is increased based on a duration difference.

[0069] Different virtual physical bodies may further have different types. The types of the virtual physical bodies are mostly determined based on types of virtual skills possessed by the virtual physical bodies. A particular type of virtual entity that is activated is configured for changing at least one corresponding state of the chased target. For example, the virtual entity 1 has a virtual skill that changes health of the chased target, and the virtual entity 2 has a virtual skill that changes a movement speed of the chased target. If the virtual entity 1 is activated and the activated virtual entity 1 chases the second virtual object, the health of the second virtual object is changed. If the virtual entity 2 is activated and the activated virtual entity 2 chases the second virtual object, the

movement speed of the second virtual object is changed. In other words, a type of a virtual entity determines an effect attribute of the virtual entity. For example, after a lightning-type virtual entity is activated, the second virtual object enters a stunned state (cannot move). After a freezing-type virtual entity is activated, the second virtual object enters a slow-down state. After a flame-type virtual entity is activated, the second virtual object is damaged continuously. In this way, an interaction dimension in the virtual scene can be enriched. The player needs to select, in a targeted manner, a type of virtual entity to be activated based on a current state of the second virtual object (for example, whether the second virtual object has slowed down) or a scene requirement (for example, it is in an urgent need to activate a virtual entity) by virtue of an advantage of large-range movement of the virtual vehicle, thereby strengthening a requirement for a skill to balance selection of a target to be activated and operation.

[0070] In the foregoing manner, a plurality of virtual physical bodies having different sizes, different positions, different types, and different effective durations are displayed on the interface of the virtual scene, and the positions of the virtual physical bodies in the virtual scene can be changed at any time. This not only enriches diversity of the virtual physical bodies in the virtual scene, but also enhances randomness and interestingness of interaction of a player with the virtual physical bodies, and finally implements various playing methods such as strategy selection, operation precision, and scene exploration based on deep combination of verification on an extended movement range of the virtual vehicle or a core objective of enhancing player skills.

[0071] Operation 102: Control, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle, a movement range of the first virtual object carrying the virtual vehicle being larger than a movement range of the first virtual object not carrying the virtual vehicle.

[0072] In actual application, when controlling the first virtual object to move, the terminal may control the first virtual object to be mounted with the virtual vehicle and move with the assistance of the virtual vehicle. Usually, the virtual vehicle has a movement capability of positive feedback, and the movement range of the first virtual object carrying the virtual vehicle is larger than a movement range of the first virtual object not carrying the virtual vehicle. This means that the first virtual object can activate more virtual physical bodies with the assistance of the virtual vehicle, and in particular, can activate a virtual entity that is difficultly activated by the first virtual object without the assistance of the virtual vehicle.

[0073] An example in which the virtual vehicle is a virtual skateboard is used. With the assistance of the virtual skateboard, the first virtual object mounted with the virtual skateboard has a

higher movement speed than a movement speed of the first virtual object not being mounted with the virtual vehicle, a longer movement distance within a target time period, or a greater movement height (that is, the first virtual object performs a jumping action with jumping assistance of the virtual skateboard). Since various virtual physical bodies are distributed in the virtual scene, it helps expand a range within which the first virtual object can activate a virtual entity.

[0074] An example in which the virtual vehicle is a virtual jet pack is used. When the virtual jet pack performs continuous jetting, the first virtual object carrying the virtual jet pack may vertically climb (for example, up to a height of 10 building floors in the virtual scene), and easily reach a high-place region such as a roof or a top of a cliff, thereby activating virtual physical bodies (for example, a large gain ball on a mountaintop) that cannot be touched by walking due to an excessively high position. The virtual jet pack can turn 360 degrees in the air, and may move slowly in a floating state, so that it is convenient to precisely position the first virtual object at a high altitude and for the first virtual object to activate dispersed small-sized virtual physical bodies (such as star-like physical bodies floating in the air). Under the action of the virtual jet pack, the first virtual object can directly cross a topographic obstacle such as a canyon and a river without bypassing, and can cover two to three times of a horizontal range in a walking state within the same time. This is especially suitable for activating virtual physical bodies distributed in a complex topographic region.

[0075] An example in which the virtual vehicle is a virtual off-road vehicle is used. The virtual off-road vehicle may roll over obstacles such as short shrubs and stones in the virtual scene and maintain a steady speed (approximately twice a walking speed) on a terrain through which a virtual object can hardly pass by walking, such as a muddy terrain or a steep slope, so that the first virtual object can go deep into regions such as wildernesses and mountains, and activate virtual physical bodies (such as supplementary box-like physical bodies hidden in tree forests) distributed in a natural environment. The virtual off-road vehicle may further carry an additional prop (such as an ejection seat). When activated, the prop can eject the first virtual object into the air at a five-meter height, to temporarily obtain a high-altitude view to position a virtual entity at a high altitude, thereby further making up a height limitation of a ground vehicle.

[0076] FIG. 5 is a schematic diagram of movement of a virtual object according to an embodiment of the present disclosure. An example in which a virtual vehicle is a virtual skateboard and a virtual object is a virtual sphere is used. A first virtual object 501 is mounted with a virtual skateboard 502 and moves in a virtual scene. With the assistance of the virtual skateboard 502, prompt information 503 configured for indicating that a movement range of the first virtual object

501 is increased compared with a movement range of the first virtual object not being mounted the virtual skateboard 502 (that is, a sphere pickup range or a range for activating the virtual sphere is increased, such as by 300%) is displayed.

[0077] In the foregoing manner, by strengthening dimensions such as a speed, a height, a terrain adaptability, or a special scene permission, different virtual vehicles achieve a core objective that the movement range of the first virtual object is larger than the movement range of a non-mounted state, and features of the virtual vehicle match distribution of virtual physical bodies in the virtual scene (such as at a high altitude, in a wilderness, or a magic region), thus finally helping the first virtual object activate more virtual physical bodies that are originally hardly touched, and enhancing diversity of playing methods by differentiating vehicle operations (such as vertical control on the jet pack and terrain determination for the off-road vehicle).

[0078] In some embodiments, the terminal may control, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle in the following manner: controlling, in response to the movement control operation and when a jumping condition is satisfied, the first virtual object to leave the virtual vehicle with the assistance of the virtual vehicle and perform a jumping action along a preset jumping trajectory; and controlling, in response to completion of the jumping action, the first virtual object to descend to the virtual vehicle and continue to move upon touching a ground. The jumping condition includes any one of the following: a trigger operation for a jumping control is received; the first virtual object moves to a target region upon touching the ground; and a matching degree between the target region and the jumping action exceeds a matching degree threshold.

[0079] In actual application, when the first virtual object is controlled to move, the first virtual object may be controlled to move upon touching a ground or move in a jumping manner with the assistance of the virtual vehicle. An example in which the virtual vehicle is a virtual skateboard is used. FIG. 6 is a schematic diagram of jumping of a virtual object according to an embodiment of the present disclosure. A first virtual object stepping on a virtual skateboard 601 may be controlled to move upon touching a ground with the sliding assistance of the virtual skateboard 602 (that is, the virtual skateboard is in contact with the ground, and the first virtual object does not leave the virtual skateboard). Alternatively, when a jumping condition is satisfied, the first virtual object 601 may be controlled to perform a jumping action with the assistance of the virtual skateboard 602. For example, in a takeoff phase, a front foot of the first virtual object is controlled to step on a front end of the virtual skateboard, and a rear foot pushes hard against the ground backwards and downwards, so as to obtain upward power. In an off-ground phase, after the

first virtual object is controlled to push hard against the ground, the first virtual object quickly lifts up the rear foot to leave the ground, and the front foot also leaves the virtual skateboard, so that the whole body leaves the ground. In an air phase, the first virtual object is controlled to keep the body balance, and a body posture is adjusted based on a type of jumping, so that there is possibly a rotation action or another action. In a landing phase, the first virtual object is controlled to start to prepare for landing at a highest point of jumping, and positions of the virtual skateboard and the body are adjusted, to ensure stable landing back onto the virtual skateboard.

[0080] There may be a plurality of jumping conditions. For example, when a player triggers a jumping control, it is considered that a jumping condition is satisfied, and the first virtual object is controlled to perform a jumping action. When the jumping condition is satisfied, an effect of the virtual vehicle may be fed back (for example, the virtual skateboard sprays an accelerated flame), and a jumping force may be associated with trigger duration (short tap indicates small jump and long tap indicates large jump), so that the player controls a jumping trajectory based on operation precision (for example, using a small jump for crossing a narrow groove, or using a large jump for jumping across a canyon). In addition, to avoid meaningless jump, it may be set that jumping can be triggered only when a movement speed of the virtual vehicle is greater than or equal to a speed threshold (for example, jumping cannot be activated when the skateboard slides at a low speed, and jumping can be activated only when the skateboard slides at a high speed), to prevent the player from frequently jumping at the same place to affect the experience.

[0081] For another example, when the first virtual object moves to a target region, features (such as whether there is an obstacle such as a hill and a railing) of the target region match features of a plurality of candidate actions (such as a jumping action, a squatting action, and a splitting action), to obtain a matching degree between the target region and each candidate action, and when the matching degree between the target region and the jumping action exceeds a matching degree threshold, it is determined that the jumping condition is satisfied, and the first virtual object is automatically controlled to perform the jumping action to cross the target region. In addition, the target region may alternatively be represented as a special mark (such as a luminous jump pad on the ground or an arrow identifier at the top of the slope) in the virtual scene. Different regions correspond to different jumping trajectories (for example, a jump pad region matches upward forward jumping, and a slope region matches slantways jumping along the slope). The matching degree may be calculated based on parameters such as a degree of overlapping between a center point of the virtual vehicle and a center point of the target region, and an angle between a movement direction of the virtual vehicle and a guide direction of the target region. For example, when the virtual vehicle completely drives into the jump pad region (100% overlapping) and the movement

direction of the virtual vehicle is consistent with a pointing direction of the jump pad (angle of 0°), the matching degree reaches the matching degree threshold (such as 80%), and jumping is automatically triggered. If only a part of the virtual vehicle drives in or the virtual vehicle deviates, the matching degree is insufficient, and jumping is not triggered, thereby avoiding a misoperation.

[0082] For another example, the jumping condition may be triggered based on the state of the virtual vehicle, and the jumping condition is bound to the state of the virtual vehicle, to enhance a strategic nature of operations. For example, it is set that the virtual vehicle needs to accumulate energy (for example, obtaining energy by activating a virtual entity). When the energy is greater than or equal to an energy threshold, a jumping capability is unlocked automatically (for example, when energy of the jet pack is full, manual triggering is not required; and it is considered that the jumping condition is satisfied when the virtual vehicle is close to the cliff, and jumping is automatically triggered). For another example, when a damage degree of the virtual vehicle is greater than or equal to a damage threshold due to an attack (for example, the virtual vehicle is hit by a skill of the second virtual object) of the virtual vehicle, it is considered that the jumping condition is satisfied, that is, jumping is forcibly triggered (for example, the skateboard pops up uncontrollably), thus increasing randomness and tension of the scene.

[0083] For another example, the jumping condition may be triggered based on a chased target (the second virtual object). A jumping action is linked to a combat objective, to serve a core playing method for activating the virtual entity and chasing the second virtual object. For example, when a distance between the first virtual object and the second virtual object is less than or equal to a distance threshold (such as 10 meters). In addition, when the second virtual object is at a high place (such as a roof), it is considered that the jumping condition is satisfied, and upward jumping is automatically triggered (for example, when detecting that the second virtual object is at a high place, the virtual vehicle actively assists the player to jump to a corresponding height). For another example, if the second virtual object releases a target skill (such as a ground fire ting), the virtual vehicle may detect an effect-taking region of the target skill. Before stepping into the target region, it is considered that the jumping condition is satisfied, and jumping is triggered (for example, jumping forwards away from the fire ting). This not only serves as an escape mechanism, but also extends the movement range.

[0084] For another example, the jumping condition may alternatively be triggered based on distribution of virtual physical bodies. That is, in conjunction with an objective for activating a virtual entity, jumping becomes a necessary operation for obtaining a particular virtual entity. For example, when a virtual entity (such as an aerial energy sphere) that is higher than a current height

exists near a movement path of the virtual vehicle, and the virtual entity is within a coverage range of a jumping trajectory of the virtual vehicle, a player is automatically prompted to trigger jumping (for example, a jumping obtaining icon is displayed on the interface), and the player is guided to actively activate the virtual entity. For another example, when it is detected that dense virtual physical bodies exist in a front region (for example, a plurality of small balls are gathered together) and can be reached only by jumping, the virtual vehicle automatically enters a jumping standby state (for example, lights of the skateboard flash), and the player can trigger jumping by simply tapping a control, thus lowering a skill barrier.

[0085] Through diversified jumping conditions, the degree of freedom (such as control triggering) of an active operation of the player is maintained, and reasonableness of passive triggering is increased through dimensions such as scene interaction, vehicle state, and target association. Finally, the jumping action is not only a measure for expanding the movement range, but also a key link for connecting "vehicle manipulation-scene exploration-target chasing", thereby enhancing a continuity and strategic nature of playing methods.

[0086] In some embodiments, in a process in which the first virtual object performs the jumping action, the terminal may further control the virtual vehicle to move with a preset action, and control, when the first virtual object lands, the virtual vehicle to move to a target position. A distance between the target position and a landing position of the first virtual object is less than a second distance threshold, and the second distance threshold is a maximum distance for controlling the first virtual object to smoothly return from the landing position to the virtual vehicle located at the target position.

[0087] In actual application, an example in which the virtual vehicle is a virtual skateboard is used. When the first virtual object is controlled to perform the jumping action, the first virtual object may be controlled to leave the virtual skateboard to perform the jumping action, or the first virtual object may be controlled to step on the virtual skateboard (that is, the first virtual object does not leave the virtual skateboard) to perform the jumping action. In a case that the first virtual object leaves the virtual skateboard to perform the jumping action, in the process of controlling the first virtual object to perform the jumping action, the virtual vehicle may be controlled to move in the preset action (which may be sliding upon touching a ground or may be moving via jumping), so that when the first virtual object lands, the virtual skateboard is controlled to move to the landing position or the target position of the first virtual object. The distance between the target position and the landing position of the first virtual object is less than the second distance threshold (which is a maximum distance at which the first virtual object can smoothly return from the landing position to

the virtual vehicle located at the target position). In this way, the first virtual object may be controlled to steadily fall back to the virtual skateboard. Alternatively, even if the first virtual object does not precisely fall back onto the virtual skateboard, the first virtual object may be controlled to smoothly return from the landing position to the virtual skateboard by inertia.

[0088] In the foregoing manner, with the assistance of the virtual vehicle, the movement range of the first virtual object is expanded, and a quantity of virtual physical bodies located within the movement range of the first virtual object can be increased. In this way, a range in which the first virtual object activates a virtual sphere is expanded.

[0089] Operation 103: Activate, in response to a target virtual entity that is within the movement range of the first virtual object satisfying an activation condition, the target virtual entity in a movement process of the first virtual object, and control the target virtual entity to chase a second virtual object.

[0090] In an actual application, in the movement process of the first virtual object, the movement range of the first virtual object may be a circular region using the first virtual object as a center and the target distance as a radius. Certainly, the movement range may alternatively be a region of another shape. A shape of the movement range of the first virtual object is not limited in this embodiment of the present disclosure. As the first virtual object moves, the movement range of the first virtual object also changes as the first virtual object moves.

[0091] In some embodiments, the activation condition includes any one of the following: a distance between the target virtual entity and the first virtual object is less than a first distance threshold; a touch operation performed by the first virtual object on the target virtual entity is received; a first placement operation for a target item combination is received, the target item combination being obtained by combining a plurality of virtual items in a preset combining manner and being configured for activating the target virtual entity; a second placement operation for a virtual activation prop is received, the second placement operation instructing the virtual activation prop to be placed at an associated position of the target virtual entity; a third placement operation for a virtual activation trigger is received, the third placement operation instructing a virtual activation item to be placed at the virtual activation trigger, or instructing the virtual activation trigger to be placed at the associated position of the target virtual entity; and a connection operation for a virtual connected item is received, the connection operation instructing the virtual connected item to be connected to the target virtual entity.

[0092] In an actual application, in the movement process of the first virtual object, the movement range of the first virtual object may be a circular region using the first virtual object as a

center and the target distance as a radius. Certainly, the movement range may alternatively be a region of another shape. A shape of the movement range of the first virtual object is not limited in this embodiment of the present disclosure. As the first virtual object moves, the movement range of the first virtual object also changes as the first virtual object moves.

[0093] The target virtual entity is any one or more virtual physical bodies within the movement range of the first virtual object. In some embodiments, an activation operation on a target virtual sphere may be an activation operation automatically triggered by the terminal. For example, assuming that within the movement range with the assistance of the virtual vehicle, the first virtual object has a capability of automatically activating a virtual entity within the movement range, when the distance between the target virtual entity and the first virtual object is less than the first distance threshold (which may be considered as a radius of the movement range), once the target virtual entity is located within the movement range of the first virtual object, it may be considered that the activation condition is satisfied before the player performs any operation on the target virtual sphere. In this case, the target virtual entity may be automatically activated. In this way, the activation condition is triggered by a distance, and the target virtual entity can be automatically activated without an additional operation, thereby significantly lowering a skill barrier. In a scene in which a surrounding virtual entity is quickly activated in the movement process, interaction efficiency can be enhanced, and a player can place more focus on vehicle manipulation and path planning. Meanwhile, the player is guided to actively adjust a movement trajectory to approach a target by using an implicit rule triggered by a distance, thereby indirectly enhancing a capability of determining a spatial distance and causing the activation process to be more consistent with a natural exploration logic.

[0094] In some other embodiments, the activation operation on the target virtual sphere may alternatively be an activation operation actively triggered by a player. That is, the player needs to perform a related operation that can activate the target virtual entity, to activate the target virtual entity. For example, in the movement process of the first virtual object, if the first virtual object touches the target virtual entity (that is, the first virtual object performs a direct touch operation such as pickup or catapulting on the target virtual entity), it can be considered that the activation condition for the target virtual entity is satisfied. In this way, touching is used as the activation condition, so that it emphasizes operation intuitiveness and a physical interactivity, and makes activation of a virtual entity correspond to a touching trigger logic in the real world, thereby enhancing immersion of a player. In this manner, in a scene needing to be precisely positioned, for example, after a virtual entity is hidden in a narrow passage or a particular landform in a scene in which precise positioning is required, the player needs to cause the first virtual object to complete

touching by finely adjusting the position of the vehicle. This not only ensures activation controllability, but also enhances operation precision based on a requirement of necessary touching, so that the activation process is of greater fulfillment.

[0095] In some other embodiments, the first virtual object may alternatively activate the target virtual entity by performing another operation different from the direct touch operation on the target virtual entity. For example, if the first virtual object combines a plurality of virtual physical bodies based on a preset combination manner (which may be set by a server or may be set by a player) to obtain a target item combination, it may be considered that the activation condition for the target virtual entity located within the movement range of the first virtual object is satisfied. In this way, a virtual entity is activated by combining items, and combining an activation logic and a strategic nature increases the playing method depth. A player needs to first collect dispersed virtual items and combine the discrete virtual items in a preset manner, and then activate the target virtual entity by using a placement operation. This process not only tests a resource collection capability, but also requires the player to understand an association rule between the items. Benefits of this process are: upgrading an activation behavior from simple triggering to a complex task of puzzles and operations, thereby enhancing the strategic nature and exploration interestingness of a game, and providing a proper unlocking mechanism for hidden content in the virtual scene.

[0096] For another example, if the first virtual object places a virtual activation prop (a type of the virtual activation prop is related to a type of the target virtual entity. For example, if the target virtual entity is a virtual energy sphere, the virtual activation prop may be a virtual battery capable of supplying energy) configured for activating a virtual entity at an associated position (for example, it may be a position near the target virtual entity, or may be a position in the target virtual entity) of the target virtual entity, it may be considered that the activation condition for the target virtual entity located within the movement range of the first virtual object is satisfied. In this manner, activating a virtual entity by placing the virtual activation prop focuses on matching between the functionality of the virtual activation prop and a scene position. For example, a signal transmitter can be activated only when placed in an associated region (for example, beside an energy tower) of the virtual entity. This manner strengthens a scene interaction, so that the activation process is closely combined with rule setting (for example, an energy field coverage range or a trigger region) of a virtual world. A player needs to determine the associated position by observing scene cues, and then reaches a target point with a movement advantage of the virtual vehicle to complete placement. This not only increases the necessity of scene exploration, but also makes the activation behavior become a key link for plot pushing or an unlocking function, thus enhancing a sense of substitution of a playing method.

[0097] For another example, if the first virtual object places a virtual activation item at a virtual activation trigger configured for activating a virtual entity, it may be considered that the activation condition for the target virtual entity located within the movement range of the first virtual object is satisfied, that is, the target virtual entity is activated through a mechanical or magic mechanism. Alternatively, if the first virtual object places the virtual activation trigger (for example, an activation initiation apparatus or an activation code) at the associated position of the target virtual entity (for example, a position near the target virtual entity, or a position in the target virtual entity), it may be considered that the activation condition for the target virtual entity located within the movement range of the first virtual object is satisfied. The activation condition constructs a more complex activation chain based on a bidirectional logic of placing the activation item on the virtual activation trigger or placing the virtual activation trigger at the target position. For example, a player needs to first find the virtual activation trigger and move the virtual activation trigger to be near a virtual entity, and then places an activation item initiation trigger. A benefit is disassembling the activation process into a multi-operation task of "searching-handling-placement", thereby increasing the hierarchy and challenge level of a playing method. Meanwhile, an association design for a trigger and a virtual entity (such as a particular angle in which the virtual activation trigger needs to be aligned with the virtual entity) can further test a spatial layout ability of a player, so that the activation behavior is not only an operation, but also understanding and application of a scene logic.

[0098] For another example, if the first virtual object connects a virtual connection item (such as a virtual wire configured for activating a virtual entity) to the target virtual entity, it may be considered that the activation condition for the target virtual entity located within movement range of the first virtual object is satisfied. In this way, connecting the virtual item to the target virtual entity is used as the activation condition, thus highlighting the core of a playing method for association construction. For example, a virtual cable is used to connect a power generation apparatus to a virtual sphere to activate energy of the virtual sphere. An advantage of this manner lies in that an activation logic is concretized as physical connection, so that an abstract activation rule becomes visually operable, thereby enhancing an understanding of a player on an interaction process. Meanwhile, a connection operation may be designed to keep clear from an obstacle (for example, to bypass another virtual entity) or maintain connection stability (for example, a cable cannot be excessively bent). This not only increases operation skills, but also enhances a sense of accomplishment of a player by visual feedback of a connection success (for example, a current flowing effect).

[0099] In the foregoing manner, by configuring various activation conditions to activate a virtual sphere, diversity and interestingness of activation of a virtual entity in the virtual scene are enriched, and it helps increase a retention rate of a player for a product in the virtual scene.

[00100] In some embodiments, the terminal may control, in the following manner, the target virtual entity to chase the second virtual object: determining, in response to at least two second virtual objects being provided, matching degrees between the target virtual entity and the second virtual objects; and controlling the target virtual entity to chase a second virtual object with a highest matching degree.

[00101] Each second virtual object may be a virtual object controlled by an account of another terminal side different from the current terminal, or may be a non-player character, such as a virtual pet or a virtual monster.

[00102] In actual application, after the target virtual entity is activated, if a plurality of chaseable second virtual objects in the virtual scene, different second virtual objects correspond to different chase priorities, and the chase priorities of the second virtual objects are determined based on the matching degrees between the target virtual entity and the second virtual objects. A higher matching degree indicates a higher chase priority. The terminal determines the matching degrees between the target virtual entity and the second virtual objects, sorts the matching degrees in descending order, and controls the target virtual entity to chase the second virtual object with the highest matching degree (i.e., a highest chase priority), to enhance chased target pertinence.

[00103] In some embodiments, the terminal may determine matching degrees between the target virtual entity and the second virtual objects in the following manner: obtaining a parameter feature configured for affecting the matching degree between the target virtual entity and each second virtual object, the parameter feature including a first feature of the target virtual entity and a second feature of the second virtual object, the first feature including at least one of the following: a position, a chasing speed, a possessed virtual skill, and a variation of a state of a chased target, and the second feature including at least one of the following: a position, a movement speed, and a state value; and performing prediction through a machine learning model based on the parameter feature to obtain the matching degree between the target virtual entity and the second virtual object, the machine learning model being obtained by training based on a parameter feature of a training sample and a matching degree annotated by the training sample, and the parameter feature including a feature of a sample virtual entity and a feature of a sample virtual object.

[00104] In actual application, when determining the matching degrees between the target virtual entity and the second virtual objects, the terminal may first obtain the first feature of the

target virtual entity and the second feature of each second virtual object as the parameter feature that affects the matching degree between the target virtual entity and the second virtual object. The first feature includes, but is not limited to: a position at which the target virtual entity is activated, a chase speed when the target virtual entity chases the target, a virtual skill (a type of the state of the chased target may be changed when the virtual skill is released) of the target virtual entity, and a variation for the state of the chased target when the target virtual entity releases the virtual skill once. The second feature includes, but is not limited to: a current position of the second virtual object, a movement speed of the second virtual object, and a state value (such as a hit point value or a magic value). After the parameter feature affecting the matching degree between the target virtual entity and the second virtual object is obtained, the parameter feature may be inputted to a trained machine learning model, and the matching degree between the target virtual entity and the second virtual object is predicted through the machine learning model, so that prediction can be more accurate.

[00105] The machine learning model is trained in the following manner: invoking, based on the feature of the sample virtual entity and the feature of the sample virtual object, the machine learning model to calculate a predicted matching degree; after a value of a loss function of the machine learning model is determined by using the predicted matching degree with an annotated matching degree, determining whether the value of the loss function exceeds a preset threshold; and when the value of the loss function exceeds the preset threshold, determining an error signal of the machine learning model based on the loss function, performing back-propagation on the error signal in the machine learning model, and updating a model parameter of each layer in the propagation process.

[00106] A model structure of the machine learning model is not limited in this embodiment of the present disclosure. For example, the machine learning model may be a convolutional neural network, a deep neural network, or the like. A form of the loss function is not limited either. For example, the loss function may be a cross entropy loss function, an L2 loss function, or the like.

[00107] The back-propagation is described herein. Training sample data is inputted to an input layer of the machine learning model. The data passes through a hidden layer and finally reaches an output layer, and a result is outputted. This is a forward-propagation process of the machine learning model. Since there is an error between an outputted result of the machine learning model and an actual result, an error between the outputted result and an actual value is calculated, and the error is back-propagated from the output layer to the hidden layer until the error is propagated to the input layer. In the back-propagation process, a value of the model parameter is

adjusted based on the error. That is, the loss function is constructed according to the error between the outputted result and the actual value, and partial derivatives of the loss function for the model parameter are calculated layer by layer, to generate a gradient of the loss function for the model parameter of each layer. Since a direction of the gradient indicates an error expansion direction, the gradient for the model parameter is negated for summation with an original model parameter of each layer. An obtained summation result is used as an updated model parameter of each layer, thus reducing the error caused by the model parameter. The above process is continuously iterated until convergence occurs.

[00108] In the foregoing manner, in a case that a plurality of chaseable second virtual objects are provided, the terminal automatically predicts the matching degrees between the target virtual entity and the second virtual objects, and controls the target virtual entity to automatically chase the second virtual object with the highest matching degree, thereby enhancing persistence and intelligent for the chased target.

[00109] In some embodiments, the terminal may control, in the following manner, the target virtual entity to chase a second virtual object: controlling, in response to at least two second virtual objects being provided, the second virtual objects to be in selectable states; and controlling, in response to a selection operation, the target virtual entity to chase a selected second virtual object.

[00110] In actual application, after the target virtual entity is activated, if a plurality of chaseable second virtual objects exists in the virtual scene, the second virtual objects may be controlled to be in the selectable states such that a player may select a chased target. When the player selects a second virtual object, the terminal controls, in response to the selection operation, the target virtual entity to chase the selected second virtual object. In this way, persistence for the chased target and activity of the player can be enhanced.

[00111] For the plurality of chaseable second virtual objects, different second virtual objects usually correspond to different chase priorities, that is, since the matching degrees between the target virtual entity and the second virtual objects are usually different. A higher matching degree between the target virtual entity and a second virtual object indicates a higher chase priority corresponding to the second virtual object. In this case, the second virtual objects may be displayed in a display manner corresponding to the chase priorities (or the matching degrees). That is, for the second virtual objects with different chase priorities (or matching degrees), the second virtual objects are displayed in different display styles (such as different display colors, different display brightness, and different display indications), or the second virtual object with the highest chase priority (or matching degree) is highlighted, so that it is convenient for a user to select a desired

second virtual object for being chased by the target virtual entity. This helps enhance chased target selection efficiency and pertinence.

[00112] In some embodiments, the terminal may control, in the following manner, the target virtual entity to chase a second virtual object: controlling, in response to at least two target virtual physical bodies and at least two second virtual objects being provided, a first part of virtual entity among the at least two target virtual physical bodies to chase a first part of virtual object among the at least two second virtual objects, and controlling a second part of virtual entity among the at least two target virtual physical bodies to chase a second part of virtual object among the at least two second virtual objects. A matching degree between the first part of virtual entity and the first part of virtual object is greater than a first matching degree threshold, and a matching degree between the second part of virtual entity and the second part of virtual object is greater than a second matching degree threshold.

[00113] In actual application, when a plurality of activated target virtual physical bodies and a plurality of chaseable second virtual objects are provided, the terminal controls the first part of virtual entity among the plurality of activated target virtual physical bodies to chase the first part of virtual objects among the plurality of chaseable second virtual objects, and controls the remaining second part of virtual entity to chase the second part of virtual object. That is, the terminal may first determine matching degrees between the target virtual physical bodies and the second virtual objects, and control the target virtual physical bodies to chase a second virtual object with a highest matching degree. For example, FIG. 7 is a schematic diagram of chasing a target by a virtual entity according to an embodiment of the present disclosure. It is assumed that three activated target virtual physical bodies are provided, namely a target virtual entity 1, a target virtual entity 2, and a target virtual entity 3. The target virtual entity 1 and the target virtual entity 2 chase a second virtual object 1 with a highest matching degree, and the target virtual entity 3 chases a second virtual object 2 with a highest matching degree. In this way, chased target pertinence and effectiveness can be enhanced, and chaos chasing can be avoided, so that each target virtual entity can play a maximum role, and an entire chasing process is more orderly. This enhances strategic nature and reasonableness of interaction in the virtual scene, and increases a sense of control and experience of a player on a scene combat.

[00114] In some embodiments, the terminal may control, in the following manner, the target virtual entity to chase the second virtual object: controlling the target virtual entity to move towards a position of the second virtual object; and controlling, in a case that an obstacle exists between the target virtual entity and the second virtual object, the target virtual entity to change a movement

direction to go around the obstacle, and continue to move towards the position of the second virtual object after the target virtual entity goes around the obstacle.

[00115] In actual application, when controlling the target virtual entity to chase the second virtual object, the terminal may control the target virtual entity to move towards the position of the second virtual object. Even if the second virtual object also moves in the chasing process, the terminal controls the target virtual entity to always move towards the position of the second virtual object. If an obstacle (such as a haystack or a stone) that affects linear movement of the target virtual entity exists between the target virtual entity and the second virtual object in the chasing process, the terminal may control the target virtual entity to change the movement direction to go around the obstacle, and after the target virtual entity goes around the obstacle, continue to control the target virtual entity to move towards the position of the second virtual object.

[00116] In the foregoing manner, by endowing the target virtual entity with an ability to autonomously keep clear of an obstacle and continuously perform chasing, reality and smoothness of chasing behaviors in the virtual scene are enhanced. For example, when an obstacle exists between the target virtual entity and the second virtual object, the target virtual entity can actively change the direction to go around the obstacle and continue chasing, thereby avoiding interruption or futile cycles of chasing caused by blockage of the obstacle, and ensuring virtual skill releasing continuity. This manner not only enhances intelligence of a virtual entity and makes the chasing process more consistent with an expectation of a player for dynamic scene interaction, but also reduces an inconsistent experience caused by environmental barriers and enhances a sense of control and immersion of a player for a combat rhythm.

[00117] Operation 104: Control, in response to the target virtual entity catching the second virtual object, the target virtual entity to release a virtual skill to the second virtual object and change a state of the second virtual object.

[00118] In some embodiments, before controlling the target virtual entity to release a virtual skill to the second virtual object, the terminal may determine, in the following manner, the second virtual object caught by the target virtual entity: determining, in response to collision occurring between the target virtual entity and the second virtual object, that the target virtual entity catches the second virtual object; and determining, in response to a distance between the target virtual entity and the second virtual object being less than a third distance threshold, that the target virtual entity catches the second virtual object.

[00119] In actual application, when the target virtual entity chases the second virtual object, if the target virtual entity collides with the second virtual object, it may be determined that the target

virtual entity catches the second virtual object, and the target virtual entity is controlled to release a corresponding virtual skill to the second virtual object. If the target virtual entity has a particular sensing range (namely a range within which the chased target can be sensed and a virtual skill is released), in the process in which the target virtual entity chases the second virtual object, the sensing range of the target virtual entity synchronously changes as the target virtual entity moves. When the sensing range of the target virtual entity can cover the chased second virtual object, that is, when the second virtual object is located within the sensing range of the target virtual entity, it may be determined that the target virtual entity catches the second virtual object. In this way, the target virtual entity may be controlled to release the corresponding virtual skill to the second virtual object without directly being in contact with the second virtual object. Whether the second virtual object is located within the sensing range of the target virtual entity may be determined by determining a relationship between the distance between the target virtual entity and the second virtual object and a radius (namely the third distance threshold) of the sensing range. If the distance between the target virtual entity and the second virtual object is less than the third distance threshold, it may be determined that the second virtual object is located within the sensing range of the target virtual entity.

[00120] In the foregoing manner, two chasing determining manners: "collision" and "distance being less than the third threshold" are clarified, thus providing a flexible and clears standard for the target virtual entity to catch the second virtual object, and effectively meeting characteristic and scene requirements of different virtual skills. For example, for a skill (such as an impact skill) that takes effect depending on direct contact, intuitiveness of a skill effect can be ensured by using collision as a determining basis. For a skill (such as a range radiation skill) that takes effect remotely, using a distance threshold as a determining basis is more in line with an action logic of the skill. Thus dual determining mechanism avoids determining stiffness caused by a single standard (for example, unreasonableness that a remote skill does not take effect before collision), and ensures certainty of a chasing result, so that a player can predict effect-taking time based on a skill type, thereby enhancing control over a combat process and strategy planning precision.

[00121] When the target virtual entity releases the virtual skill to the second virtual object, the state of the second virtual object is changed under the action of the virtual skill. The state is a temporary situation of the virtual object in the virtual scene, may be changed at any time, and is configured for reflecting a real-time state of the virtual object. The state includes, but is not limited to, a hit point value (a current vitality of the virtual object), a magic value (a current magic or energy reserve of the virtual object), a stamina point value (which is in positive correlation to a movement speed of the virtual object, and a higher stamina point value indicates a higher movement

speed of the virtual object), and an equipment effect (a temporary effect that may be brought by current equipment of the virtual object).

[00122] FIG. 8 is a schematic diagram of releasing a virtual skill by a virtual entity according to an embodiment of the present disclosure. When a target virtual entity 801 releases a virtual skill to a second virtual object 802, a corresponding skill release effect may be presented, and a variation for a state of the second virtual object may be displayed.

[00123] In some embodiments, the terminal may control, in the following manner, the target virtual entity to chase a second virtual object: controlling, in response to at least two target virtual physical bodies being provided, the at least two target virtual physical bodies to chase the same second virtual object. Correspondingly, in the following manner, the terminal may control, in response to the target virtual entity catching the second virtual object, the target virtual entity to release a virtual skill to the second virtual object and change a state of the second virtual object: controlling, in response to the target virtual physical bodies catching the second virtual object, the target virtual physical bodies to release corresponding virtual skills to the second virtual object and change a target type of the state of the second virtual object, the target type corresponding to the virtual skills released by the target virtual physical bodies. In a case that the virtual skills released by the target virtual physical bodies are configured for changing the same type of state of the second virtual object, a total variation applied by the at least two target virtual physical bodies to the target type of the state of the second virtual object is the same as a sum of component variations applied by the target virtual physical bodies to the target type of the state of the second virtual object, or the total variation is greater than the sum of the component variations.

[00124] In actual application, when a plurality of activated target virtual physical bodies are provided, the terminal may control the plurality of activated target virtual physical bodies to simultaneously chase the same second virtual object (that is, the chased target is the same), control, when the target virtual entity catches the second virtual object, the target virtual physical bodies to release the corresponding virtual skills to the second virtual object and change the state of the second virtual object. The state is a temporary situation of the virtual object in the virtual scene, may be changed at any time, and is configured for reflecting a real-time state of the virtual object. The state includes, but is not limited to, a hit point value (a current vitality of the virtual object), a magic value (a current magic or energy reserve of the virtual object), a stamina point value (which is in positive correlation to a movement speed of the virtual object, and a higher stamina point value indicates a higher movement speed of the virtual object), intelligence, and an equipment effect (a temporary effect that may be brought by current equipment of the virtual object).

[00125] One target virtual entity may have one or more virtual skills. Different target virtual physical bodies may have the same or different virtual skills. When a plurality of target virtual physical bodies have different virtual skills (that is, the types to be changed of the state of the virtual object are different), the terminal may control the target virtual physical bodies to release their virtual skills to the second virtual object and change states of different types of the second virtual object.

[00126] For example, FIG. 9 is a schematic diagram of chasing a target by a virtual entity according to an embodiment of the present disclosure. It is assumed that three activated target virtual physical bodies are provided, namely, a target virtual entity 1, a target virtual entity 2, and a target virtual entity 3. The three target virtual physical bodies chase the same second virtual object. It is assumed that the three target virtual physical bodies have different virtual skills. For example, the target virtual entity 1 has a virtual skill 1 that changes a hit point value of the virtual object, the target virtual entity 2 has a virtual skill 2 that changes a magic value of the virtual object, and the target virtual entity 3 has a virtual skill 3 that changes a stamina point value of the virtual object. Therefore, when the three target virtual physical bodies chase the second virtual object, the target virtual entity 1 is controlled to release the virtual skill 1 to the second virtual object, to change the hit point value of the second virtual object; the target virtual entity 2 is controlled to release the virtual skill 2 to the second virtual object, to change the magic value of the second virtual object; and the target virtual entity 3 is controlled to release the virtual skill 3 to the second virtual object, to change the stamina point value of the second virtual object.

[00127] In the foregoing manner, by controlling a plurality of activated target virtual physical bodies to simultaneously chase the same second virtual object, and releasing different types of virtual skills to change various states (such as the hit point value, the magic value, and the stamina point value) of the second virtual object, a strategic and richness of combat interactions in the virtual scene are significantly enhanced. The plurality of target virtual physical bodies work together. A superimposition effect (for example, both the hit point value and the movement speed are reduced) can be achieved by combining the skills, and suppression on the second virtual object can be enhanced. In addition, player can be provided with diversified tactical options due to a difference in skill types (for example, an attack is preferentially performed on a magic value or a stamina point value). In this manner, releasing of the virtual skills is no longer monotonous effect superimposition. Instead, a more complex combat logic is constructed by multidimensional state change. This not only strengthens a planning demand of a player for a target virtual entity activation strategy, but also enhances tension and interestingness in a combat process by dynamic changes in real-time states, so that the player can participate in interaction in the virtual scene more deeply.

[00128] In some embodiments, in a case that a plurality of target virtual physical bodies have different virtual skills (that is, types to be changed of the state of the virtual object are different), when the terminal controls the target virtual physical bodies to release the virtual skills to the second virtual object, a brand new virtual skill may be obtained by combining the virtual skills to act on the second virtual object. For example, in the example in FIG. 9, when the target virtual entity 1 (the virtual skill 1: changing the hit point value), the target virtual entity 2 (the virtual skill 2: changing the magic value), and the target virtual entity 3 (the virtual skill 3: changing the stamina point value) simultaneously chase the same second virtual object and release the skills, the combination of the three skills may trigger a brand new virtual skill, to achieve a superimposition effect of "1 +1 +1 > 3". For example, basic effects of the virtual skill 1 (which reduces the hit point value) and the virtual skill 2 (which clears the magic value) may cause the second virtual object to enter a weakened state, and addition of the virtual skill 3 (which reduces the stamina point value) may trigger the brand new virtual skill of Energy Breakdown based on this. The virtual skill not only additionally causes a burst damage based on the sum of the effects of the three skills, but also causes the second virtual object to fail to restore any state (including the hit point value, the magic value, and the stamina point value) within a target time period (such as 10 seconds), and reduces the movement speed by another 30%.

[00129] The foregoing brand new virtual skill is not simple superimposition of the single virtual skills, but generates a quality change through association of state changes. For example, a double loss of the hit point value and the magic value provides a trigger basis for Energy Breakdown, and a decrease in the stamina point value enhances a continuous suppression effect of the new skill (i.e., Energy Breakdown). If a player can activate the three types of virtual physical bodies in a targeted manner, a tactical value far beyond a tactical value of a single virtual skill may be created by using a combined skill. This not only increases a requirement on a virtual entity activation strategy (such as preferentially gathering a particular type of virtual physical bodies), but also enhances a a sense of surprise and strategic depth of a combat based on randomness and potency of the new skill, so that a multi-target collaborative chase playing method is more hierarchical.

[00130] When a plurality of target virtual physical bodies have the same virtual skill (that is, types to be changed of the state of the virtual object are the same, for example, all the types are a target type of the state). When the plurality of target virtual physical bodies release the same virtual skill to the second virtual object, the total variation for the target type of the state of the second virtual object may be the sum of the component variations for the target type of the state of the second virtual object generated by the target virtual physical bodies releasing the various virtual

skills to the second virtual object, or may have a gain coefficient. That is, the total variation for the target type of the state of the second virtual object is greater than the sum of the component variations. For example, assuming that both the target virtual entity 1 and the target virtual entity 2 have the virtual skill that changes a hit point value of a virtual object, a variation generated by the target virtual entity 1 releasing the virtual skill to the hit point value of the second virtual object is 20, and a variation generated by the target virtual entity 2 releases the virtual skill to the hit point value of the second virtual object is 30. A total variation generated by the target virtual entity 1 and the target virtual entity 2 to the hit point value of the second virtual object may be 50 or 50 * a, where a represents a gain coefficient (which is usually greater than 1). The gain coefficient may be set by a server in advance, or may be dynamically set by a player in the virtual scene before or during interaction.

[00131] In the foregoing manner, when a plurality of target virtual physical bodies having the same virtual skill release the skill, the component variations of the state can be simply superimposed, and the total variation exceeding the sum can be generated by using the gain coefficient, thereby significantly enhancing a strategic nature and motivation of a playing method, and helping increase enthusiasm of a player for activating a plurality of virtual physical bodies. When the skill effects are simply superimposed, the player can achieve stable state suppression by activating more virtual physical bodies in the same type (for example, a large number of hit points are reduced cumulatively). The design of the gain coefficient encourages the player to gather the same type of virtual physical bodies in a targeted manner. The effect of "1 +1 > 2" is magnified (for example, the superimposed damage is additionally increased by 20%), to obtain an excess return. This dual calculation manner ensures stability of a basic playing method, and provides a player with a target for pursuing a higher profit (for example, actively planning an activation path to gather enough physical bodies of the same type). In addition, a presetting or dynamic setting mechanism of a gain coefficient can flexibly adjust a combat balance and a difficulty, so that the player can achieve an objective by quantity accumulation and achieve a breakthrough by strategy optimization in the virtual scene, thereby increasing enthusiasm for activating virtual physical bodies in the same type and a playing method depth.

[00132] In some embodiments, when a plurality of target virtual physical bodies simultaneously catch down the same second virtual object, if the plurality of target virtual physical bodies are controlled to release virtual skills to the second virtual object, the plurality of target virtual physical bodies may be controlled to release a combined skill to the second virtual object, and a value of the state of the second virtual object is changed by the combined skill acting on the second virtual object. The combined skill includes at least one virtual skill belonging to each target

virtual entity, and the combined skill is determined in the following manner: combining the virtual skills of the target virtual physical bodies; combining a representative skill of each target virtual entity; and invoking, based on features of a plurality of candidate combined skills of the plurality of target virtual physical bodies, a machine learning model to calculate and obtain use probabilities of the candidate combined skills, and selecting a candidate combined skill having a maximum use probability. The machine learning model is trained in the following manner: invoking the machine learning model for prediction based on features of a plurality of combined skill samples, to obtain a probability of each combined skill sample; and performing back propagation based on a difference between the probability of each combined skill sample and an actual selection result label, to update a parameter of the machine learning model.

[00133] In actual application, when the plurality of target virtual physical bodies simultaneously catch down the same second virtual object, if the plurality of target virtual physical bodies are controlled to release virtual skills to the second virtual object, the plurality of target virtual physical bodies may be controlled to release the combined skill to the second virtual object.

[00134] For example, the target virtual physical bodies that simultaneously catch down the second virtual object include a target virtual entity 1 having a skill for changing a hit point value, a target virtual entity 2 having a skill for changing a magic value, and a target virtual entity 3 having a skill for confusing enemies, the combined skill released by the three target virtual physical bodies (1 to 3) includes the skill of the target virtual entity 1 for changing a hit point value, the skill of the target virtual entity 2 for changing a magic value, and the skill of the target virtual entity 3 for confusing enemies.

[00135] When each target virtual entity has various different virtual skills, the combined skill may alternatively be obtained by combining a representative skill selected from the various skills of each target virtual entity. For example, the target virtual entity 1 has a skill for changing a hit point value and a skill for changing a magic value (the representative skill of this target virtual entity is the skill for changing a magic value). The target virtual entity 2 has a skill for changing health and a skill for changing attack power (the representative skill of this target virtual entity is the skill for changing attack power). The target virtual entity 3 has a skill for affecting an equipment effect and a skill for changing intelligence (the representative skill of this target virtual entity is the skill for affecting an equipment effect). The combined skill released by the three target virtual physical bodies (1 to 3) includes the skill of the target virtual entity 1 for changing a magic value, the skill of the target virtual entity 2 for changing attack power, and the skill of the target virtual entity 3 for affecting an equipment effect. After the combined skill is released to the second virtual object,

changed states of the second virtual object include: the magic value, the attack power, and the equipment effect.

[00136] In addition, when the plurality of target virtual physical bodies simultaneously release the virtual skills to the second virtual object, the virtual skills of the target virtual physical bodies may be further combined into a plurality of candidate combined skills in a permutation and combination manner, features (such as a skill type, a skill action scene, effective duration of skills, or cooling duration of skills) of the candidate combined skills are obtained. The machine learning model is invoked to calculate and obtain the use probability of each candidate combined skill, and the candidate combined skill having the maximum use probability is selected as a synthesized combined skill. The machine learning model is trained in the following manner: invoking the machine learning model for prediction based on features of a plurality of combined skill samples, to obtain a probability of selecting each combined skill sample; and performing back propagation based on a difference between the probability of each combined skill sample and an actual selection result label (1 for selection and 0 for no selection), to update a parameter of the machine learning model, such as a difference between a predicted probability of each combined skill sample and the actual selection result label; after a value of a loss function of the machine learning model is determined, determining whether the value of the loss function exceeds a preset threshold; and when the value of the loss function exceeds the preset threshold, determining an error signal of the machine learning model based on the loss function, performing back-propagation on the error signal in the machine learning model, and updating a model parameter of each layer in the propagation process.

[00137] When the plurality of target virtual physical bodies release the same virtual skill, an effect (namely, the variation for the state of the second virtual object) of the combined skill may be simple superposition of the effects of the same virtual skill released by the target virtual physical bodies, or may be multiple superposition of the effects of the same virtual skill released by the target virtual physical bodies.

[00138] In the foregoing manner, the combined skill of the plurality of target virtual physical bodies is obtained, a skill range is expanded, and diversity and interestingness of interaction in the virtual scene are enriched. This helps increase a retention rate of a player for products in the virtual scene.

[00139] In some embodiments, the terminal may change the state of the second virtual object in the following manner: changing the state of the second virtual object in response to the second virtual object being in an opposing relationship with the first virtual object, the state after change

being worse than the state before change; and changing the state of the second virtual object in response to the second virtual object being in an allied relationship with the first virtual object, the state after change being better than the state before change.

[00140] In actual application, when the target virtual entity catches the second virtual object and releases the virtual skill to the second virtual object, a change direction (positive for negative) for the state of the second virtual object is determined by an interaction relationship between the second virtual object and the first virtual object. If the second virtual object and the first virtual object are in the opposing relationship (a hostile relationship), the state after change is worse than the state before change. For example, the virtual skill released by the target virtual entity reduces the hit point value of the second virtual object. If the second virtual object and the first virtual object are in the allied relationship (a friend or interaction relationship), the state after change is better than the state before change. For example, the virtual skill released by the target virtual entity increases the hit point value of the second virtual object.

[00141] In addition, changes in the state may be alternatively clearly distinguished in different interaction relationships by using multidimensional feedback such as a visual effect and a sound effect. For example, a red damage value and an explosion effect are displayed when the virtual skill is released to the second virtual object that is in the opposing relationship, and a green treatment value and a halo effect are displayed when the virtual skill is released to the second virtual object that is in the friend relationship, to prevent a player from misjudging an operation result due to fuzzy feedback. Especially in a multi-target chaotic battle scene, an identification degree of skill action objects and relationships thereof needs to be enhanced in a manner such as highlighting and a target locking identification.

[00142] In addition, state change strengths in different interaction relationships need to be balanced. For a debuff effect of the opposing relationship and a buff effect of the allied relationship, scene reasonableness needs to be maintained in numerical design. For example, when the same virtual skill is released to the second virtual object (namely a friend target) in the friend relationship and the second virtual object (an enemy target) in the enemy relationship, a healing value for a friend is not to exceed a damage value for an enemy, thereby preventing a player from over-relying on summoning a friend target to refresh states. An upper limit also needs to be set for debuff on an enemy, to prevent a single skill from directly breaking a combat balance, and an effect range can be dynamically adjusted based on an intimacy (such as a friend or a temporary ally) or an opposition level (such as an ordinary enemy or a BOSS) of the interaction relationship, to enhance a hierarchical sense of a playing method.

[00143] Finally, special cases of a misoperation or range skill waves and a non-target relationship object need to be processed. For example, when an action range of a virtual skill may cover both an enemy target and a friend target, different action manners (for example, debuff only takes effect on an enemy and has no impact on a friend) of the virtual skill for objects in different interaction relationships, or a friend exemption mechanism is provided to prevent a player from having a negative impact on a friend object due to misoperations, thereby ensuring fault tolerance of strategy execution.

[00144] In the foregoing manner, after the target virtual entity is activated, since the target virtual entity can chase the second virtual object in the virtual scene, and release the virtual skill to the second virtual object to change the state of the second virtual object, an interaction manner between the target virtual entity and the second virtual object is provided, thereby enriching diversity and interestingness of interaction in the virtual scene, and helping enhance a retention rate of a product in the virtual scene by a player.

[00145] In some embodiments, in a process in which the target virtual entity releases the virtual skill to the second virtual object, in response to a third virtual object existing within an effective action range of the virtual skill, the terminal controls the virtual skill released by the target virtual entity to act on the third virtual object and change a state of the third virtual object.

[00146] In actual application, in the process in which the target virtual entity releases the virtual skill to the second virtual object, since the virtual skill has an effective action range, the third virtual object (which may be all virtual objects located within the effective action range) located within the effective action range may be affected by the virtual skill. That is, the virtual skill released by the target virtual entity is controlled to act on the third virtual object and change the state of the third virtual object. A change direction (positive for negative) for the state of the third virtual object is determined by an interaction relationship between the third virtual object and the first virtual object. If the third virtual object and the first virtual object are in the opposing relationship (a hostile relationship), the state after change is worse than the state before change. For example, the virtual skill released by the target virtual entity reduces the hit point value of the third virtual object. If the third virtual object and the first virtual object are in the allied relationship (a friend relationship), the state after change is better than the state before change. For example, the virtual skill released by the target virtual entity increases the hit point value of the third virtual object.

[00147] If the third virtual object is a virtual environment object (i.e., a virtual object not controlled by a player) in the virtual scene, the virtual skill released by the target virtual entity may affect the virtual environment object as well, such as causing road collapse or tree breakage.

[00148] In the foregoing manner, the virtual skill can have an impact on the third virtual object within the action range, the state change direction is determined based on the relationship between the third virtual object and the first virtual object, and the virtual skill can act on the virtual environment object at the same time, thereby greatly enriching the breadth and depth of skill interaction in the virtual scene. This not only enables the skill effect to break through a monotonous target limitation, to form a radiation effect of achieving multiple effects by one skill (for example, when an enemy target is attacked, a friend falls within a healing range is healed), thereby enhancing combat efficiency and strategy flexibility. In addition, reality and a tactical possibility of scene interaction can also enhanced by affecting a virtual environment (such as collapsing a road to block movement of an enemy). In addition, a relationship-oriented state change manner ensures reasonableness of a skill effect (no accidental damage to a friend and no omission of an enemy), and a player needs to consider range planning and object relationship determination when a virtual skill is released. This enhances a strategic nature of operations and enhances immersion of the virtual scene through environment feedback, so that skill releasing is no longer an isolated target interaction, but is a comprehensive behavior that drives multi-party relationships and scenes to change.

[00149] In some embodiments, after changing the state of the second virtual object, the terminal controls, in response to a variation of the state of the second virtual object exceeds a variation threshold, the target virtual entity to break up into at least one new virtual entity. A variation applied by the new virtual entity to the state of the chased target does not exceed a variation applied by the target virtual entity to the state of the same chased target.

[00150] In actual application, after the target virtual entity releases the virtual skill to the second virtual object to change the state of the second virtual object, if the variation of the state of the second virtual object exceeds the variation threshold (which may be set according to an actual need), if the second virtual object and the first virtual object are in the opposing relationship and the hit point value of the second virtual object returns to zero after change (that is, the second virtual object is dead), and if the second virtual object and the first virtual object are in the allied relationship and the hit point value of the second virtual object reaches 100 after change (for example, the second virtual object is dying before change, and the hit point value approaches 0, but the second virtual object resurrects with full hit points after change, and the hit point value reaches

100), the target virtual entity may be controlled to be broken into at least one new virtual entity. Similarly, after being activated, the new virtual entity may find out a chased target and chases the chased target. After the new virtual entity catches the chased target, the state of the chased target is changed. A type of the virtual skill of the new virtual entity may be the same as or different from a type of the virtual skill of the target virtual entity. When the virtual skill of the new virtual entity is the same as the virtual skill of the target virtual entity, a variation of the state of the chased target caused by the new virtual entity releasing the virtual skill once does not exceed a variation of the state of the chased target caused by the target virtual entity (i.e., the virtual entity before breakage) releasing the virtual skill once.

[00151] In the foregoing manner, when the variation applied by the virtual skill released by the target virtual entity to the state of the second virtual object exceeds the variation threshold, the target virtual entity is broken up into the new virtual entity. By breaking up the target virtual entity, one or more new virtual physical bodies having the original virtual skill or new virtual skills are generated, thereby forming cyclic interaction of "skill effect-breakage and generation", balancing the strength of the playing method, and enriching diversity and interestingness of interaction in the virtual scene. After an original virtual entity achieves a significant effect (for example, slaying an enemy target or restoring full hit points of a friend), the original virtual object is broken up and then regenerated. This provides continuous resource replenishment (a new virtual entity may be activated and used again) for a player, enhances positive feedback of "activation-action-regeneration", and restricts the effect strength of the new virtual entity, so that a single virtual entity is prevented from excessively affecting the balance. In addition, the variability (which is the same as or different from the original entity) of the type of the skill of the new virtual entity adds randomness and a strategy space to a playing method (for example, an original attack-type virtual entity is broken up into an auxiliary virtual entity), so that resource utilization in the virtual scene is more extensible. This encourages a player to pursue a maximum state change to trigger the breakage of the virtual entity. In addition, continuity of a combat or exploration is prolonged through continuous interaction of the new virtual entity, and a sense of hierarchy and interestingness of the overall playing method are enhanced.

[00152] In some embodiments, in response to a gain condition being satisfied, the first virtual object is controlled to obtain a gain of the target type. The gain condition includes at least one of the following: a quantity of activated virtual physical bodies reaches a first quantity threshold, a quantity of virtual objects that are caught reaches a second quantity threshold, and a variation of a state of a virtual object that is caught exceeds a variation threshold. The target type includes at least one of the following: a movement speed of the first virtual object with the assistance of the virtual

vehicle, the movement range of the first virtual object carrying the virtual vehicle, the variation for the state of the virtual object that is caught, and attack power of the virtual vehicle.

[00153] In actual application, since an activated virtual sphere in the virtual scene may chase a virtual object in the virtual scene, and may change a state of the chased virtual object, and the virtual sphere is directly or indirectly activated by the first virtual object carrying the virtual vehicle, when the gain condition is satisfied, for example, when a quantity of virtual spheres directly or indirectly activated by the first virtual object reaches the first quantity threshold (which may be set according to an actual need), or when a quantity of virtual objects caught by the activated virtual spheres reaches the second quantity threshold (which may be set according to an actual need), or when a variation of a state of a chased virtual object exceeds the variation threshold (which may be set according to an actual need), the first virtual object is provided with the gain of the target type, to increase interaction enthusiasm of the first virtual object.

[00154] The gain of the target type may be an increase in the movement speed of the first virtual object with the assistance of the virtual vehicle. For example, before the first virtual object is provided with the gain of the target type, a movement speed of the first virtual object not carrying the virtual vehicle is V_a, and a movement speed of the first virtual object with the assistance of the virtual vehicle is V_b. After the first virtual object is provided with the gain of the target type, the movement speed of the first virtual object with the assistance of the virtual vehicle is increased to V_c, where $V_a<V_b<V_c$.

[00155] The gain of the target type may alternatively be expansion in the movement range (which may be represented by using a maximum movement height of the first virtual object) of the first virtual object carrying the virtual vehicle. For example, before the first virtual object is provided with the gain of the target type, a movement range of the first virtual object not carrying the virtual vehicle is S_a, and a movement range of the first virtual object with the assistance of the virtual vehicle is S_b. After the first virtual object is provided with the gain of the target type, the movement range of the first virtual object with the assistance of the virtual vehicle is expanded to S_c, where $S_a<S_b<S_c$.

[00156] The gain of the target type may further increase the variation applied by the target virtual entity to the state of the chased virtual object. For example, before the first virtual object is provided with the gain of the target type, the target virtual entity directly or indirectly activated by the first virtual object releases a virtual skill once to the chased virtual object. A variation of the state of the virtual object is L_a. After the first virtual object is provided with the gain of the target type, the target virtual entity directly or indirectly activated by the first virtual object releases the

same virtual skill once to the chased virtual object. A variation of the state of the virtual object is L_b, where $L_a < L_b$.

[00157] In addition, since the virtual vehicle can further has a function of assisting the first virtual object in attacking an enemy target in addition to having an auxiliary function of expanding the movement range of the first virtual object, the gain of the target type may alternatively be an increase in attack power of the virtual vehicle, to increase the attack power of the first virtual object for the enemy target.

[00158] In the foregoing manner, gain obtaining is bound to core interaction behaviors such as a quantity of virtual objects activated, a chasing result, and a state change effect, and multi-dimensional gains such as a movement speed, a range, a skill effect, and attack power of a vehicle are provided, thus forming a clear "behavior-reward" positive cycle and increasing enthusiasm and objective guidance of interaction of the first virtual object. When a player activates enough virtual physical bodies and achieves a particular chasing result or causes a significant state change, capability enhancement (for example, faster movement, a larger exploration range, and a better skill effect) can be obtained intuitively. This feeds back an operation result of a player in real time, and reduces a difficulty of a subsequent task (for example, more virtual physical bodies are activated more quickly, and a target is chased more efficiently) by a gain effect, thereby forming a virtuous cycle. In addition, diversified gain types meet requirements of different playing methods (for example, a player focusing on exploration may obtain a movement gain, and a player focusing on fighting may enhance a skill effect), so that players with different preferences can obtain targeted excitation, thereby further enhancing immersion and a strategic nature of interaction in the virtual scene, and promoting players to more actively explore scenes and optimize operations to satisfy the gain condition.

[00159] The following describes exemplary application of this embodiment of the present disclosure in an actual application scene. An example in which the virtual scene is a game, the virtual vehicle is a virtual skateboard, and the target virtual entity is a virtual sphere is used to continue to describe the interaction processing method for a virtual scene provided in this embodiment of the present disclosure.

[00160] FIG. 10 is a flowchart of an interaction processing method for a virtual scene according to an embodiment of the present disclosure. The method includes:

[00161] Operation 201: Display, on an interface of a virtual scene, a first virtual object carrying a virtual skateboard, and at least one virtual sphere.

[00162] The first virtual object is a virtual object controlled by a player account currently corresponding to a terminal. The terminal may periodically refresh a plurality of virtual spheres. As shown in FIG. 4, the refreshed virtual spheres may be randomly placed at different positions in the virtual scene. Sizes, effective duration, and the like of the virtual spheres at the different positions may be the same or different, and the positions of the virtual spheres in the virtual scene may be changed at any time. In this way, different virtual objects may be activated at different difficulties. For example, compared with a virtual entity at a higher position, the player may easily touch a virtual entity at a lower position. Therefore, an activation difficulty of the virtual sphere at the higher position is higher than an activation difficulty of the virtual sphere at the lower position.

[00163] According to different functions of the virtual spheres, the virtual spheres may be divided into ordinary spheres and explosive spheres. It is assumed that a refreshing count of the virtual spheres is v, a total quantity of virtual spheres is c, a weight of the ordinary spheres is m, and a weight of the explosive spheres is n. At each time the virtual physical bodies are refreshed, a total quantity of virtual spheres refreshed each time is first determined; a quantity of ordinary spheres and a quantity of explosive spheres are then determined; and different spheres are distributed on different layers according to proportions. For example, the virtual spheres are all distributed in layers in the virtual scene. For example, a weight of the ordinary spheres distributed on a first layer/a second layer/a third layer/a fourth layer is Ln, and a weight of the explosive spheres distributed on the first layer/the second layer/the third layer/the fourth layer is Pn. A placement point of each virtual sphere in the game scene is implemented by using a visible and placeable generator (a length and a width of the generator may be scaled proportionally). The generator is placed in the game scene, and a quantity, a spacing, and a rotation change of virtual spheres corresponding to placement points are determined by configuring a quantity of generators, an adjacent distance, a quantity of layers, a layer height, and layer-wise rotation, and the like.

[00164] Operation 202: Control, in response to a movement control operation, the first virtual object to move with assistance of the virtual skateboard.

[00165] In actual application, when the first virtual object is controlled to move, the first virtual object may be controlled to move upon touching a ground or move in a jumping manner with the assistance of the virtual skateboard. The first virtual object stepping on the virtual skateboard may be controlled to move upon touching the ground with the sliding assistance of the virtual skateboard (that is, the virtual skateboard is in contact with the ground, and the first virtual object does not leave the virtual skateboard). Alternatively, when a jumping condition is satisfied, the first virtual object may be controlled to perform a jumping action with the assistance of the

virtual vehicle. For example, in a takeoff phase, a front foot of the first virtual object is controlled to step on a front end of the virtual skateboard, and a rear foot pushes hard against the ground backwards and downwards, so as to obtain upward power. In an off-ground phase, after the first virtual object is controlled to push hard against the ground, the first virtual object quickly lifts up the rear foot to leave the ground, and the front foot also leaves the virtual skateboard, so that the whole body leaves the ground. In an air phase, the first virtual object is controlled to keep the body balance, and a body posture is adjusted based on a type of jumping, so that there is possibly a rotation action or another action. In a landing phase, the first virtual object is controlled to start to prepare for landing at a highest point of jumping, and positions of the virtual skateboard and the body are adjusted, to ensure stable landing back onto the virtual skateboard.

[00166] The jumping action may be a single jump or a plurality of consecutive jumps. The single jump or the plurality of consecutive jumps respectively represent different jumping phases or jumping counts of the jumping action. The single jump refers to an action that the first virtual object takes off from the virtual skateboard. The plurality of consecutive jumps mean that the first virtual object may take off in the air again or for multiple times after jumping from the virtual skateboard, to keep clear of an obstacle, reach a higher position, or perform a stunt action. There may be a plurality of jumping conditions. For example, when a player triggers a jumping control, it is considered that a jumping condition is satisfied, and the first virtual object is controlled to perform a jumping action. For another example, when the first virtual object moves to a target region, features (such as whether there is an obstacle such as a hill and a railing) of the target region match features of a plurality of candidate actions (such as a jumping action, a squatting action, and a splitting action), to obtain a matching degree between the target region and each candidate action, and when the matching degree between the target region and the jumping action exceeds a matching degree threshold, it is determined that the jumping condition is satisfied, and the first virtual object is automatically controlled to perform the jumping action to cross the target region.

[00167] Usually, the virtual skateboard which is a virtual prop has a movement capability of positive feedback. With the assistance of the virtual skateboard, the movement speed of the first virtual object after being mounted with the virtual skateboard is higher than the movement speed before being mounted with the virtual skateboard, and within a target time period, a movement distance is longer, or a movement height is higher (for example, the jumping action is performed with the assistance of jumping of the virtual skateboard, so that a maximum height that the player can reach is increased). Therefore, a movement range of the first virtual object mounted with the virtual skateboard is greater than a movement range of the first virtual object not mounted with the virtual skateboard. Since the virtual spheres at different positions are distributed in the virtual scene,

this helps assist the first virtual object in reaching a wider range. This means that the first virtual object can activate more virtual physical bodies with the assistance of the virtual skateboard, and in particular, can activate a virtual sphere that cannot be reached by the first virtual object before the first virtual object is mounted with the virtual skateboard and is located at a higher position.

[00168] In the foregoing manner, with the assistance of the virtual skateboard, the movement range of the first virtual object is expanded, and a quantity of virtual spheres located within the movement range of the first virtual object can be increased. In this way, a range in which the first virtual object activates a virtual sphere is expanded.

[00169] Operation 203: Activate a target virtual sphere in response to the target virtual sphere exists within a movement range of the first virtual object.

[00170] Herein, in a movement process of the first virtual object, if the target virtual sphere exists in a movement range of the first virtual object, the target virtual sphere may be activated. There are various activation manners. For example, the target virtual sphere is activated in a manner in which the first virtual object picks up or touches the target virtual entity. Alternatively, the target virtual entity is activated remotely by using an activation manner such as an item placement function or an item taking function (that is, the first virtual object does not need to directly touch the target virtual sphere).

[00171] Operation 204: Control the target virtual sphere to chase a second virtual object.

[00172] Herein, the activated target virtual sphere may actively search for a chased target (namely the second virtual object), and chase the chased target.

[00173] The second virtual object generally refers to a chaseable chased target. After the first virtual object activates the target virtual sphere, if no chased target exists in the virtual scene, the target virtual sphere may be controlled to disappear after moving forwards by a target distance in an orientation in which the target virtual sphere is activated.

[00174] Step 205: Control, when the target virtual sphere catches the second virtual object, the target virtual sphere to release a virtual skill to the second virtual object.

[00175] Herein, when the target virtual sphere catches the second virtual object, the virtual skill possessed by the target virtual sphere may be released to the second virtual object, to change a state of the second virtual object, for example, to reduce a hit point value or health of the second virtual object.

[00176] Operation 206: Control, when a third virtual object exists within an effective action range of the virtual skill, the released virtual skill to act on the third virtual object

[00177] Herein, in the process in which the target virtual sphere releases the virtual skill to the second virtual object, since the virtual skill has an effective action range, the third virtual object (which may be all virtual objects located within the effective action range) located within the effective action range can be affected by the virtual skill. That is, the virtual skill released by the target virtual entity is controlled to act on the third virtual object and change a state of the third virtual object.

[00178] Operation 207: Control the target virtual sphere to be broken into at least one new virtual sphere.

[00179] Herein, after the virtual skill of the target virtual entity is released, the target virtual sphere may be controlled to be broken up into a new virtual sphere. Similarly, after being activated, the new virtual sphere may find out a chased target and chase the chased target, and a state of the chased target is changed after the chased target is caught. In this way, by the breakage of the target virtual sphere, one or more new virtual spheres having the original virtual skill or new virtual skills are generated, thereby enriching diversity and interestingness of interaction in the virtual scene.

[00180] Operation 208: Control, in response to a gain condition being satisfied, the first virtual object to obtain a gain of a target type.

[00181] The gain condition includes at least one of the following: a quantity of activated virtual spheres reaches a first quantity threshold, a quantity of virtual objects that are caught reaches a second quantity threshold, and a variation of a state of a virtual object that is caught exceeds a variation threshold. According to different gain conditions, the first virtual object (i.e., a player) may obtain different types of gains. For example, if a player cumulatively activates 10 virtual spheres, the ordinary attack capability of the virtual skateboard is permanently enhanced in a single-play method, and the total current damage of the basic attack of the virtual skateboard is increased by X%, which enables more damage hits on an enemy per unit time. If the player cumulatively activates 20 virtual spheres, a range for picking up virtual spheres by the player in a skateboard state is permanently expanded in the single-play method. If the player cumulatively activates 30 virtual spheres, the heavy attack power of the virtual skateboard is permanently strengthened in the single-play method, and the extra heavy attack damage applied by the skateboard based on the current combat power or level of the player. If the player cumulatively activates 40 virtual spheres, the movement speed of the virtual skateboard is permanently increased in the single-play method. If the player cumulatively activates 50 virtual spheres, an X-times increase is directly obtained for a character damage capability in the single-play method. In the foregoing manner, the player is

provided with the gain of the target type, so that enthusiasm of the player for interaction can be increased.

[00182] To this end, the interaction processing method for a virtual scene provided by the embodiments of the present disclosure has been described in conjunction with the exemplary applications and implementations of the electronic device provided by the embodiments of the present disclosure. The following continues to describe cooperation of modules in an interaction processing apparatus 555 for a virtual scene to implement an interaction processing solution for a virtual scene.

[00183] An object display module 5551 is configured to display, on an interface of a virtual scene, a first virtual object carrying a virtual vehicle. A movement control module 5552 is configured to control, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle, a movement range of the first virtual object carrying the virtual vehicle being larger than a movement range of the first virtual object not carrying the virtual vehicle. A first processing module 5553 is configured to: activate, in response to a target virtual entity that is within the movement range of the first virtual object satisfying an activation condition, the target virtual entity in a movement process of the first virtual object, and control the target virtual entity to chase a second virtual object. A movement control module 5554 is configured to control, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle, a movement range of the first virtual object carrying the virtual vehicle being larger than a movement range of the first virtual object not carrying the virtual vehicle.

[00184] In some embodiments, the activation condition includes any one of the following: a distance between the target virtual entity and the first virtual object is less than a first distance threshold; a touch operation performed by the first virtual object on the target virtual entity is received; a first placement operation for a target item combination is received, the target item combination being obtained by combining a plurality of virtual items in a preset combining manner and being configured for activating the target virtual entity; a second placement operation for a virtual activation prop is received, the second placement operation instructing the virtual activation prop to be placed at an associated position of the target virtual entity; a third placement operation for a virtual activation trigger is received, the third placement operation instructing a virtual activation item to be placed at the virtual activation trigger, or instructing the virtual activation trigger to be placed at the associated position of the target virtual entity; and a connection operation for a virtual connected item is received, the connection operation instructing the virtual connected item to be connected to the target virtual entity.

[00185] In some embodiments, the movement control module is further configured to: control, in response to the movement control operation, the first virtual object to move upon touching a ground under the assistance of the virtual vehicle, and control, when a jumping condition is satisfied, the first virtual object to leave the virtual vehicle with the assistance of the virtual vehicle and perform a jumping action a preset jumping trajectory; and control, in response to completion of the jumping action, the first virtual object to descend to the virtual vehicle and continue to move upon touching a ground, the jumping condition including any one of the following: a trigger operation for a jumping control is received; the first virtual object moves to a target region upon touching a ground; and a matching degree between the target region and the jumping action exceeds a matching degree threshold.

[00186] In some embodiments, the movement control module is further configured to: control, in a process in which the first virtual object performs the jumping action, the virtual vehicle to move with a preset action, and control, when the first virtual object lands, the virtual vehicle to move to a target position, wherein a distance between the target position and a landing position of the first virtual object is less than a second distance threshold, and the second distance threshold is a maximum distance for controlling the first virtual object to smoothly return from the landing position to the virtual vehicle located at the target position.

[00187] In some embodiments, the first processing module is further configured to: control, in response to at least two target virtual physical bodies being provided, the at least two target virtual physical bodies to chase the same second virtual object. Correspondingly, the second processing module is further configured to: control, in response to the target virtual physical bodies catching the second virtual object, the target virtual physical bodies to release corresponding virtual skills to the second virtual object and change a target type of the state of the second virtual object, the target type corresponding to the virtual skills released by the target virtual physical bodies. In a case that the virtual skills released by the target virtual physical bodies are configured for changing the same type of the state of the second virtual object, a total variation applied by the at least two target virtual physical bodies to the target type of the state of the second virtual object is the same as a sum of component variations applied by the target virtual physical bodies to the target type of the state of the second virtual object, or the total variation is greater than the sum of the component variations.

[00188] In some embodiments, the first processing module is further configured to: determine, in response to at least two second virtual objects being provided, matching degrees

between the target virtual entity and the second virtual objects; and control the target virtual entity to chase a second virtual object with a highest matching degree.

[00189] In some embodiments, the first processing module is further configured to: obtain a parameter feature configured for affecting the matching degree between the target virtual entity and each second virtual object, the parameter feature including a first feature of the target virtual entity and a second feature of the second virtual object, the first feature including at least one of the following: a position, a chasing speed, a possessed virtual skill, and a variation of a state of a chased target, and the second feature including at least one of the following: a position, a movement speed, and a state value; and perform prediction through a machine learning model based on the parameter feature to obtain the matching degree between the target virtual entity and the second virtual object, the machine learning model being obtained by training based on a parameter feature of a training sample and a matching degree annotated by the training sample, and the parameter feature including a feature of a sample virtual entity and a feature of a sample virtual object.

[00190] In some embodiments, the first processing module is further configured to: control, in response to at least two second virtual objects being provided, the second virtual objects to be in selectable states; and control, in response to a selection operation, the target virtual entity to chase a selected second virtual object.

[00191] In some embodiments, the first processing module is further configured to: control, in response to at least two target virtual physical bodies and at least two second virtual objects being provided, a first part of virtual entity among the at least two target virtual physical bodies to chase a first part of virtual object among the at least two second virtual objects, and control a second part of virtual entity among the at least two target virtual physical bodies to chase a second part of virtual object among the at least two second virtual objects, a matching degree between the first part of virtual entity and the first part of virtual object being greater than a first matching degree threshold, and a matching degree between the second part of virtual entity and the second part of virtual object being greater than a second matching degree threshold.

[00192] In some embodiments, the first processing module is further configured to: control the target virtual entity to move towards a position of the second virtual object; and control, in a case that an obstacle exists between the target virtual entity and the second virtual object, the target virtual entity to change a movement direction to go around the obstacle and continue to move towards the position of the second virtual object after the target virtual entity goes around the obstacle.

[00193] In some embodiments, before controlling the target virtual entity to release the virtual skill to the second virtual object, the second processing module is further configured to perform at least one of the following: determining, in response to collision occurring between the target virtual entity and the second virtual object, that the target virtual entity catches the second virtual object; and determining, in response to a distance between the target virtual entity and the second virtual object being less than a third distance threshold, that the target virtual entity catches the second virtual object.

[00194] In some embodiments, the second processing module is further configured to: change the state of the second virtual object in response to the second virtual object being in an opposing relationship with the first virtual object, the state after change being worse than the state before change; and change the state of the second virtual object in response to the second virtual object being in an allied relationship with the first virtual object, the state after change being better than the state before change.

[00195] In some embodiments, the second processing module is further configured to: in the process in which the target virtual entity releases the virtual skill to the second virtual object, in response to a third virtual object existing within an effective action range of the virtual skill, control the virtual skill released by the target virtual entity to act on the third virtual object and change a state of the third virtual object.

[00196] In some embodiments, after changing the state of the second virtual object, the apparatus further includes: a third processing module configured to control, in response to a variation of the state of the second virtual object exceeding a variation threshold, the target virtual entity to be broken up into at least one new virtual entity, a variation applied by the new virtual entity to the state of the chased target not exceeding a variation applied by the target virtual entity to the state of the same chased target.

[00197] In some embodiments, before activating the target virtual entity, the apparatus further includes: a entity display module configured to: display a plurality of virtual physical bodies in the virtual scene, the target virtual entity being at least one of the plurality of virtual physical bodies, and the plurality of virtual physical bodies satisfying any one of the following: the plurality of virtual physical bodies include at least two virtual physical bodies with different sizes, variations applied by the virtual physical bodies to the state of the chased target being in positive correlation to the sizes of the virtual physical bodies; the plurality of virtual physical bodies include at least two different types of virtual physical bodies, the type of the state of the chased target changed by the virtual physical bodies being related to the types of the virtual physical bodies; the virtual physical

bodies among the plurality of virtual physical bodies are dispersed at different positions in the virtual scene, a difficulty at which each virtual entity satisfies the activation condition being related to a position of the virtual entity, and a variation applied by the virtual entity to the state of the chased target being in positive correlation to the difficulty at which the virtual entity satisfies the activation condition; the plurality of virtual physical bodies include at least two virtual physical bodies having different effective durations; and the plurality of virtual physical bodies are periodically displayed in the virtual scene.

[00198] In some embodiments, the apparatus further includes a fourth processing module configured to: control, in response to a gain condition being satisfied, the first virtual object to obtain a gain of the target type, the gain condition including at least one of the following: a quantity of activated virtual physical bodies reaches a first quantity threshold, a quantity of virtual objects that are caught reaches a second quantity threshold, and a variation of a state of a virtual object that is caught exceeds a variation threshold; and the target type including at least one of the following: a movement speed of the first virtual object with the assistance of the virtual vehicle, the movement range of the first virtual object carrying the virtual vehicle, the variation for the state of the virtual object that is caught, and attack power of the virtual vehicle.

[00199] In some embodiments, the movement control module is further configured to: control, in response to at least two target virtual physical bodies being provided, the at least two target virtual physical bodies to chase the same second virtual object. The second processing module is further configured to: release, in response to each target virtual entity simultaneously catching the second virtual object, a combined skill to the second virtual object, and change the state of the second virtual object by using the combined skill, the combined skill including a virtual skill belonging to each target virtual entity, and the combined skill being determined in the following manner: combining the virtual skill of each target virtual entity; combining a representative skill of each target virtual entity; and invoking, based on features of a plurality of candidate combined skills of the at least two target virtual physical bodies, the machine learning model to calculate and obtain use probabilities of the candidate combined skills, and selecting a candidate combined skill having a maximum use probability. The machine learning model is trained in the following manner: invoking the machine learning model for prediction based on features of a plurality of combined skill samples, to obtain a probability of each combined skill sample; and performing back propagation based on a difference between the probability of each combined skill sample and an actual selection result label, to update a parameter of the machine learning model.

[00200] An embodiment of the present disclosure provides a computer program product. The computer program product includes a computer program or a computer-executable instruction. The computer program or computer-executable instruction is stored in a computer-readable storage medium. A processor of an electronic device reads the computer-executable instruction from the computer-readable storage medium, and the processor executes the computer-executable instruction, to cause the electronic device to perform the foregoing interaction processing method for a virtual scene according to the embodiments of the present disclosure.

[00201] An embodiment of the present disclosure provides a computer-readable storage medium having a computer-executable instruction or a computer program stored therein. The computer-executable instruction or the computer program, when executed by a processor, causes the processor to perform an interaction processing method for a virtual scene according to the embodiments of the present disclosure, for example, the interaction processing method for a virtual scene shown in FIG. 3.

[00202] In some embodiments, the computer-readable storage medium may be a memory such as a ferroelectric random access memory (FRAM), a ROM, a programmable read-only memory (PROM), an erasable programmable read-only memory (EPROM), an electrically erasable programmable read-only memory (EEPROM), a flash memory, a magnetic surface memory, an optical disk, or a CD-ROM. The computer-readable storage medium may include one or any combination of the aforementioned memories.

[00203] In some embodiments, the computer-executable instructions may be written in the form of program, software, software module, script, or code in any form of programming language (including compilation or interpretation language, or declarative or procedural language), and the computer executable instructions may be deployed in any form, including being deployed as an independent program or being deployed as a module, component, subroutine, or another unit suitable for use in a computing environment.

[00204] In an example, the computer-executable instructions may but do not necessarily correspond to a file in a file system, and may be stored as a part of a file that saves other programs or data, for example, stored in one or more scripts in a Hypertext Markup Language (HTML) document, stored in a single file dedicated to a discussed program, or stored in a plurality of collaborative files (for example, files that store one or more modules, subprograms, or code parts).

[00205] In an example, the computer-executable instructions may be deployed to be executed on one electronic device, on a plurality of electronic devices located at one site, or on a plurality of electronic devices distributed at a plurality of locations and connected by a communication network.

[00206] By the embodiments of the present disclosure, a player controls the first virtual object to move with the assistance of the virtual vehicle. In the movement process of the first virtual object, the target virtual entity can be activated when the target virtual entity within the movement range of the first virtual object satisfies the activation condition, and the target virtual entity can be controlled to chase the second virtual object. When the target virtual entity catches the second virtual object, the target virtual entity is controlled to release the virtual skill to the second virtual object and change the state of the second virtual object. In this way, in a case that the first virtual object cannot activate the target virtual entity because the first virtual object does not carry the virtual vehicle (if the target virtual entity is located at a relatively high position that cannot be touched by the first virtual object), since the movement range of the first virtual object carrying the virtual vehicle is larger than the movement range of the first virtual object not carrying the virtual vehicle, a possibility that the target virtual entity exists within the movement range of the first virtual object is expanded, thereby increasing a probability that the target virtual entity is activated. In addition, after the target virtual entity is activated, since the target virtual entity can chase the second virtual object in the virtual scene, and release the virtual skill to the second virtual object to change the state of the second virtual object, an interaction manner between the target virtual entity and the second virtual object is provided, thereby enriching diversity and interestingness of interaction in the virtual scene, and helping enhance a retention rate of a product in the virtual scene by a player.

[00207] The foregoing descriptions are merely embodiments of the present disclosure and are not intended to limit the protection scope of the present disclosure. Any modification, equivalent replacement, or improvement made within the spirit and scope of the present disclosure fall within the protection scope of the present disclosure.

CLAIMS

1. An interaction processing method for a virtual scene, the method being performed by an electronic device, and the method comprising:

displaying, on an interface of the virtual scene, a first virtual object carrying a virtual vehicle;

controlling, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle, a movement range of the first virtual object carrying the virtual vehicle being larger than a movement range of the first virtual object not carrying the virtual vehicle;

activating, in response to a target virtual entity that is within the movement range of the first virtual object satisfying an activation condition, the target virtual entity in a movement process of the first virtual object, and controlling the target virtual entity to chase a second virtual object; and

controlling, in response to the target virtual entity catching the second virtual object, the target virtual entity to release a virtual skill to the second virtual object and change a state of the second virtual object.

2. The method according to claim 1, wherein the activation condition comprises any one of the following:

a distance between the target virtual entity and the first virtual object is less than a first distance threshold;

a touch operation performed by the first virtual object on the target virtual entity is received;

a first placement operation for a target item combination is received, the target item combination being obtained by combining a plurality of virtual items in a preset combining manner and being configured for activating the target virtual entity;

a second placement operation for a virtual activation prop is received, the second placement operation instructing the virtual activation prop to be placed at an associated position of the target virtual entity;

a third placement operation for a virtual activation trigger is received, the third placement operation instructing a virtual activation item to be placed at the virtual activation trigger, or instructing the virtual activation trigger to be placed at the associated position of the target virtual entity; and

a connection operation for a virtual connected item is received, the connection operation instructing the virtual connected item to be connected to the target virtual entity.

3. The method according to any one of claims 1 to 2, wherein the controlling, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle comprises:

controlling, in response to the movement control operation and when a jumping condition is satisfied, the first virtual object to leave the virtual vehicle with the assistance of the virtual vehicle and perform a jumping action along a preset jumping trajectory; and

controlling, in response to completion of the jumping action, the first virtual object to descend to the virtual vehicle and continue to move with the virtual vehicle,

the jumping condition comprising any one of the following: a trigger operation for a jumping control is received; the first virtual object moves to a target region upon touching a ground; and a matching degree between the target region and the jumping action exceeds a matching degree threshold.

4. The method according to any one of claims 1 to 3, wherein the method further comprises:

controlling, in a process in which the first virtual object performs the jumping action, the virtual vehicle to move with a preset action, and controlling, when the first virtual object lands, the virtual vehicle to move to a target position,

wherein a distance between the target position and a landing position of the first virtual object is less than a second distance threshold, and the second distance threshold is a maximum distance for controlling the first virtual object to smoothly return from the landing position to the virtual vehicle located at the target position.

5. The method according to any one of claims 1 to 4, wherein the controlling the target virtual entity to chase a second virtual object comprises:

controlling, in response to at least two target virtual physical bodies being provided, the at least two target virtual physical bodies to chase the same second virtual object; and

the controlling, in response to the target virtual entity catching the second virtual object, the target virtual entity to release a virtual skill to the second virtual object and change a state of the second virtual object comprises:

controlling, in response to the target virtual physical bodies catching the second virtual object, the target virtual physical bodies to release corresponding virtual skills to the second virtual object and change a target type of the state of the second virtual object, the target type corresponding to the virtual skills released by the target virtual physical bodies,

wherein in a case that the virtual skills released by the target virtual physical bodies are configured for changing the same type of the state of the second virtual object, a total variation applied by the at least two target virtual physical bodies to the target type of the state of the second virtual object is the same as a sum of component variations applied by the target virtual physical bodies to the target type of the state of the second virtual object, or the total variation is greater than the sum of the component variations.

6. The method according to any one of claims 1 to 6, wherein the controlling the target virtual entity to chase a second virtual object comprises:

determining, in response to at least two second virtual objects being provided, matching degrees between the target virtual entity and the second virtual objects; and

controlling the target virtual entity to chase a second virtual object with a highest matching degree.

7. The method according to claim 7, wherein the determining matching degrees between the target virtual entity and the second virtual objects comprises:

obtaining a parameter feature configured for affecting the matching degree between the target virtual entity and each second virtual object, the parameter feature comprising a first feature of the target virtual entity and a second feature of the second virtual object, the first feature comprising at least one of the following: a position, a chasing speed, a possessed virtual skill, and a variation of a state of a chased target, and the second feature comprising at least one of the following: a position, a movement speed, and a state value; and

performing prediction through a machine learning model based on the parameter feature to obtain the matching degree between the target virtual entity and the second virtual object, the machine learning model being obtained by training based on a parameter feature of a training sample and a matching degree annotated by the training sample, and the parameter feature comprising a feature of a sample virtual entity and a feature of a sample virtual object.

8. The method according to any one of claims 1 to 8, wherein the controlling the target virtual entity to chase a second virtual object comprises:

controlling, in response to at least two second virtual objects being provided, the second virtual objects to be in selectable states; and

controlling, in response to a selection operation, the target virtual entity to chase a selected second virtual object.

9. The method according to any one of claims 1 to 9, wherein the controlling the target virtual entity to chase a second virtual object comprises:

controlling, in response to at least two target virtual physical bodies and at least two second virtual objects being provided, a first part of virtual entity among the at least two target virtual physical bodies to chase a first part of virtual object among the at least two second virtual objects, and

controlling a second part of virtual entity among the at least two target virtual physical bodies to chase a second part of virtual object among the at least two second virtual objects,

a matching degree between the first part of virtual entity and the first part of virtual object being greater than a first matching degree threshold, and a matching degree between the second part of virtual entity and the second part of virtual object being greater than a second matching degree threshold.

10. The method according to any one of claims 1 to 10, wherein the controlling the target virtual entity to chase a second virtual object comprises:

controlling the target virtual entity to move towards a position of the second virtual object; and

controlling, in a case that an obstacle exists between the target virtual entity and the second virtual object, the target virtual entity to change a movement direction to go around the obstacle and continue to move towards the position of the second virtual object after the target virtual entity goes around the obstacle.

11. The method according to any one of claims 1 to 11, wherein before the controlling the target virtual entity to release a virtual skill to the second virtual object, the method further comprises at least one of the following:

determining, in response to collision occurring between the target virtual entity and the second virtual object, that the target virtual entity catches the second virtual object; and

determining, in response to a distance between the target virtual entity and the second virtual object being less than a third distance threshold, that the target virtual entity catches the second virtual object.

12. The method according to any one of claims 1 to 12, wherein the changing a state of the second virtual object comprises:

changing the state of the second virtual object in response to the second virtual object being in an opposing relationship with the first virtual object, the state after change being worse than the

state before change; and

changing the state of the second virtual object in response to the second virtual object being in an allied relationship with the first virtual object, the state after change being better than the state before change.

13. The method according to any one of claims 1 to 13, wherein the method further comprises:

in a process in which the target virtual entity releases the virtual skill to the second virtual object, in response to a third virtual object existing within an effective action range of the virtual skill, controlling the virtual skill released by the target virtual entity to act on the third virtual object and change a state of the third virtual object.

14. The method according to any one of claims 1 to 13, wherein after the changing a state of the second virtual object, the method further comprises:

controlling, in response to a variation of the state of the second virtual object exceeding a variation threshold, the target virtual entity to be broken up into at least one new virtual entity,

a variation applied by the new virtual entity to the state of the chased target not exceeding a variation applied by the target virtual entity to the state of the same chased target.

15. The method according to any one of claims 1 to 14, wherein before the activating the target virtual entity, the method further comprises:

displaying a plurality of virtual physical bodies in the virtual scene, the target virtual entity being at least one of the plurality of virtual physical bodies, and the plurality of virtual physical bodies satisfying any one of the following:

the plurality of virtual physical bodies comprise at least two virtual physical bodies with different sizes, variations applied by the virtual physical bodies to the state of the chased target being in positive correlation to the sizes of the virtual physical bodies;

the plurality of virtual physical bodies comprise at least two different types of virtual physical bodies, the type of the state of the chased target changed by the virtual physical bodies being related to the types of the virtual physical bodies;

the virtual physical bodies among the plurality of virtual physical bodies are dispersed at different positions in the virtual scene, a difficulty at which each virtual entity satisfies the activation condition being related to a position of the virtual entity, and a variation applied by the virtual entity to the state of the chased target being in positive correlation to the difficulty at which the virtual entity satisfies the activation condition;

the plurality of virtual physical bodies comprise at least two virtual physical bodies having different effective durations; and

the plurality of virtual physical bodies are periodically displayed in the virtual scene.

16. The method according to any one of claims 1 to 15, wherein the method further comprises:

controlling, in response to a gain condition being satisfied, the first virtual object to obtain a gain of the target type,

the gain condition comprising at least one of the following: a quantity of activated virtual physical bodies reaches a first quantity threshold, a quantity of virtual objects that are caught reaches a second quantity threshold, and a variation of a state of a virtual object that is caught exceeds a variation threshold; and

the target type comprising at least one of the following: a movement speed of the first virtual object with the assistance of the virtual vehicle, the movement range of the first virtual object carrying the virtual vehicle, the variation for the state of the virtual object that is caught, and attack power of the virtual vehicle.

17. The method according to any one of claims 1 to 15, wherein the controlling the target virtual entity to chase a second virtual object comprises:

controlling, in response to at least two target virtual physical bodies being provided, the at least two target virtual physical bodies to chase the same second virtual object; and

the controlling, in response to the target virtual entity catching the second virtual object, the target virtual entity to release a virtual skill to the second virtual object and change a state of the second virtual object comprises:

releasing, in response to each target virtual entity simultaneously catching the second virtual object, a combined skill to the second virtual object, and changing the state of the second virtual object by using the combined skill,

the combined skill comprising a virtual skill belonging to each target virtual entity, and the combined skill being determined in the following manner:

combining the virtual skill of each target virtual entity;

combining a representative skill of each target virtual entity; and

invoking, based on features of a plurality of candidate combined skills of the at least two target virtual physical bodies, the machine learning model to calculate and obtain use probabilities of the

candidate combined skills, and selecting a candidate combined skill having a maximum use probability; and the machine learning model is trained in the following manner: invoking the machine learning model for prediction based on features of a plurality of combined skill samples, to obtain a probability of each combined skill sample; and performing back propagation based on a difference between the probability of each combined skill sample and an actual selection result label, to update a parameter of the machine learning model.

18. An interaction processing apparatus for a virtual scene, the apparatus comprising:

an object display module configured to display, on an interface of a virtual scene, a first virtual object carrying a virtual vehicle;

a movement control module configured to control, in response to a movement control operation, the first virtual object to move with assistance of the virtual vehicle, a movement range of the first virtual object carrying the virtual vehicle being larger than a movement range of the first virtual object not carrying the virtual vehicle;

a first processing module configured to: activate, in response to a target virtual entity that is within the movement range of the first virtual object satisfying an activation condition, the target virtual entity in a movement process of the first virtual object, and control the target virtual entity to chase a second virtual object; and

a second processing module configured to: control, in response to the target virtual entity catching the second virtual object, the target virtual entity to release a virtual skill to the second virtual object and change a state of the second virtual object.

19. An electronic device, comprising:

a memory configured to store a computer-executable instruction or a computer program; and

a processor configured to implement, when executing the computer-executable instruction or the computer program stored in the memory, the interaction processing method for a virtual scene according to any one of claims 1 to 17.

20. A computer-readable storage medium, having a computer-executable instruction or a computer program stored therein, the computer-executable instruction or the computer program, when executed by a processor, implementing the interaction processing method for a virtual scene according to any one of claims 1 to 17.

21. A computer program product, comprising a computer program or a computer-executable instruction, the computer program or the computer-executable instruction, when executed by a

processor, implementing the interaction processing method for a virtual scene according to any one of claims 1 to 17.