

LIVE STREAMING PICTURE DATA PROCESSING METHOD AND APPARATUS, DEVICE, STORAGE MEDIUM, AND PROGRAM

RELATED APPLICATION

[0001] This application claims priority to Chinese Patent Application No. 202210486106.1, filed on May 6, 2022 and entitled "LIVE STREAMING PICTURE DISPLAY METHOD AND APPARATUS, DEVICE, STORAGE MEDIUM, AND PROGRAM PRODUCT", which is incorporated herein by reference in its entirety.

FIELD OF THE TECHNOLOGY

[0002] This application relates to the field of virtual scene technologies, and in particular, to a live streaming picture data processing method and apparatus, a device, a storage medium, and a program.

BACKGROUND OF THE DISCLOSURE

[0003] With continuous development of game technologies, during a multiplayer online game, a user may watch game live streaming pictures of other players.

[0004] In the related art, when a live streaming application or a game application provides a game live streaming service, a plurality of different game perspectives may usually be provided for the user to select. Correspondingly, after the user manually selects a perspective, the live streaming application or the game application switches to the perspective selected by the user to display a live streaming picture.

SUMMARY

[0005] Embodiments of this application provide a live streaming picture data processing method and apparatus, a device, a storage medium, and a program, which can reduce operations by a user when watching live streaming pictures from different perspectives, improve human-computer interaction efficiency, and reduce running load of a server. The technical solutions are as follows:

[0006] According to one aspect, an embodiment of this application provides a live streaming picture data processing method, performed by a computer device, the method including:

[0007] displaying a live streaming interface of a virtual scene, the virtual scene corresponding to live streaming pictures from n perspectives; and n being greater than or equal to 2, and n being an integer;

[0008] obtaining live streaming picture data of a first perspective, and displaying a live streaming picture from the first perspective and a split-screen control in the live streaming interface based on the live streaming picture data of the first perspective, the first perspective being one of the n perspectives; and

[0009] obtaining live streaming picture data of m perspectives of the n perspectives in response to receiving a trigger operation on the split-screen control, and performing split-screen display on live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives, $2 \leq m \leq n$, and m being an integer.

[0010] According to another aspect, an embodiment of this application provides a live streaming picture data processing apparatus, the apparatus including:

[0011] a live streaming interface display module, configured to display a live streaming interface of a virtual scene, the virtual scene corresponding to live streaming pictures from n perspectives; and n being greater than or equal to 2, and n being an integer;

[0012] a picture display module, configured to obtain live streaming picture data of a first perspective, and display a live streaming picture from the first perspective and a split-screen control in the live streaming interface based on the live streaming picture data of the first perspective, the first perspective being one of the n perspectives; and

[0013] a split-screen display module, configured to obtain live streaming picture data of m perspectives of the n perspectives in response to receiving a trigger operation on the split-screen control, and perform split-screen display on live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives, $2 \leq m \leq n$, and m being an integer.

[0014] According to another aspect, an embodiment of this application provides a computer device, including a processor and a memory, the memory having at least one computer instruction stored therein, and the at least one computer instruction being loaded and executed by the processor, to enable the computer device to implement the live streaming picture data processing method according to the foregoing aspect.

[0015] According to another aspect, an embodiment of this application provides a non-volatile computer-readable storage medium, having at least one computer instruction stored

therein, and the at least one computer instruction being loaded and executed by a processor, to enable a computer device to implement the live streaming picture data processing method according to the foregoing aspect.

[0016] According to another aspect, a computer program product or a computer program is provided, including computer instructions, and the computer instructions being stored in a non-volatile computer-readable storage medium. A processor of a computer device reads the computer instructions from the non-volatile computer-readable storage medium, and the processor executes the computer instructions, to enable the computer device to perform the live streaming picture data processing method provided in various optional implementations of the foregoing aspect.

[0017] For a virtual scene that supports live streaming pictures from a plurality of perspectives, when a terminal displays a live streaming picture from one of the plurality of perspectives in a live streaming interface based on obtained live streaming picture data of the perspective, a user may trigger a split-screen control in the live streaming interface, so that the terminal obtains live streaming picture data of two or more perspectives, and simultaneously displays live streaming pictures from the two or more perspectives in a split-screen manner in the live streaming interface, which can reduce user operations, improve data processing efficiency, and simplify the user operation when the user simultaneously focuses on the plurality of perspectives, thereby improving human-computer interaction efficiency and reducing running load of a server.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 is a schematic diagram of an implementation environment according to an exemplary embodiment of this application.

[0019] FIG. 2 is a flowchart of a live streaming picture display method according to an exemplary embodiment of this application.

[0020] FIG. 3 is a flowchart of a live streaming picture display method according to an exemplary embodiment of this application.

[0021] FIG. 4 is a schematic diagram of a split-screen effect according to an exemplary embodiment of this application.

[0022] FIG. 5 to FIG. 10 are diagrams of interface display effects of a live streaming split-screen interface according to an exemplary embodiment of this application.

[0023] FIG. 11 is a schematic diagram of split-screen logic according to an exemplary embodiment of this application.

[0024] FIG. 12 is a schematic diagram of size adjustment according to an exemplary embodiment of this application.

[0025] FIG. 13 is a flowchart of front-end logic according to an exemplary embodiment of this application.

[0026] FIG. 14 is a flowchart of back-end logic according to an exemplary embodiment of this application.

[0027] FIG. 15 is a block diagram of a live streaming picture display apparatus according to an exemplary embodiment of this application.

[0028] FIG. 16 is a block diagram of a structure of a computer device according to an exemplary embodiment of this application.

DESCRIPTION OF EMBODIMENTS

[0029] Exemplary embodiments are described in detail herein, and the embodiments are illustratively shown in the accompanying drawings. When the following descriptions relate to the accompanying drawings, unless otherwise indicated, same numbers in different accompanying drawings represent same or similar elements. The implementations described in the following exemplary embodiments do not represent all implementations consistent with this application. On the contrary, the implementations are merely examples of apparatuses and methods that are described in detail in the appended claims and that are consistent with some aspects of this application.

[0030] "Multiple" described in this specification means one or more, and "plurality of" means two or more. "And/or" describes an association relationship of associated objects, indicating that three relationships may exist. For example, A and/or B may represent the following three cases: Only A exists, both A and B exist, and only B exists. The character "/" generally indicates an "or" relationship between the associated objects.

[0031] The following explains terms involved in this application.

[0032] 1) Virtual scene

[0033] A virtual scene is a virtual scene displayed (or provided) when an application runs on a terminal. The virtual scene may be a simulated environment scene of a real world, a semi-simulated semi-fictional three-dimensional environment scene, or a purely fictional

three-dimensional environment scene. The virtual scene may be any one of a two-dimensional virtual scene, a 2.5-dimensional virtual scene, and a three-dimensional virtual scene. The following embodiment uses an example in which the virtual scene is the three-dimensional virtual scene for description, but is not limited thereto. In some embodiments, the virtual scene may be further configured for a virtual scene battle between at least two virtual characters. In some embodiments, the virtual scene may be further configured for performing a battle between at least two virtual characters by using virtual items. In some embodiments, the virtual scene may be further configured for performing a battle between at least two virtual characters by using the virtual items in a target area range, where the target area range continuously decreases with time in the virtual scene.

[0034] The virtual scene is usually generated by an application in a computer device such as a terminal or a server, and is displayed based on hardware (for example, a screen) in the terminal. The computer device may be a mobile terminal such as a smartphone, a tablet computer, or an e-book reader; or the computer device may be a notebook computer or a personal computer device of a fixed computer; or the computer device may be a cloud server.

[0035] 2) Virtual object

[0036] A virtual object is a movable object in a virtual scene. The movable object may be at least one of a virtual character, a virtual animal, or a virtual vehicle. In some embodiments, when the virtual scene is the three-dimensional virtual scene, the virtual object is a three-dimensional model created based on an animation skeleton technology. Each virtual object has a shape, a volume, and an orientation in the three-dimensional virtual scene, and occupies a part of space in the three-dimensional virtual scene.

[0037] FIG. 1 is a block diagram of a structure of a computer system 100 according to an exemplary embodiment of this application. The computer system 100 includes: a first terminal 110, a server cluster 120, a second terminal 130, and a third terminal 140.

[0038] A client 111 supporting a virtual scene is installed and run on the first terminal 110, and the client 111 may be a multiplayer online battle program. When the first terminal 110 runs the client 111, a user interface of the client 111 is displayed on a screen of the first terminal 110. The client may be any one of a game client of a multiplayer online battle arena (MOBA) game, a shooting game, or the like. In this embodiment, an example in which the client is of the MOBA game is used for description. The first terminal 110 is a terminal used by a first user 101, and the first user 101 uses the first terminal 110 to control a first virtual object located in the virtual scene to move, where the first virtual object may be referred to as a master virtual object of the first user 101. Activities of the first virtual object include, but are not limited to, at least one of adjusting

body posture, crawling, walking, running, riding, flying, jumping, driving, picking, shooting, attacking, and throwing. For example, the first virtual object is a first virtual character, such as a simulated character role or an animated character role.

[0039] A client 131 supporting the virtual scene is installed and run on the second terminal 130, and the client 131 may be a multiplayer online battle program. When the second terminal 130 runs the client 131, a user interface of the client 131 is displayed on a screen of the second terminal 130. The client may be of any one of a MOBA game, a shooting game, or a simulation game (SLG, a strategy game). In this embodiment, an example in which the client is of the MOBA game is used for description. The second terminal 130 is a terminal used by a second user 102, and the second user 102 uses the second terminal 130 to control a second virtual object located in the virtual scene to move, where the second virtual object may be referred to as a master virtual object of the second user 102. For example, the second virtual object is a second virtual character, such as a simulated character role or an animated character role.

[0040] In some embodiments, the first virtual character and the second virtual character are in a same virtual scene. In some embodiments, the first virtual character and the second virtual character may belong to a same camp, a same team, or a same organization, and may have a friend relationship or a temporary communication permission. In some embodiments, the first virtual character and the second virtual character may belong to different camps, different teams, or different organizations, or may have a hostile relationship.

[0041] In some embodiments, clients installed on the first terminal 110 and the second terminal 130 are the same, or the clients installed on the first terminal 110 and the second terminal 130 are a same type of clients on different operating system platforms. The first terminal 110 may generally refer to one of a plurality of terminals, and the second terminal 130 may generally refer to another one of the plurality of terminals. In this embodiment, only the first terminal 110 and the second terminal 130 are used as examples for description. Device types of the first terminal 110 and the second terminal 130 are the same or different, and the device type includes at least one of a smartphone, a tablet computer, an e-book reader, a media player 1 (MP1), a media player 3 (MP3), a media player 4 (MP4), a laptop portable computer, or a desktop computer.

[0042] A client supporting a live streaming picture playing function is installed and run on a viewer terminal 140 (namely, the foregoing third terminal 140). Live streaming pictures of the virtual scene corresponding to the first terminal 110 and the second terminal 130 may be propagated to the viewer terminal 140 through the server cluster 120 for playing and displaying.

[0043] Only two terminals are shown in FIG. 1, but in different embodiments, there are a plurality of other terminals that may access the server cluster 120. In some embodiments, there are one or more terminals corresponding to a developer. A development and editing platform of the client of the virtual scene is installed on the terminal corresponding to the developer. The developer may edit and update the client on the terminal, and transmit an updated client installation package to the server cluster 120 through a wired network or a wireless network. The first terminal 110 and the second terminal 130 may download the client installation package from the server cluster 120 to update the clients.

[0044] The first terminal 110, the second terminal 130, and the third terminal 140 are connected to the server cluster 120 through the wireless network or the wired network.

[0045] The server cluster 120 includes at least one of a server, a plurality of servers, a cloud computing platform, and a virtualization center. The server 120 is configured to provide a back-end service for a client supporting a three-dimensional virtual scene. In some embodiments, the server cluster 120 undertakes primary computing work, and the terminal undertakes secondary computing work; or the server cluster 120 undertakes the secondary computing work, and the terminal undertakes the primary computing work; or the server cluster 120 and the terminal perform collaborative computing by using a distributed computing architecture.

[0046] In an illustrative example, the server cluster 120 includes a server 121 and a server 126, and the server 121 includes a processor 122, a user account database 123, a battle service module 124, and a user-oriented input/output interface (I/O interface) 125. The processor 122 is configured to: load instructions stored in the server 121, and process data in the user account database 123 and the battle service module 124; the user account database 121 is configured to store data of user accounts used by the first terminal 110, the second terminal 130, and the viewer terminal 140, such as an avatar of the user account, a nickname of the user account, a combat effectiveness index of the user account, and a service area in which the user account is located; the battle service module 124 is configured to provide a plurality of battle rooms for users to battle, such as 1V1 battle, 3V3 battle, and 5V5 battle; and the user-oriented I/O interface 125 is configured to establish communication and exchange data with the first terminal 110 and/or the second terminal 130 through the wireless network or the wired network. In some embodiments, the server 126 is internally provided with an intelligent signal module 127, and the intelligent signal module 127 may be configured to transmit live streaming pictures of game scenes corresponding to the first terminal 110 and the second terminal 130 to the viewer terminal 140 in a specific signal mode for

displaying and playing, where the signal mode of the live streaming picture may be intelligently determined by the intelligent signal module 127.

[0047] In the related art, when a live streaming application or a game application provides a game live streaming service, a plurality of different game perspectives may usually be provided for the user to select. Correspondingly, after the user manually selects a perspective, the live streaming application or the game application switches to the perspective selected by the user to display a live streaming picture.

[0048] However, in the foregoing solution, the user can only focus on the live streaming picture from the selected perspective at a time. When the user expects to focus on live streaming pictures from a plurality of perspectives, the user needs to switch between the plurality of perspectives, resulting in a cumbersome user operation, and affecting human-computer interaction efficiency when the user watches live streaming pictures from different perspectives. The server needs to continuously provide the live streaming pictures from different perspectives based on the user operation. As a result, running load of the server is large.

[0049] FIG. 2 is a flowchart of a live streaming picture display method (also referred to as a live streaming picture data processing method) according to an exemplary embodiment of this application. The live streaming picture display method may be performed by a computer device, and the computer device may be a terminal. For example, the terminal may be the viewer terminal 140 in the foregoing system shown in FIG. 1. As shown in FIG. 2, the live streaming picture display method includes the following operations:

[0050] Operation 201: Display a live streaming interface of a virtual scene, the virtual scene corresponding to live streaming pictures from n perspectives; and n being greater than or equal to 2, and n being an integer.

[0051] In this embodiment of this application, the live streaming interface may be a live streaming interface of a live streaming channel or an online live streaming room, and the live streaming channel or the online live streaming room simultaneously corresponds to live streaming pictures from a plurality of perspectives. The live streaming pictures from the plurality of perspectives are the live streaming pictures from the n perspectives, or the live streaming pictures from the n perspectives are the live streaming pictures from the plurality of perspectives, and are live streaming pictures from at least two perspectives.

[0052] In other words, the live streaming pictures from the n perspectives may be live streaming pictures provided by a single live streaming channel or a single online live streaming

room. Each terminal accessing the live streaming channel or the online live streaming room may separately play live streaming pictures from different perspectives at the same time.

[0053] Operation 202: Display a live streaming picture from a first perspective and a split-screen control in the live streaming interface, the first perspective being one of the n perspectives.

[0054] In this embodiment of this application, when a live streaming picture from a single perspective is displayed in the live streaming interface, the split-screen control may further be displayed in the live streaming interface, to trigger performing split-screen display on the live streaming pictures from the plurality of perspectives. The live streaming picture from the single perspective is the live streaming picture from the first perspective. In this embodiment of this application, live streaming picture data of the first perspective may be obtained, so that the live streaming picture from the first perspective and the split-screen control are displayed in the live streaming interface based on the live streaming picture data of the first perspective.

[0055] For example, split-screen display means: splitting a screen of the computer device into a plurality of view areas, each view area displaying a live streaming picture from at least one perspective, so that a user using the computer device can simultaneously watch live streaming pictures from perspectives displayed in the plurality of view areas. For example, each view area displays a live streaming picture from one perspective; for another example, each view area displays live streaming pictures from at least two perspectives; and for still another example, a part of the view area displays a live streaming picture from one perspective and another part of the view area displays live streaming pictures from at least two perspectives. This is not limited in this embodiment of this application. The splitting the screen of the computer device may mean splitting a live streaming interface displayed on the screen of the computer device.

[0056] Operation 203: In response to receiving a trigger operation on the split-screen control, perform split-screen display on live streaming pictures from m perspectives of the n perspectives in the live streaming interface, $2 \leq m \leq n$, and m being an integer.

[0057] In this embodiment of this application, when the live streaming picture from the single perspective is displayed in the live streaming interface, and the trigger operation on the split-screen control by the user is received, the terminal may perform split-screen display on the live streaming pictures from the plurality of perspectives in the live streaming interface. The live streaming pictures from the plurality of perspectives performed split-screen on are the live streaming pictures from the m perspectives, or the live streaming pictures from the m perspectives are the live streaming pictures from the plurality of perspectives, and are the live streaming pictures

from the at least two perspectives. When $m=n$, the live streaming pictures from the m perspectives are the live streaming pictures from the n perspectives, or the live streaming pictures from the m perspectives are live streaming pictures from all perspectives in the live streaming pictures from the n perspectives. When $m<n$, the live streaming pictures from the m perspectives are live streaming pictures from a part of perspectives in the live streaming pictures from the n perspectives. In this embodiment of this application, in response to receiving the trigger operation on the split-screen control, live streaming picture data of the m perspectives of the n perspectives may be obtained, and split-screen display is performed on the live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

[0058] Based on a definition of split-screen display in the foregoing operation 202, the performing split-screen display on the live streaming pictures from the m perspectives of the n perspectives in the live streaming interface includes: splitting the live streaming interface into a plurality of view areas, each view area displaying a live streaming picture from at least one perspective in the live streaming pictures from the m perspectives, and the plurality of view areas displaying the live streaming pictures from the m perspectives in total. For example, when each view area displays a live streaming picture from one perspective, a value of m is the same as a quantity of the view areas, and the live streaming interface is split into m view areas. Each view area displays a live streaming picture from one perspective in the live streaming pictures from the m perspectives, and different view areas display live streaming pictures from different perspectives, to implement display of the live streaming pictures from the m perspectives in total in the m view areas. For another example, when at least one view area of the plurality of view areas displays live streaming pictures from at least two perspectives, the value of m is greater than the quantity of view areas. Further examples are not described herein.

[0059] Through the foregoing solution, when the user watches live streaming of the virtual scene, and simultaneously focuses on live streaming pictures from two or more perspectives, the terminal can simultaneously display the live streaming pictures from the two or more perspectives on which the user focuses in the live streaming interface, and the user does not need to switch between the plurality of perspectives on which the user focuses. Instead, the user only needs to perform the trigger operation on the split-screen control, thereby greatly reducing switching operations by the user on the live streaming perspective, simplifying a quantity and types of operations required to be performed by the user during human-computer interaction, and improving human-computer interaction efficiency.

[0060] A server only needs to continuously provide the live streaming pictures from the two or more perspectives to the terminal, and does not need to continuously switch a perspective of a live streaming picture provided to the terminal based on the switching operation by the user. In other words, the live streaming picture provided to the terminal does not need to be switched between the live streaming pictures from the different perspective, thereby reducing running load of the server. Correspondingly, after obtaining the live streaming picture data of the first perspective, the computer device (for example, the terminal) continues to obtain the live streaming picture data of the m perspectives, and does not need to continuously obtain live streaming picture data of the different perspectives, so that efficiency of processing the live streaming picture data by the computer device is high, and overheads are small.

[0061] In summary, in the solution shown in the embodiments of this application, for a virtual scene that supports live streaming pictures from a plurality of perspectives, when a terminal displays a live streaming picture from one of the plurality of perspective in a live streaming interface, a user may trigger a split-screen control in the live streaming interface, to enable the terminal to simultaneously display live streaming pictures from two or more perspectives in a split-screen manner in the live streaming interface, which meets a requirement of the user to simultaneously focus on the plurality of perspectives, and can reduce user operations, improve data processing efficiency, and simplify the operation of the user, thereby improving human-computer interaction efficiency and reducing running load of a server to provide the live streaming pictures.

[0062] FIG. 3 is a flowchart of a live streaming picture display method (also referred to as a live streaming picture data processing method) according to an exemplary embodiment of this application. The live streaming picture display method may be performed by a computer device, and the computer device may be a terminal. For example, the terminal may be the viewer terminal 140 in the foregoing system shown in FIG. 1. As shown in FIG. 3, the live streaming picture display method includes the following operations:

[0063] Operation 301: Display a live streaming interface of a virtual scene, the virtual scene corresponding to live streaming pictures from n perspectives; and n being greater than or equal to 2, and n being an integer.

[0064] In this embodiment of this application, when a user enables a live streaming application of the virtual scene through the terminal, the user may tap a live streaming channel/live streaming room of the virtual scene, to display a live streaming interface of the virtual scene through the live streaming application.

[0065] The live streaming application may be a live streaming type application (for example, a live streaming platform application), or the live streaming application may be a virtual scene type application (for example, a game application) that supports a live streaming function.

[0066] Operation 302: Display a live streaming picture from a first perspective and a split-screen control in the live streaming interface, the first perspective being one of the n perspectives.

[0067] In this embodiment of this application, live streaming picture data of the first perspective may be obtained, and the live streaming picture from the first perspective and the split-screen control are displayed in the live streaming interface based on the live streaming picture data of the first perspective. In a possible implementation, when a live streaming picture from a single perspective is displayed in the live streaming interface, the split-screen control may further be displayed in the live streaming interface, to trigger the terminal to perform split-screen display on live streaming pictures from a plurality of perspectives through the live streaming interface.

[0068] Operation 303: In response to receiving a trigger operation on the split-screen control, perform split-screen display on live streaming pictures from m perspectives of the n perspectives in the live streaming interface, $2 \leq m \leq n$, and m being an integer.

[0069] In this embodiment of this application, in response to receiving the trigger operation on the split-screen control, live streaming picture data of the m perspectives of the n perspectives may be obtained, and split-screen display is performed on the live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

[0070] For example, FIG. 4 is a schematic diagram of a split-screen effect according to an embodiment of this application. As shown in FIG. 4, the terminal performs split-screen display on a live streaming picture 42 and a live streaming picture 43 in a live streaming interface 41, which respectively correspond to perspectives of different game players.

[0071] In this embodiment of this application, selection solutions of the m perspectives displayed after the user triggers the split-screen control may include a plurality of solutions, and some of the solutions are described below.

[0072] In a possible implementation, the terminal displays a second perspective selection interface in response to receiving the trigger operation on the split-screen control, where the second perspective selection interface includes selection controls respectively corresponding to the n perspectives; and the terminal performs split-screen display on the live streaming pictures from the

m perspectives in the live streaming interface based on a selection operation on selection controls of the m perspectives of the n perspectives. The selection controls respectively corresponding to the n perspectives are also referred to as second selection controls. In other words, the second perspective selection interface includes n second selection controls. The terminal performs split-screen display on the live streaming pictures from the m perspectives in the live streaming interface based on a selection operation on second selection controls of the m perspectives of the n perspectives. In other words, the terminal displays the second perspective selection interface in response to receiving the trigger operation on the split-screen control, where the second perspective selection interface includes the second selection controls respectively corresponding to the n perspectives; the live streaming picture data of the m perspectives of the n perspectives is obtained based on the selection operation on the second selection controls of the m perspectives of the n perspectives; and split-screen display is performed on the live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

[0073] In an exemplary solution of this embodiment of this application, after the user triggers the split-screen control, the terminal may display selection controls respectively corresponding to the n perspectives to the user through a perspective selection interface, the user may select selection controls corresponding to the m perspectives and tap to confirm, and the terminal performs split-screen display on live streaming pictures from perspectives corresponding to m selection controls selected by the user. For example, a value of n is 5, and a value of m is 2. After the user triggers the split-screen control, the terminal may display second selection controls respectively corresponding to five perspectives to the user through the perspective selection interface, and the user may select second selection controls corresponding to two of the five perspectives and tap to confirm. If the user taps to confirm second selection controls corresponding to any two perspectives, the terminal performs split-screen display on live streaming pictures from the any two perspectives.

[0074] In a possible implementation, the terminal performs split-screen display on live streaming pictures from m perspectives recently displayed in the live streaming interface of the live streaming pictures from the n perspectives in the live streaming interface in response to receiving the trigger operation on the split-screen control. In other words, in response to receiving the trigger operation on the split-screen control, the live streaming picture data of the m perspectives of the n perspectives is obtained, and split-screen display is performed on the live streaming pictures from the m perspectives recently displayed in the live streaming interface of the live streaming pictures from the n perspective in the live streaming interface based on the live streaming picture data of the m perspectives.

[0075] In an exemplary solution of this application, after the user triggers the split-screen control, the terminal may alternatively determine live streaming pictures from m perspectives on which split-screen display needs to be performed. For example, the terminal may determine the live streaming pictures from the m perspectives recently displayed in the terminal, and perform split-screen display on the recently displayed live streaming pictures from the m perspectives.

[0076] In a possible implementation, the terminal performs split-screen display on live streaming pictures from default m perspectives of the n perspectives in the live streaming interface in response to receiving the trigger operation on the split-screen control. In other words, the terminal obtains the live streaming picture data of the m perspectives of the n perspectives in response to receiving the trigger operation on the split-screen control, and split-screen display is performed on the live streaming pictures from the default m perspectives of the n perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

[0077] In an exemplary solution of this application, after the user triggers the split-screen control, the terminal may alternatively perform split-screen display on the live streaming pictures from the default m perspectives in the live streaming interface. For example, the terminal may perform split-screen display on a live streaming picture from a free perspective or a live streaming picture from a perspective corresponding to a virtual object with a specific responsibility (for example, mid lane matchup) by default.

[0078] In a possible implementation, the terminal obtains quantities of viewers for the live streaming pictures from the n perspectives in response to receiving the trigger operation on the split-screen control; arranges the n perspectives based on the quantities of viewers in descending order or in ascending order; and perform split-screen display on live streaming pictures from first m perspectives in the live streaming interface. In other words, the terminal obtains the quantities of the live streaming pictures from the n perspectives in response to receiving the trigger operation on the split-screen control; arranges the n perspectives based on the quantities of viewers in descending order or in ascending order; obtain live streaming picture data of m perspectives of the n perspectives; and perform split-screen display on the live streaming pictures from the first m perspectives in the live streaming interface based on live streaming picture data of the m perspectives.

[0079] In an exemplary solution of this application, after the user triggers the split-screen control, the terminal performs split-screen display on live streaming pictures from currently popular m perspectives based on the quantities of viewers in descending order, to be specific, split-screen

display is performed on live streaming pictures from m perspectives that currently have larger quantities of viewers, to improve a display effect of the live streaming pictures.

[0080] Alternatively, after the user triggers the split-screen control, the terminal performs split-screen display on live streaming pictures that currently have smaller quantities of viewers based on the quantities of viewers in ascending order, to balance each live streaming video stream and reduce freezing.

[0081] The live streaming interface includes m perspective switching controls, and the m perspective switching controls respectively correspond to the m perspectives.

[0082] Operation 304: In response to receiving a trigger operation on a target perspective switch control, switch a live streaming picture from a second perspective to a live streaming picture from a third perspective in the live streaming interface.

[0083] The terminal obtains live streaming picture data of the third perspective in response to receiving the trigger operation on the target perspective switching control, and switches the live streaming picture from the second perspective to the live streaming picture from the third perspective in the live streaming interface based on the live streaming picture data of the third perspective. The second perspective is any one of the m perspectives; the target perspective switching control is a perspective switching control corresponding to the second perspective in the m perspective switching controls; and the third perspective is any one of the n perspectives other than the m perspectives.

[0084] In this embodiment of this application, when split-screen display is performed, each live streaming picture on which split screen is performed may correspond to one perspective switching control, and the user may trigger a perspective switching control of a live streaming picture, to switch the live streaming picture to a live streaming picture from another perspective, thereby improving flexibility of split-screen display of the plurality of perspectives.

[0085] For example, referring to FIG. 4, a switching control 42a and a switching control 43a are respectively displayed at lower right corners of the live streaming picture 42 and the live streaming picture 43. The user may tap the switching control 42a, to switch the live streaming picture 42 to a live streaming picture from another perspective other than the live streaming picture 42 and the live streaming picture 43. In this example, the second perspective is a perspective corresponding to the live streaming picture 42, the target perspective switching control is the switching control 42a, and the third perspective is the another perspective other than the live streaming picture 42 and the live streaming picture 43.

[0086] In this embodiment of this application, the user may not need to select the third perspective. When the user needs to switch the live streaming picture from the second perspective, the user may randomly select one or more perspectives from the n perspectives other than the m perspectives as the third perspective, so that a live streaming picture displayed in the live streaming interface is switched from the live streaming picture from the second perspective to the live streaming picture from the third perspective.

[0087] Alternatively, the third perspective may be selected by the user. In a possible implementation, the terminal displays a first perspective selection interface in response to receiving the trigger operation on the target perspective switching control, where the first perspective selection interface includes $n-m$ first selection controls, and the $n-m$ first selection controls respectively correspond to $n-m$ third perspectives; and switches the live streaming picture from the second perspective to the live streaming picture from the third perspective in the live streaming interface in response to receiving a trigger operation on a target selection control, where the target selection control is any one of the $n-m$ first selection controls, and the live streaming picture from the third perspective is a live streaming picture from a third perspective corresponding to the target selection control. For example, the terminal obtains live streaming picture data of the third perspective in response to receiving the trigger operation on the target selection control, and switches the live streaming picture from the second perspective to the live streaming picture from the third perspective in the live streaming interface based on the live streaming picture data of the third perspective.

[0088] In this embodiment of this application, because the third perspective is a perspective of the n perspectives other than the m perspectives, a quantity of the third perspective is $n-m$. If each third perspective corresponds to one first selection control, the quantity of the first selection controls is also $n-m$. In a split screen case, when the user switches a live streaming picture from a perspective, the terminal may display a first selection control corresponding to an optional third perspective through a perspective selection interface, and the user selects the first selection control to select a target perspective for switching. In the $n-m$ first selection controls, the first selection control selected by the user is the target selection control. Therefore, the live streaming picture of the third perspective is a live streaming picture corresponding to the target selection control.

[0089] In a possible implementation, the terminal displays the first perspective selection interface using a thumbnail map of the virtual scene as a background in response to receiving the trigger operation on the target perspective switching control; obtains positions of the $n-m$ first selection controls in the thumbnail map; and displays the $n-m$ first selection controls in the first

perspective selection interface based on the positions of the $n-m$ first selection controls in the thumbnail map.

[0090] In this embodiment of this application, to facilitate the user to accurately select a perspective that the user expects to watch, the terminal may display the thumbnail map in the perspective selection interface, and display the first selection controls based on the position in the thumbnail map, so that the user can more intuitively find a first selection control corresponding to a perspective on which the user focuses. The position of the first selection control in the thumbnail map may be a default position, for example, a hotspot position in the thumbnail map, and the hotspot position may be specified based on an actual requirement, or may be a position at which occurrence frequency of the virtual object is higher than a frequency threshold. Alternatively, the first selection control may correspond to a virtual object, and the position of the first selection control in the thumbnail map may be determined based on the virtual object. Refer to the following descriptions for details.

[0091] In a possible implementation, for any first selection control, a position of the any first selection control in the thumbnail map is obtained based on at least one of a responsibility of a virtual object corresponding to the any first selection control in the virtual scene and a camp to which the virtual object belongs in the virtual scene. For example, the terminal obtains the position of the selection control in the thumbnail map based on the responsibility of the virtual object corresponding to the selection control in the virtual scene and the camp to which the virtual object corresponding to the selection control belongs in the virtual scene.

[0092] In this embodiment of this application, positions of virtual objects with different responsibilities and different camps in the virtual scene are usually different. For example, in a MOBA game scene, the responsibility of the virtual object may be understood as lane division, such as top lane matchup, mid lane matchup, bot lane matchup, or jungle; and in a first-person shooting game, the responsibility of the virtual object may include an assaulter, a medic, a sniper, or the like. By using the MOBA game as an example, a virtual object of the mid lane is usually located in a mid lane of the map, a virtual object of the jungle is usually located in a jungle area of the camp, and the like. When displaying the first perspective selection interface, the terminal may set a first selection control of the perspective at a corresponding position in the thumbnail map based on at least one of a responsibility and a camp of a virtual object corresponding to a perspective. In this way, the user can quickly determine the perspective corresponding to the responsibility and the camp of the virtual object based on the position of the first selection control, so that the user can quickly screen out the perspective on which the user focuses.

[0093] In a possible implementation, the terminal obtains, for any first selection control, a position of the any first selection control in the thumbnail map based on a real-time position of a virtual object corresponding to the any first selection control in the virtual scene.

[0094] In this embodiment of this application, when displaying the first perspective selection interface, the terminal may alternatively set a first selection control of a perspective corresponding to the virtual object in a corresponding position in the thumbnail map based on the real-time position of the virtual object in the virtual scene, and the position of the first selection control in the thumbnail map may move with movement of the virtual object. In this way, the user can quickly find out a perspective in which a highlight may appear through distribution of first selection controls in the thumbnail map.

[0095] In a possible implementation, when any first selection control has a corresponding virtual object, the any first selection control includes a character avatar or a user avatar of the virtual object corresponding to the any first selection control.

[0096] In this embodiment of this application, to facilitate the user to accurately determine a first selection control on which the user focuses, when displaying the first perspective selection interface, the terminal may further display a character avatar or a user avatar of each virtual object in a first selection control of a perspective corresponding to the virtual object, so that the user quickly finds a player or a game character (for example, a specific champion) on which the user focuses. The character avatar of the virtual object is used for finding a game character, and the game character may be a virtual object in the virtual scene. The user avatar is used for finding a player, the user avatar is the player avatar, and the player is another user that controls the virtual object.

[0097] In a possible implementation, the first perspective selection interface further includes an avatar switching control. For any first selection control, the terminal switches the character avatar of the virtual object corresponding to the any first selection control to the user avatar, or switches the user avatar of the virtual object corresponding to the any first selection control to the character avatar in response to receiving a trigger operation on the avatar switching control.

[0098] In this embodiment of this application, the terminal may further set the avatar switching control in the first perspective selection interface, so that the user selects a selection control that is of interest to the user through the character avatar or the user avatar, thereby improving flexibility of avatar display.

[0099] Operation 305: Adjust display sizes of the live streaming pictures from the m perspectives in response to receiving a split-screen size adjustment operation performed in the live streaming interface.

[00100] In this embodiment of this application, when split-screen display is performed on the live streaming pictures from the plurality of perspectives, the user may have a particular focus on the plurality of perspectives. For example, the user may focus on a live streaming picture from one of the plurality of perspectives. In this case, to improve a split-screen display effect, the terminal may receive the split-screen size adjustment operation performed by the user, to adjust display sizes of live streaming pictures from all the perspectives on which split-screen display is performed, for example, scale up a live streaming picture from a perspective on which the user focuses, and scale down a live streaming picture from a perspective that the user is less focused on.

[00101] In a possible implementation, the m perspectives include a fourth perspective and a fifth perspective; a live streaming picture from the fourth perspective and a live streaming picture from the fifth perspective correspond to size adjustment controls; and the terminal adjusts, in response to receiving a drag operation on the size adjustment control, a display size of the live streaming picture from the fourth perspective and a display size of the live streaming picture from the fifth perspective based on a drag direction and a drag distance of the drag operation. In this embodiment of this application, a position of the size adjustment control is not limited. The size adjustment control may be located between the live streaming picture from the fourth perspective and the live streaming picture from the fifth perspective, or may be located at another position. A user may change the position of the size adjustment control based on an actual requirement.

[00102] In this embodiment of this application, the terminal may set a size adjustment control between live streaming pictures from two perspectives, and the size adjustment control may receive the drag operation. When the user expects to adjust sizes of the live streaming pictures from the two perspectives, the user may drag the size adjustment control, and the terminal adjusts display sizes of the live streaming pictures from the two perspectives. For example, for the size adjustment control between the live streaming picture from the fourth perspective and the live streaming picture from the fifth perspective, when the user drags the size adjustment control toward the live streaming picture from the fourth perspective, the terminal may scale up the live streaming picture from the fifth perspective and scale down the live streaming picture from the fourth perspective.

[00103] Certainly, the terminal may alternatively display live streaming pictures from three or more perspectives. In this case, the user may first select a live streaming picture of which a size needs to be adjusted from the live streaming pictures from the three or more perspectives. After a

selection operation by the user is detected, a size adjustment control corresponding to the selected live streaming picture is displayed, the size of the selected live streaming picture is changed based on an operation by the user on the size adjustment control, and sizes of live streaming pictures other than the selected live streaming picture in the three or more live streaming pictures may be adaptively and automatically adjusted by the terminal, thereby reducing user operations.

[00104] Operation 306: Obtain a distance between a first virtual object and a second virtual object in the virtual scene, the first virtual object corresponding to a sixth perspective of the m perspectives, and the second virtual object corresponding to a seventh perspective of the m perspectives.

[00105] In this embodiment of this application, the n perspectives include perspectives respectively corresponding to at least two virtual objects in the virtual scene.

[00106] Operation 307: Merge and display a live streaming picture from the sixth perspective and a live streaming picture from the seventh perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being less than a distance threshold.

[00107] In this embodiment of this application, when there are perspectives corresponding to virtual objects in the n perspectives, if positions of two virtual objects in the virtual scene are close, perspectives of the two virtual objects are also close. In this case, if split-screen display is performed on live streaming pictures from the two perspectives of the two virtual objects in the live streaming interface, the live streaming pictures from the two perspectives are consequently close, and display sizes are both small. In this case, a display effect of the live streaming picture is in turn affected. For example, that the display sizes are both small means that: a size of a live streaming picture from each of the two perspectives when split-screen display is performed is smaller than a size of the live streaming picture from the single perspective when split-screen display is not performed. Based on this, because the live streaming pictures from the two perspectives are close, the user only needs to focus on the live streaming picture from one of the two perspectives. Therefore, rather than continue to perform split-screen display based on the smaller size, the user chooses not to perform split-screen display based on a larger size, so that live streaming pictures from different perspectives can be merged. In this embodiment of this application, when split-screen is performed on live streaming pictures from perspectives respectively corresponding to the two virtual objects, the terminal may temporarily merge the live streaming pictures from the two perspectives into one live streaming picture for displaying. The merged live streaming picture is a live streaming picture from a single perspective, and a display area of the live streaming picture

from the single perspective is display areas of live streaming pictures from the original two perspectives, or the display area is larger than the display areas of the live streaming pictures from the original two perspectives (in other words, an area of the live streaming picture becomes larger, and the area of the live streaming picture may also be understood as the display size of the live streaming picture).

[00108] A perspective of the merged live streaming picture may be one of the sixth perspective or the seventh perspective.

[00109] In a possible implementation, the n perspectives further include a free perspective, and the free perspective is a perspective not bound to a virtual object in the virtual scene; and the terminal merges and displays the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective as a live streaming picture from the free perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being less than the distance threshold, where a perspective position of the free perspective is located at a midpoint of a connection line between the first virtual object and the second virtual object. For example, the terminal may obtain live streaming picture data of the free perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being less than the distance threshold; and merge and display the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective as the live streaming picture from the free perspective based on the live streaming picture data of the free perspective.

[00110] The free perspective is a perspective of which the perspective position does not move with movement of the virtual object, but can be freely adjusted by the user.

[00111] In an exemplary solution of this embodiment of this application, the perspective of the merged live streaming picture may be one of the sixth perspective and the seventh perspective, and the perspective may be implemented through the free perspective. Specifically, when the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective are merged and displayed, the terminal may determine a midpoint position of the connection line between the first virtual object and the second virtual object in the virtual scene, set the midpoint position as the perspective position of the free perspective, and then display the live streaming picture from the free perspective at original display positions of the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective. The midpoint position is set as the perspective position of the free perspective, so that the live streaming

picture can perform a smooth change during a transition from split-screen display to merged display, thereby improving the display effect of the live streaming picture.

[00112] In a possible implementation, when the live streaming picture from the free perspective is used as a substitute live streaming picture for the merged live streaming picture from the sixth perspective and live streaming picture from the seventh perspective, because the first virtual object and the second virtual object are separated by a distance, in this case, the user may need to observe a larger area in the virtual scene. In addition, a longer distance between the two virtual objects indicates a larger scene area that the user needs to observe. In this case, the terminal may adjust a viewpoint height of the free perspective. For example, a larger distance between the first virtual object and the second virtual object indicates a higher viewpoint height that can be set, and correspondingly, a larger scene area that can be covered in the live streaming picture. Conversely, a smaller distance between the first virtual object and the second virtual object indicates a smaller scene area that the user needs to observe, and in this case, the viewpoint height may be set to be lower.

[00113] In some embodiments, after the operation of merging and displaying the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective, when the distance between the first virtual object and the second virtual object in the virtual scene is greater than the distance threshold, the terminal may restore split-screen display of the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective. For example, live streaming picture data of the sixth perspective and live streaming picture data of the seventh perspective are obtained in response to the distance between the first virtual object and the second virtual object in the virtual scene being greater than the distance threshold; and split-screen display of the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective is restored based on the live streaming picture data of the sixth perspective and the live streaming picture data of the seventh perspective. In this way, flexible switching between split-screen display and merged display can be automatically implemented, which is intelligent and improves experience of watching the live streaming picture of the user.

[00114] In a possible implementation, when split-screen is performed, the terminal may receive an exit split-screen operation by the user, and display a live streaming picture from an eighth perspective in the live streaming interface. For example, live streaming picture data of the eighth perspective is obtained in response to receiving the exit split-screen operation, and the live streaming picture from the eighth perspective is displayed in the live streaming interface based on

the live streaming picture data of the eighth perspective. In this way, the user can switch between split-screen display and merged display based on an actual requirement, which is conducive to satisfying a preference of the user.

[00115] In a possible implementation, the live streaming picture from the eighth perspective may be a live streaming picture located at a specified position in the live streaming pictures from the m perspectives, for example, a live streaming picture located on the leftmost side, or a live streaming picture located on the rightmost side.

[00116] Alternatively, the live streaming picture from the eighth perspective may be a live streaming picture with the largest display size in the live streaming pictures from the m perspectives.

[00117] For example, when watching a single live streaming picture in a full screen, the user enters a split screen to simultaneously watch the live streaming pictures from the plurality of perspectives by tapping a "multi-perspective" button. After entering the split screen, the user taps an "exit multi-perspective" button at an upper right corner, to return to the full screen to watch the single live streaming picture.

[00118] In summary, in the solutions shown in the embodiments of this application, for a virtual scene that supports live streaming pictures from a plurality of perspectives, when a terminal displays a live streaming picture from a perspective in a live streaming interface, a user may trigger a split-screen control in the live streaming interface, to enable the terminal to simultaneously display live streaming pictures from two or more perspectives in a split-screen manner in the live streaming interface, which can reduce user operations, improve data processing efficiency, and simplify the user operation when the user simultaneously focuses on the plurality of perspectives, thereby improving human-computer interaction efficiency and reducing running load of a server.

[00119] For example, a virtual scene is a MOBA game scene, and $m=2$. FIG. 5 to FIG. 10 are diagrams of display effects of a live streaming split-screen interface according to an exemplary embodiment of this application.

[00120] As shown in FIG. 5, when there are live streaming video streams from a plurality of perspectives in a current live streaming channel/live streaming room, a terminal displays a "multi-perspective" control 51. If there are no live streaming video streams of a plurality of viewing angles, the control is not displayed. If the "multi-perspective" control does not receive an operation in three seconds, the "multi-perspective" control may enter a hidden state.

[00121] After a user taps on the "multi-perspective" control 51, as shown in FIG. 6, the terminal may perform split-screen display on live streaming pictures from two perspectives. There is a "switch" control 61 at a lower right corner of a live streaming picture from each perspective, and the user may call out a perspective selection interface shown in FIG. 7 or FIG. 8 by taping the "switch" control 61; and an "exit multi-perspective" control 62 is further displayed at an upper right corner of the live streaming interface, and the user taps the control to return to a state of displaying a live streaming picture from a single perspective.

[00122] As shown in FIG. 7 or FIG. 8, the user may switch a player avatar or a champion avatar by taping a "player" control 71 or a "champion" control 81, and each avatar corresponds to a perspective of a game character. The user taps the player avatar or the champion avatar, so that the perspective can be switched.

[00123] As shown in FIG. 9, after the user switches the perspective, a prompt 91 indicating that switching is completed, namely, "perspective switched", may be displayed in a live streaming picture from the switched perspective.

[00124] As shown in FIG. 10, when no further operation by the user is received in three seconds, the "switch" control and the "exit multi-perspective" control in a live streaming interface 1001 may be hidden.

[00125] FIG. 11 is a schematic diagram of split-screen logic according to an exemplary embodiment of this application. With reference to FIG. 5 to FIG. 10, as shown in FIG. 11, the user enables a live streaming player (operation S1101), and taps a video picture to call out a live streaming player operation bar, to determine whether a multi-perspective function is configured for event live streaming (operation S1102); and if the multi-perspective function is configured for the event live streaming, a multi-perspective button is displayed, and the user taps the multi-perspective button (operation S1103), to enter a split screen to simultaneously watch pictures from two perspectives (operation S1104). The user may switch both the two live streaming perspectives, provided that the user taps a switching button (operation S1105), to call out a perspective switching selection panel (operation S1106); and selects a perspective to be switched to on the panel (operation S1107), so that switching can be completed (operation S1108).

[00126] The user may further press adjustment controls in the two pictures, to freely scale up or scale down scales of the two pictures to an expected appearance. To ensure normal visual experience of the two pictures, the scale to which the picture can be adjusted are defined, where a single video picture can be scaled down to a minimum of 33% of a visual width of an entire screen, and can be scaled up to a maximum of 66% of the visual width of the entire screen. 33% and 66%

are merely examples, and are not intended to constitute a limitation. A minimum scale-down scale of the single video picture may be greater than 33% or less than 33%, and a maximum scale-up scale of the single video picture may be greater than 66% or less than 66%. FIG. 12 is a schematic diagram of size adjustment according to an exemplary embodiment of this application. As shown in FIG. 12, the user taps and drags a contact position 1201 between the two live streaming pictures, so that sizes of the two live streaming pictures can be adjusted.

[00127] The solutions shown in the embodiments of this application may be implemented on a mobile terminal. FIG. 13 is a flowchart of front-end logic according to an exemplary embodiment of this application. As shown in FIG. 13, a live streaming video picture is played at a front end (operation S1301); it is detected whether a "multi-perspective" function is configured (operation S1302) when a user calls out a playback control progress bar; and if the "multi-perspective" function is configured, a "multi-perspective" button is displayed (operation S1303), otherwise, the "multi-perspective" button is not displayed (operation S1304). The user taps on the "multi-perspective" button (operation S1305), to request a back end to obtain information about a player in a current game and a first perspective live streaming picture of the player (operation S1306); and after the information and the live streaming picture are obtained, the front end responds by entering a split screen to simultaneously watch pictures displayed from two perspectives (operation S1307). When the user is in a state of simultaneously watching the two pictures on the split screen, the user taps any switching button (operation S1308), to request the back end to obtain information about players at all positions in the current game (operation S1309); and after the information is obtained, the front end responds by displaying a perspective switching panel (operation S1310). The user completes selection of a perspective to be switched to (operation S1311), to request the back end to obtain a video picture from the perspective (operation S1312); and after the picture is obtained, the front end displays pictures simultaneously watched in the split screen after switching (operation S1313).

[00128] FIG. 14 is a flowchart of back-end logic according to an exemplary embodiment of this application. As shown in FIG. 14, a front end detects that a user transmits a multi-perspective instruction (operation S1401); the front-end requests a back end to obtain a first perspective live streaming picture of a player in a current game (operation S1402); and the back end responds by replying the front end with a first perspective video picture database of the player (operation S1403).

[00129] When the user transmits a perspective switching instruction (operation S1404), the front end requests the back end to obtain information about all players in the current game

(operation S1405); and the back end responds by replying the front end with player and champion data in the current game (operation S1406).

[00130] The user completes selection of a perspective to be switched (operation S1407); the front end requests the back end to obtain a first perspective live streaming picture of a corresponding player or champion (operation S1408); and the back end packs first perspective video picture data of the player and responds by replying the front end with the data (that is, operation S1409).

[00131] With progress of mobile phone technologies, screens of mobile devices are becoming larger. To meet a plurality of game watching needs of users, this application provides a solution for using a split screen to watch a plurality of perspectives. When watching event live streaming, the user can simultaneously watch at least two live streaming video pictures from different perspectives by splitting the screen into at least two view areas. The user may simultaneous watch from an omniscient perspective and a first perspective of a favorite player of the user. Alternatively, the user may simultaneously watch first perspectives of two players, compare game levels of the two players, and learn a game battle technology.

[00132] FIG. 15 is a block diagram of a live streaming picture display apparatus (also referred to as a live streaming picture data processing apparatus) according to an exemplary embodiment of this application. The live streaming picture display apparatus may be applied to a computer device, to perform all or some of operations performed by a terminal in the method shown in FIG. 2 or FIG. 3. As shown in FIG. 15, the live streaming picture display apparatus includes:

[00133] a live streaming interface display module 1501, configured to display a live streaming interface of a virtual scene, the virtual scene corresponding to live streaming pictures from n perspectives; and n being greater than or equal to 2, and n being an integer;

[00134] a picture display module 1502, configured to display a live streaming picture from a first perspective and a split-screen control in the live streaming interface, for example, configured to obtain live streaming picture data of the first perspective, and display the live streaming picture from the first perspective and the split-screen control in the live streaming interface based on the live streaming picture data of the first perspective, the first perspective being one of the n perspectives; and

[00135] a split-screen display module 1503, configured to perform split-screen display on live streaming pictures from m perspectives of the n perspectives in the live streaming interface in response to receiving a trigger operation on the split-screen control, $2 \leq m \leq n$, and m being an integer.

[00136] In a possible implementation, the live streaming interface includes m perspective switching controls, and the m perspective switching controls respectively correspond to the m perspectives; and the apparatus further includes: a switching module, configured to switch a live streaming picture from a second perspective to a live streaming picture from a third perspective in the live streaming interface in response to receiving a triggering operation on a target perspective switching control, for example, obtain live streaming picture data of the third perspective in response to receiving the trigger operation on the target perspective switching control, and switch the live streaming picture from the second perspective to the live streaming picture from the third perspective in the live streaming interface based on the live streaming picture data of the third perspective, the second perspective being any one of the m perspectives; the target perspective switching control being a perspective switching control corresponding to the second perspective in the m perspective switching controls; and the third perspective being any one of the n perspectives other than the m perspectives.

[00137] In a possible implementation, the switching module is configured to display a first perspective selection interface in response to receiving the trigger operation on the target perspective switching control, the first perspective selection interface including $n-m$ first selection controls, and the $n-m$ first selection controls respectively corresponding to $n-m$ third perspectives; and switch the live streaming picture from the second perspective to the live streaming picture from the third perspective in the live streaming interface in response to receiving a trigger operation on a target selection control, for example, obtain the live streaming picture data of the third perspective in response to receiving the trigger operation on the target selection control, and switch the live streaming picture from the second perspective to the live streaming picture from the third perspective in the live streaming interface based on the live streaming picture data of the third perspective, the target selection control being any one of the $n-m$ first selection controls, and the live streaming picture from the third perspective being a live streaming picture from a third perspective corresponding to the target selection control.

[00138] In a possible implementation, the switching module is configured to display the first perspective selection interface using a thumbnail map of the virtual scene as a background in response to receiving the trigger operation on the target perspective switching control; obtain positions of the $n-m$ first selection controls in the thumbnail map; and display the $n-m$ first selection controls in the first perspective selection interface based on the positions of the $n-m$ first selection controls in the thumbnail map.

[00139] In a possible implementation, the switching module is configured to obtain, for any first selection control, a position of the any first selection control in the thumbnail map based on at least one of a responsibility of a virtual object corresponding to the any first selection control in the virtual scene and a camp to which the virtual object belongs in the virtual scene.

[00140] In a possible implementation, the switching module is configured to obtain, for any first selection control, a position of the any first selection control in the thumbnail map based on a real-time position of a virtual object corresponding to the any first selection control in the virtual scene.

[00141] In a possible implementation, when any first selection control corresponds to a virtual object, the any first selection control includes a character avatar or a user avatar of the virtual object corresponding to the any first selection control.

[00142] In a possible implementation, the first perspective selection interface further includes an avatar switching control; and the apparatus further includes: an avatar switching control, configured to switch, for the any first selection control, the character avatar of the virtual object corresponding to the any first selection control to the user avatar, or switch the user avatar of the virtual object corresponding to the any first selection control to the character avatar in response to receiving a trigger operation on the avatar switching control.

[00143] In a possible implementation, the apparatus further includes: a size adjustment module, configured to adjust display sizes of the live streaming pictures from the m perspectives in response to receiving a split-screen size adjustment operation performed in the live streaming interface.

[00144] In a possible implementation, the m perspectives include a fourth perspective and a fifth perspective; a live streaming picture from the fourth perspective and a live streaming picture from the fifth perspective correspond to size adjustment controls; and the size adjustment module is configured to adjust, in response to receiving a drag operation on the size adjustment control, a display size of the live streaming picture from the fourth perspective and a display size of the live streaming picture from the fifth perspective based on a drag direction and a drag distance of the drag operation.

[00145] In a possible implementation, the split-screen display module 1503 is configured to display a second perspective selection interface in response to receiving the trigger operation on the split-screen control, the second perspective selection interface including second selection controls respectively corresponding to the n perspectives; and perform split-screen display on the live

streaming pictures from the m perspectives in the live streaming interface based on a selection operation on selection controls of the m perspectives of the n perspectives, for example, obtain live streaming picture data of the m perspectives of the n perspectives based on the selection operation on the selection controls of the m perspectives of the n perspectives; and perform split-screen display on the live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

[00146] In a possible implementation, the split-screen display module 1503 is configured to perform split-screen display on live streaming pictures from m perspectives recently displayed in the live streaming interface of the live streaming pictures from the n perspective in the live streaming interface in response to receiving the trigger operation on the split-screen control, for example, obtain the live streaming picture data of the m perspectives of the n perspectives in response to receiving the trigger operation on the split-screen control; and perform split-screen display on the live streaming pictures from the m perspectives recently displayed in the live streaming interface of the live streaming pictures from the n perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

[00147] In a possible implementation, the split-screen display module 1503 is configured to perform split-screen display on live streaming pictures from default m perspectives of the n perspectives in the live streaming interface in response to receiving the trigger operation on the split-screen control, for example, obtain the live streaming picture data of the m perspectives of the n perspectives in response to receiving the trigger operation on the split-screen control; and perform split-screen display on the live streaming pictures from the default m perspectives of the n perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

[00148] In a possible implementation, the split-screen display module 1503 is configured to obtain quantities of viewers for the live streaming pictures from the n perspectives in response to receiving the trigger operation on the split-screen control; arrange the n perspectives based on the quantities of viewers in descending order or in ascending order; and perform split-screen display on live streaming pictures from first m perspectives in the live streaming interface, for example, obtain the quantities of the live streaming pictures from the n perspectives in response to receiving the trigger operation on the split-screen control; arrange the n perspectives based on the quantities of viewers in descending order or in ascending order; obtain live streaming picture data of the m perspectives of the n perspectives; and perform split-screen display on the live streaming pictures

from the first m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

[00149] In a possible implementation, the n perspectives include perspectives respectively corresponding to at least two virtual objects in the virtual scene; and the apparatus further includes: a distance obtaining module, configured to obtain a distance between a first virtual object and a second virtual object in the virtual scene, the first virtual object corresponding to a sixth perspective of the m perspectives, and the second virtual object corresponding to a seventh perspective of the m perspectives; and a picture merging module, configured to merge and display a live streaming picture from the sixth perspective and a live streaming picture from the seventh perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being less than a distance threshold.

[00150] In a possible implementation, the n perspectives further include a free perspective; and the free perspective is a perspective not bound to a virtual object in the virtual scene; and the picture merging module is configured to merge and display the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective as a live streaming picture from the free perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being less than the distance threshold, a perspective position of the free perspective being located at a midpoint of a connection line between the first virtual object and the second virtual object, for example, obtain live streaming picture data of the free perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being less than the distance threshold; and merge and display the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective as the live streaming picture from the free perspective based on the live streaming picture data of the free perspective.

[00151] In a possible implementation, the picture merging module is further configured to restore split-screen display of the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being greater than the distance threshold, for example, obtain live streaming picture data of the sixth perspective and live streaming picture data of the seventh perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being greater than the distance threshold; and restore split-screen display of the live streaming picture from the sixth perspective and the live streaming picture from

the seventh perspective based on the live streaming picture data of the sixth perspective and the live streaming picture data of the seventh perspective.

[00152] In a possible implementation, the split-screen display module 1503 is further configured to display a live streaming picture from an eighth perspective in the live streaming interface in response to receiving an exit split-screen operation, the live streaming picture from the eighth perspective being a live streaming picture located at a specified position or a live streaming picture with a maximum display size in the live streaming pictures from the m perspectives, for example, obtain live streaming picture data of the eighth perspective in response to receiving the exit split-screen operation, and display the live streaming picture from the eighth perspective in the live streaming interface based on the live streaming picture data of the eighth perspective, the live streaming picture from the eighth perspective being the live streaming picture located at the specified position or the live streaming picture with the maximum display size in the live streaming pictures from the m perspectives.

[00153] In summary, in the solutions shown in the embodiments of this application, for a virtual scene that supports live streaming pictures from a plurality of perspectives, when a terminal displays a live streaming picture from a perspective in a live streaming interface, a user may trigger a split-screen control in the live streaming interface, to enable the terminal to simultaneously display live streaming pictures from two or more perspectives in a split-screen manner in the live streaming interface, which can reduce user operations, improve data processing efficiency, and simplify the user operation when the user simultaneously focuses on the plurality of perspectives, thereby improving human-computer interaction efficiency and reducing running load of a server.

[00154] FIG. 16 is a block diagram of a structure of a computer device 1600 according to an exemplary embodiment of this application. The computer device 1600 may be a portable mobile terminal, such as a smartphone, a tablet computer, or a personal computer.

[00155] Generally, the computer device 1600 includes a processor 1601 and a memory 1602.

[00156] The processor 1601 may include one or more processing cores, such as a 4-core processor or an 8-core processor. The processor 1601 may be implemented in at least one hardware form of a digital signal processor (DSP), a field-programmable gate array (FPGA), or a programmable logic array (PLA). The processor 1601 may also include a main processor and a coprocessor. The main processor is a processor configured to process data in an awake state, and is also referred to as a central processing unit (CPU); and the coprocessor is a low power consumption processor configured to process data in a standby state. In some embodiments, the processor 1601 may be integrated with a graphics processing unit (GPU), and the GPU is configured to render and

draw content that needs to be displayed on a display screen. In some embodiments, the processor 1601 may further include an artificial intelligence (AI) processor, and the AI processor is configured to process computing operations related to machine learning.

[00157] The memory 1602 may include one or more computer-readable storage media, and the computer-readable storage medium may be non-transient. The non-transient computer-readable storage medium may also be referred to as a non-volatile computer-readable storage medium, or a non-transitory computer-readable storage medium. The memory 1602 may further include a high-speed random access memory and a non-volatile memory, such as one or more disk storage devices or flash storage devices. In some embodiments, the non-transient computer-readable storage medium in the memory 1602 is configured to store at least one computer instruction, and the at least one computer instruction is configured to be executed by the processor 1601, to enable the computer device to implement all or some of operations performed by the terminal device in the live streaming picture display method (also referred to as the live streaming picture data processing method) provided in the method embodiments of this application.

[00158] In some embodiments, the computer device 1600 may further optionally include a display screen 1605, and the display screen 1605 is configured to display live streaming pictures of perspectives. The display screen 1605 is configured to display a user interface (UI). The UI may include a graph, text, an icon, a video, and any combination thereof. When the display screen 1605 is a touch display screen, the display screen 1605 further has a capability of collecting a touch signal on or above a surface of the display screen 1605. The touch signal may be inputted to the processor 1601 as a control signal for processing. In this case, the display screen 1605 may be further configured to provide a virtual button and/or a virtual keyboard that are/is also referred to as a soft button and/or a soft keyboard. In some embodiments, there may be one display screen 1605, disposed on a front panel of the computer device 1600. In some other embodiments, there may be at least two display screens 1605, respectively disposed on different surfaces of the computer device 1600 or designed in a foldable shape. In still some other embodiments, the display screen 1605 may be a flexible display screen, disposed on a curved surface or a folded surface of the computer device 1600. Even, the display screen 1605 may be further set in a non-rectangular irregular pattern, namely, a special-shaped screen. The display screen 1605 may be prepared by using a material such as a liquid crystal display (LCD) or an organic light-emitting diode (OLED).

[00159] A person skilled in the art may understand that, the structure shown in FIG. 16 constitutes no limitation on the computer device 1600, and the computer device may include more

or fewer components than those shown in the figure, or some components may be combined, or a different component deployment may be used.

[00160] In an exemplary embodiment, a non-transitory computer-readable storage medium including an instruction, for example, a memory including at least one computer instruction, is further provided, and the at least one computer instruction may be executed by a processor, to enable a computer device to perform all or some of operations performed by a terminal in the method shown in any one of the embodiments in FIG. 2 or FIG. 3. For example, the non-temporary computer-readable storage medium may be a read-only memory, a random access memory, a magnetic tape, a floppy disk, or an optical data storage device.

[00161] In an exemplary embodiment, a computer program product or a computer program is further provided, the computer program product or the computer program including computer instructions, and the computer instructions being stored in a non-volatile computer-readable storage medium. A processor of a computer device reads the computer instructions from the non-volatile computer-readable storage medium, and the processor executes the computer instructions, to enable the computer device to perform all or some of operations performed by a terminal in the method shown in any one of the embodiments in FIG. 2 or FIG. 3.

[00162] A person skilled in the art can easily figure out another implementation solution of this application after considering the specification and practicing this application that is disclosed herein. This application is intended to cover any variations, uses, or adaptive changes of this application. The variations, uses, or adaptive changes follow the general principles of this application and include common general knowledge or common technical means in the art that are not disclosed in this application. The specification and the embodiments are considered as merely exemplary, and the real scope of this application is pointed out in the following claims.

[00163] This application is not limited to the precise structures described above and shown in the accompanying drawings, and various modifications and changes can be made without departing from the scope of this application. The scope of this application is limited only by the appended claims.

CLAIMS

We claim:

1. A live streaming picture data processing method, performed by a computer device, the method comprising:

displaying a live streaming interface of a virtual scene, the virtual scene corresponding to live streaming pictures from n perspectives; and n being greater than or equal to 2, and n being an integer;

obtaining live streaming picture data of a first perspective, and displaying a live streaming picture from the first perspective and a split-screen control in the live streaming interface based on the live streaming picture data of the first perspective, the first perspective being one of the n perspectives; and

obtaining live streaming picture data of m perspectives of the n perspectives in response to receiving a trigger operation on the split-screen control, and performing split-screen display on live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives, $2 \leq m \leq n$, and m being an integer.

2. The method according to claim 1, wherein the live streaming interface comprises m perspective switching controls, and the m perspective switching controls respectively correspond to the m perspectives; and

the method further comprises:

obtaining live streaming picture data of a third perspective in response to receiving a trigger operation on a target perspective switching control, and switching a live streaming picture from a second perspective to a live streaming picture from the third perspective in the live streaming interface based on the live streaming picture data of the third perspective,

the second perspective being any one of the m perspectives; the target perspective switching control being a perspective switching control corresponding to the second perspective in the m perspective switching controls; and the third perspective being any one of the n perspectives other than the m perspectives.

3. The method according to claim 2, wherein the obtaining live streaming picture data of a third perspective in response to receiving a trigger operation on a target perspective switching control, and switching a live streaming picture from a second perspective to a live streaming picture from the third perspective in the live streaming interface based on the live streaming picture data of

the third perspective comprises:

displaying a first perspective selection interface in response to receiving the trigger operation on the target perspective switching control, the first perspective selection interface comprising $n-m$ first selection controls, and the $n-m$ first selection controls respectively corresponding to $n-m$ third perspectives; and

obtaining the live streaming picture data of the third perspective in response to receiving a trigger operation on a target selection control, and switching the live streaming picture from the second perspective to the live streaming picture from the third perspective in the live streaming interface based on the live streaming picture data of the third perspective,

the target selection control being any one of the $n-m$ first selection controls, and the live streaming picture from the third perspective being a live streaming picture from a third perspective corresponding to the target selection control.

4. The method according to claim 3, wherein the displaying a first perspective selection interface in response to receiving the trigger operation on the target perspective switching control comprises:

displaying the first perspective selection interface using a thumbnail map of the virtual scene as a background in response to receiving the trigger operation on the target perspective switching control;

obtaining positions of the $n-m$ first selection controls in the thumbnail map; and

displaying the $n-m$ first selection controls in the first perspective selection interface based on the positions of the $n-m$ first selection controls in the thumbnail map.

5. The method according to claim 4, wherein the obtaining positions of the $n-m$ first selection controls in the thumbnail map comprises:

obtaining, for any first selection control, a position of the any first selection control in the thumbnail map based on at least one of a responsibility of a virtual object corresponding to the any first selection control in the virtual scene and a camp to which the virtual object belongs in the virtual scene.

6. The method according to claim 4, wherein the obtaining positions of the $n-m$ first selection controls in the thumbnail map comprises:

obtaining, for any first selection control, a position of the any first selection control in the thumbnail map based on a real-time position of a virtual object corresponding to the any first

selection control in the virtual scene.

7. The method according to any one of claims 3 to 6, wherein when any first selection control corresponds to a virtual object, the any first selection control comprises a character avatar or a user avatar of the virtual object corresponding to the any first selection control.

8. The method according to claim 7, wherein the first perspective selection interface further comprises an avatar switching control, and the method further comprises:

for the any first selection control, switching the character avatar of the virtual object corresponding to the any first selection control to the user avatar, or switching the user avatar of the virtual object corresponding to the any first selection control to the character avatar in response to receiving a trigger operation on the avatar switching control.

9. The method according to any one of claims 1 to 8, wherein the method further comprises:

adjusting display sizes of the live streaming pictures from the m perspectives in response to receiving a split-screen size adjustment operation performed in the live streaming interface.

10. The method according to claim 9, wherein the m perspectives comprise a fourth perspective and a fifth perspective; and a live streaming picture from the fourth perspective and a live streaming picture from the fifth perspective correspond to size adjustment controls; and

the adjusting display sizes of the live streaming pictures from the m perspectives in response to receiving a split-screen size adjustment operation performed in the live streaming interface comprises:

in response to receiving a drag operation on the size adjustment control, adjusting a display size of the live streaming picture from the fourth perspective and a display size of the live streaming picture from the fifth perspective based on a drag direction and a drag distance of the drag operation.

11. The method according to any one of claims 1 to 10, wherein the obtaining live streaming picture data of m perspectives of the n perspectives in response to receiving a trigger operation on the split-screen control, and performing split-screen display on live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives comprises:

displaying a second perspective selection interface in response to receiving the trigger operation on the split-screen control, the second perspective selection interface comprising second selection controls respectively corresponding to the n perspectives;

obtaining the live streaming picture data of the m perspectives of the n perspectives based on a selection operation on second selection controls of the m perspectives of the n perspectives; and

performing split-screen display on the live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

12. The method according to any one of claims 1 to 10, wherein the obtaining live streaming picture data of m perspectives of the n perspectives in response to receiving a trigger operation on the split-screen control, and performing split-screen display on live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives comprises:

obtaining the live streaming picture data of the m perspectives of the n perspectives in response to receiving the trigger operation on the split-screen control; and

performing split-screen display on live streaming pictures from m perspectives recently displayed in the live streaming interface of the live streaming pictures from the n perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

13. The method according to any one of claims 1 to 10, wherein the obtaining live streaming picture data of m perspectives of the n perspectives in response to receiving a trigger operation on the split-screen control, and performing split-screen display on live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives comprises:

obtaining the live streaming picture data of the m perspectives of the n perspectives in response to receiving the trigger operation on the split-screen control; and

performing split-screen display on live streaming pictures from default m perspectives of the n perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

14. The method according to any one of claims 1 to 10, wherein the obtaining live streaming picture data of m perspectives of the n perspectives in response to receiving a trigger operation on the split-screen control, and performing split-screen display on live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives comprises:

obtaining quantities of viewers for the live streaming pictures from the n perspectives in response to receiving the trigger operation on the split-screen control;

arranging the n perspectives based on the quantities of viewers in descending order or in ascending order;

obtaining the live streaming picture data of the m perspectives of the n perspectives; and

performing split-screen display on live streaming pictures from first m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives.

15. The method according to any one of claims 1 to 14, wherein the n perspectives comprise perspectives respectively corresponding to at least two virtual objects in the virtual scene, and the method further comprises:

obtaining a distance between a first virtual object and a second virtual object in the virtual scene, the first virtual object corresponding to a sixth perspective of the m perspectives, and the second virtual object corresponding to a seventh perspective of the m perspectives; and

merging and displaying a live streaming picture from the sixth perspective and a live streaming picture from the seventh perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being less than a distance threshold.

16. The method according to claim 15, wherein the n perspectives further comprise a free perspective; and the free perspective is a perspective not bound to a virtual object in the virtual scene; and

the merging and displaying a live streaming picture from the sixth perspective and a live streaming picture from the seventh perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being less than a distance threshold comprises:

obtaining live streaming picture data of the free perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being less than the distance threshold; and

merging and displaying the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective as a live streaming picture from the free perspective based on the live streaming picture data of the free perspective, a perspective position of the free perspective being located at a midpoint of a connection line between the first virtual object and the second virtual object.

17. The method according to claim 15 or 16, wherein after the merging and displaying the live streaming picture from the sixth perspective and the live streaming picture from the seventh

perspective, the method further comprises:

obtaining live streaming picture data of the sixth perspective and live streaming picture data of the seventh perspective in response to the distance between the first virtual object and the second virtual object in the virtual scene being greater than the distance threshold; and

restoring split-screen display of the live streaming picture from the sixth perspective and the live streaming picture from the seventh perspective based on the live streaming picture data of the sixth perspective and the live streaming picture data of the seventh perspective.

18. The method according to any one of claims 1 to 17, wherein after the performing split-screen display on live streaming pictures from the m perspectives in the live streaming interface, the method further comprises:

obtaining live streaming picture data of an eighth perspective in response to receiving an exit split-screen operation, and displaying a live streaming picture from the eighth perspective in the live streaming interface based on the live streaming picture data of the eighth perspective,

the live streaming picture from the eighth perspective being a live streaming picture located at a specified position or a live streaming picture with a maximum display size in the live streaming pictures from the m perspectives.

19. A live streaming picture data processing apparatus, the apparatus comprising:

a live streaming interface display module, configured to display a live streaming interface of a virtual scene, the virtual scene corresponding to live streaming pictures from n perspectives; and n being greater than or equal to 2, and n being an integer;

a picture display module, configured to: obtain live streaming picture data of a first perspective, and display a live streaming picture from the first perspective and a split-screen control in the live streaming interface based on the live streaming picture data of the first perspective, the first perspective being one of the n perspectives; and

a split-screen display module, configured to: obtain live streaming picture data of m perspectives of the n perspectives in response to receiving a trigger operation on the split-screen control, and perform split-screen display on live streaming pictures from the m perspectives in the live streaming interface based on the live streaming picture data of the m perspectives, $2 \leq m \leq n$, and m being an integer.

20. A computer device, comprising a processor and a memory, the memory having at least one computer instruction stored therein, and the at least one computer instruction being loaded and

executed by the processor, to enable the computer device to implement the live streaming picture data processing method according to any one of claims 1 to 18.

21. A non-volatile computer-readable storage medium, having at least one computer instruction stored therein, and the at least one computer instruction being loaded and executed by a processor, to enable a computer device to implement the live streaming picture data processing method according to any one of claims 1 to 18.

22. A computer program product, comprising computer instructions, and the computer instructions being read and executed by a processor of a computer device, to enable the computer device to perform the live streaming picture data processing method according to any one of claims 1 to 18.

23. A computer program, comprising computer instructions, and the computer instructions being read and executed by a processor of a computer device, to enable the computer device to perform the live streaming picture data processing method according to any one of claims 1 to 18.