

GAME STAGE SWITCHING METHOD AND APPARATUS, AND STORAGE MEDIUM

Technical Field

The present disclosure relates to the field of computer vision, particularly to a game stage switching method and apparatus, and a storage medium.

Background

At present, a specific action is required to be performed manually, or a specified button to be pressed, to switch a game progress stage. The present method may introduce additional actions and affect the rhythm of the game; or an additional button needs to be added, and the complexity of hardware is increased.

Summary

The present disclosure provides a game stage switching method and apparatus, and a storage medium.

According to the first aspect of embodiments of the present disclosure, provided is a game stage switching method, including: obtaining video streams of a game desktop; performing respectively target object detection on a plurality of image frames included in the video streams; and in response to detecting a specific target object in at least one image frame in the video streams, switching a game progress stage at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected.

In some optional embodiments, the video streams include video streams synchronously acquired at a plurality of views of the game desktop, and the switching a game progress stage at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected includes: determining the first image frame in the plurality of continuous image frames where the specific target object is detected in the video stream at one view; determining synchronous images acquired synchronously with the first image frame from the video streams synchronously acquired at the other views; and in response to detecting the specific target object in at least one image frame in N image frames acquired before the synchronous images, switching the game progress stage at the time point corresponding to the image where the specific target object is detected earliest in the N image frames acquired before the synchronous images.

In some optional embodiments, the method further includes: in response to not detecting the specific target object in the N image frames acquired before the synchronous images, switch the

game progress stage at the time point corresponding to the first image frame.

In some optional embodiments, the plurality of views includes: a side view and an overhead view, where the side view includes a view of the left side of the game desktop and/or a view of the right side of the game desktop.

In some optional embodiments, the performing respectively target object detection on a plurality of image frames included in the video streams includes: for one image frame in the video streams, inputting the image frame into a neural network for target object detection to obtain a detection result, where the detection result indicates whether the image frame includes the specific target object.

In some optional embodiments, the target object includes at least one of a person, a game chip, a game card, or a game currency.

In some optional embodiments, the specific game object includes a game card, and the switching a game progress stage at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected includes: switching the game progress stage from a betting stage to a game stage at the time point corresponding to the first image frame in the plurality of continuous image frames where the game card is detected.

In some optional embodiments, the method further includes: providing a prompt of stopping betting after switching from the betting stage to the game stage.

In some optional embodiments, the method further includes: in response to detecting a change in betting chip in the images of the game stage in the video streams, determining that the changed chip is an invalid chip and sending warning information.

According to the second aspect of the embodiments of the present disclosure, provided is a game stage switching apparatus, including: a video stream obtaining module, configured to obtain video streams of a game desktop; an object detection module, configured to perform respectively target object detection on a plurality of image frames included in the video streams; and a game stage switching module, configured to, in response to detecting a specific target object in at least one image frame in the video streams, switch a game progress stage at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected.

In some optional embodiments, the video streams include video streams synchronously acquired at a plurality of views of the game desktop, and the game stage switching module

includes: a first determining sub-module, configured to determine the first image frame in the plurality of continuous image frames where the specific target object is detected in the video stream at one view; a second determining sub-module, configured to determine synchronous images acquired synchronously with the first image frame from the video streams synchronously acquired at the other views; and a first game stage switching sub-module, configured to, in response to detecting the specific target object in at least one image frame in N image frames acquired before the synchronous images, switch the game progress stage at the time point corresponding to the image where the specific target object is detected earliest in the N image frames acquired before the synchronous images.

In some optional embodiments, the first game stage switching sub-module is configured to: in response to not detecting the specific target object in the N image frames acquired before the synchronous images, switch the game progress stage at the time point corresponding to the first image frame.

In some optional embodiments, the plurality of views includes: a side view and an overhead view, where the side view includes a view of the left side of the game desktop and/or a view of the right side of the game desktop.

In some optional embodiments, the object detection module includes: an object detection sub-module, configured to, for one image frame in the video streams, input the image frame into a neural network for target object detection to obtain a detection result, where the detection result indicates whether the image frame includes the specific target object.

In some optional embodiments, the target object includes at least one of a person, a game chip, a game card, or a game currency.

In some optional embodiments, the specific game object includes a game card, the game stage switching module includes: a second game stage switching sub-module, configured to switch the game progress stage from a betting stage to a game stage at the time point corresponding to the first image frame in the plurality of continuous image frames where the game card is detected.

In some optional embodiments, the apparatus further includes: a prompting module, configured to provide a prompt of stopping betting after switching from the betting stage to the game stage.

In some optional embodiments, the apparatus further includes: a determining module, configured to, in response to detecting a change in betting chip in the images of the game stage in the video streams, determine that the changed chip is an invalid chip and send warning

information.

According to the third aspect of the embodiments of the present disclosure, provided is a computer readable storage medium, having a computer program stored thereon, where computer program is configured to implement the game stage switching method according to any one item of the first aspect.

According to the fourth aspect of the embodiments of the present disclosure, provided is a game stage switching apparatus, including: a processor; a memory configured to store processor executable instructions; where the processor is configured to invoke the executable instructions stored in the memory, to implement the game stage switching method according to any one item of the first aspect.

The technical solutions provided according to the embodiments of the present disclosure include the following beneficial effects:

In the embodiments of the present disclosure, video streams of a game desktop are obtained; target object detection is performed respectively on a plurality of image frames included in the video streams; and in a case that a specific target object is detected in at least one image frame in the video streams, a game progress stage is switched at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected. Through the process above, the game progress stage can automatically be switched based on detection on the video streams, the rhythm of the game is ensured, hardware costs are saved, and the efficiency is improved.

It should be understood that the above general description and the following detailed description are merely exemplary and explanatory and are not intended to limit the present application.

Brief Description of the Drawings

The accompanying drawings, which are incorporated in and constitute a part of the present specification, illustrate embodiments consistent with the present disclosure and, together with the specification, serve to explain the principles of the present disclosure.

FIG. 1 is a flowchart of a game stage switching method according to an exemplary embodiment of the present disclosure;

FIG. 2 is a schematic diagram of multi-view scene according to an exemplary embodiment of the present disclosure;

FIG. 3 is a flowchart of another game stage switching method according to an exemplary

embodiment of the present disclosure;

FIG. 4 is a flowchart of another game stage switching method according to an exemplary embodiment of the present disclosure;

FIG. 5 is a flowchart of another game stage switching method according to an exemplary embodiment of the present disclosure;

FIG. 6 is a flowchart of another game stage switching method according to an exemplary embodiment of the present disclosure;

FIG. 7 is a block diagram of a game stage switching apparatus according to an exemplary embodiment of the present disclosure;

FIG. 8 is a schematic structural diagram of a game stage switching apparatus according to an exemplary embodiment of the present disclosure.

Detailed Description

Exemplified embodiments would be explained in detail herein, and examples thereof are represented in drawings. When the description relates to the drawings, unless otherwise indicated, the same number in different drawings represents the same or similar element. Implementations described in the following exemplified embodiments do not represent all implementations consistent with the present disclosure. On the contrary, they are only examples for apparatuses and methods consistent in same aspects of the present disclosure as detailed in the attached claims.

Terms used in the present disclosure merely aim at describing a specific embodiment rather than aiming at limitation of the present disclosure. "A", "the", and "the" in a single form used in the present disclosure and the attached claims also aim at including a multiple form, unless other meanings are clearly represented in the context. It should also be understood that the term "and/or" used in the present text refers to any or all possible combinations including one or more associated listed terms.

It should be understood that the present disclosure may use terms such as first, second, and third to describe information, but these information are not limited to these terms. These terms are merely used for distinguishing the same type of pieces of information from one another. For example, in the case of not departing from the scope of the present disclosure, the first information may also be referred to as the second information; similarly, the second information may also be referred to as the first information. Depending on the context, for example, the term "if" used herein may be explained as "when" or "while", or "in response to a determination".

Embodiments of the present disclosure provide a game stage switching method, applied to an electronic device, where the electronic device may include cameras for acquiring video streams, and detection of a game stage is performed using the video streams acquired by the electronic device.

As shown in FIG. 1, FIG. 1 is a flowchart of a game stage switching method according to an exemplary embodiment, including the following steps.

At step 101, video streams of a game desktop are obtained.

In the embodiments of the present disclosure, in order to improve the accuracy of video stream analysis, the video streams synchronously acquired at a plurality of views of the game desktop are obtained. Optionally, the plurality of views includes a side view and an overhead view, where the side view includes a view of the left side of the game desktop and/or a view of the right side of the game desktop.

As shown in FIG. 2, the video stream at the view of the left side of the game desktop is obtained by means of a left camera, the video stream at the view of the right side of the game desktop is obtained by means of a right camera, and the video stream at the overhead view is obtained by means of a middle camera.

At step 102, target object detection is performed respectively on a plurality of image frames included in the video streams.

In the embodiments of the present disclosure, the target object includes, but not limited to, any one or a combination of: a person, a game chip, a game card, a game currency, or the like.

At step 103, in response to detecting a specific target object in at least one image frame in the video streams, a game progress stage is switched at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected.

In the embodiments of the present disclosure, the game progress stage includes a betting stage, a game stage, and a payout stage, and the specific target object includes a game card. The game progress stage may be switched to the game stage at the time point corresponding to the first image frame in the plurality of continuous image frames where the specific target object is detected.

In the embodiments, video streams of a game desktop are obtained; target object detection is performed respectively on a plurality of image frames included in the video streams; and in a case that a specific target object is detected in at least one image frame in the video streams, a

game progress stage is switched at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected. Through the process above, the game progress stage can automatically be switched based on detection on the video streams, the rhythm of the game is ensured, hardware costs are saved, the game time is saved, and the efficiency is improved.

In some optional embodiments, the video streams include the video streams synchronously acquired at the plurality of views of the game desktop.

At step 103-1, the first image frame in the plurality of continuous image frames where the specific target object is detected is determined in the video stream at one view.

It should be noted that since a game may be played for a plurality of rounds, the video streams may include video streams acquired at the plurality of views in each round. In order to distinguish each round, a plurality of image frames where the specific target object is continuously acquired is recognized as images of one round, and therefore, the first image frame in the plurality of image frames where the specific target object is detected is respectively obtained from the video stream of each view.

If the plurality of views includes a side view and an overhead view, and the side view includes a view of the left side of the game desktop and/or a view of the right side of the game desktop, in the video stream at each view, for example, the video stream at the view of the right side of the game desktop, the view of the left side of the game desktop, or the overhead view, the first image frame in the plurality of continuous image frames where the specific target object is detected is respectively determined, and it is assumed that the first image frame in the plurality of continuous image frames where the specific target object at one view (such as the view of the left side of the game desktop) in a certain round is image a.

At step 103-2, synchronous images acquired synchronously with the first image frame are determined from the video streams synchronously acquired at the other views.

For example, when the current one view is the view of the left side of the game desktop, and there is one or more other views, assuming that the other view includes the view of the right side of the game desktop and/or the overhead view, the first image frame corresponding to the view of the right side of the game desktop, i.e., the synchronous image synchronously acquired with image a, is determined from the video stream synchronously acquired at the other view. Correspondingly, the number of synchronous image may also be one or more.

At step 103-3, in response to detecting the specific target object in at least one image frame in N image frames acquired before the synchronous images, the game progress stage is switched

at the time point corresponding to the image where the specific target object is detected earliest in the N image frames acquired before the synchronous images.

In the embodiments of the present disclosure, in each round of the game, the specific target object may be detected in the video streams synchronously acquired at the plurality of views, and in order to distinguish each round of the game during switching of the game progress stage, and avoid using a time point where the specific target object is detected in the last round of the game as the time point for switching the game progress stage in the present round of the game, the value range of N is limited. For example, N may be determined according to the average duration of a round of the game, the average duration of each game progress stage, and an image acquisition frequency, so as to ensure that N image frames before the synchronous image belong to the same round of the game. N may be greater than or equal 1, and less than or equal to 30.

The above is only an example to illustrate the value range of N, which may be limited in the same round of the game, and is limited according to the game time. This is not limited in the present disclosure.

Assuming that the first image frame at the view of the left side of the game desktop is image a, the synchronous image synchronously acquired at the overhead view with image a is image b, and the target object can also be detected in at least one image frame in the N image frames before image b, it can be considered that the specific target object is shielded in a period of time before image a is acquired at the view of the left side of the game desktop, resulting in that the earliest time point, when the target object appears, determined in the images acquired at the view of the left side of the game desktop in the present round of the game is incorrect, and at this time, the game progress stage is switched at the earliest time point corresponding to the image where the target object is detected in the N image frames before image b in the images acquired at the overhead view.

If the view streams acquired at three or more views are acquired, the synchronous images of the first image frame are required to be found at each of the views. After it is determined that the specific target object is detected in at least one image frame in N image frames before the synchronous images at each of the views, the earliest time points corresponding to the images where the target object is detected in the N image frames before the synchronous images at each of the views are determined, the earliest time point is found in the time points, and the game progress stage is switched at the earliest time point, so that the game progress stage is switched at the earliest time point when the specific target object appears in a round of the game. Therefore, it is more accurate to determine a game progress stage according to video streams acquired at a plurality of views, than according to a video stream acquired at a single view.

In the embodiments, in a case that the video streams include video streams synchronously acquired at a plurality of views of the game desktop, a time point for switching a game progress stage is determined quickly, and each round of the game is distinguished, so that the accuracy in switching of a game progress stage is improved.

In some optional embodiments, as shown in FIG. 4, the method further includes:

at step 104, in response to not detecting the specific target object in the N image frames acquired before the synchronous images, switching the game progress stage at the time point corresponding to the first image frame.

In the embodiments of the present disclosure, if the specific target object is not detected in each of the N image frames before the synchronous images at different views, it indicates that in the present round of the game, the time point when the specific target object first appears is the time point corresponding to the first image frame, and therefore, the time point corresponding to the first image frame is used as the time point for switching the game progress stage.

In some optional embodiments, step 102 includes:

for one image frame in the video streams, inputting the image frame into a neural network for target object detection to obtain a detection result, where the detection result indicates whether the image frame includes the specific target object.

In the embodiments of the present disclosure, a neural network for target object detection is pre-established, and adopts deep learning Faster Region Proposal Networks Convolutional Neural Networks (RCNN). In a training process, a plurality of sample image frames with annotations are used as input values, the plurality of sample images respectively including at least one of the target objects, and an output value is an object detection result of each sample image frame. According to a target object truth value on the plurality of sample image frames, a network parameter of the Faster RCNN is adjusted, so that a loss function is minimized, and the neural network for target object detection is trained.

After the video streams at the plurality of views of the game desktop are obtained, the video streams are input into the trained neural network for target object detection, so that the neural network for target object detection outputs the detection result. The detection result indicates whether the specific target object is included in each image frame of the view streams. In the embodiments of the present disclosure, the target object may include, but not limited to, at least one of: a person, a game chip, a game card, a game currency, or the like. The specific target object may include a game card.

In the embodiments, the neural network for target object detection is used to detect whether the specific target object is included in each image frame of the video streams, so as to perform subsequent switching of the game progress stage.

In some optional embodiments, the specific target object includes a game card, and step 103 includes:

switching the game progress stage from a betting stage to a game stage at the time point corresponding to the first image frame in the plurality of continuous image frames where the game card is detected.

In the embodiments of the present disclosure, if the game card is detected in a plurality of continuous image frames in the video frames, it indicates that the current round of the game enters the game stage. Therefore, the time point corresponding to the first image frame in the plurality of continuous image frames where the game card is detected is the time point for switching the game progress stage from the betting stage to the game stage.

In the embodiments, the game progress stage is switched from the betting stage to the game stage at the time point corresponding to the first image frame in the plurality of continuous image frames where the game card is detected, so that the hardware costs are saved, and the efficiency is improved.

In some optional embodiments, as shown in FIG. 5, the method further includes:

at step 105, providing a prompt of stopping betting after switching from the betting stage to the game stage.

In the embodiments of the present disclosure, the prompt of stopping betting may be provided as a voice prompt after switching from the betting stage to the game stage.

In some optional embodiments, as shown in FIG. 6, the method further includes:

at step 106, in response to detecting a change in betting chip in the images of the game stage in the video streams, determining that the changed chip is an invalid chip and sending warning information.

In the embodiments of the present disclosure, in each round of the game, after the switching from the betting stage to the game stage, if a change in betting chip is detected in the images of the game stage, for example, a certain player adds a betting chip, it is determined that the changed chip is an invalid chip. In the embodiments of the present disclosure, if a certain player adds a chip, according to rules of the game, it is determined that the chip added by the player after the game stage is entered is an invalid chip, or it is determined that all the chips of the

player are invalid chips. This is not limited in the present disclosure.

Furthermore, the warning information is also sent when the invalid chip is determined, for example, a warning is provided by means of voice, so as to ensure the fairness of the game.

In some optional embodiments, the game stage switching method can be applied to an intelligent casino. When a croupier performs switching from the betting stage to the game stage, there is no need to perform a specific action or press a specified button. Based on the video stream analysis, the video streams include video streams synchronously acquired at a plurality of views of the game desktop.

The first image frame in the plurality of continuous image frames where the specific target object is detected is first determined in the video stream at one view, and synchronous images acquired synchronously with the first image frame are determined from the video streams synchronously acquired at the other views. If the specific target object, for example, a game card, is detected in at least one image frame in N image frames acquired before the synchronous images, the game progress stage is switched from the betting stage to the game stage at the time point corresponding to the image where the specific target object is detected earliest in the N image frames acquired before the synchronous images.

If the specific target object is not detected in the N image frames acquired before the synchronous images, the game progress stage is also directly switched from the betting stage to the game stage at the time point corresponding to the first image frame.

In addition, in the embodiments of the present disclosure, during the switching from the betting stage to the game stage, a prompt of no more bet (common no-more-bet detection in casinos) is automatically provided. In addition, in the video streams, if a change in betting chip in the images of the game stage occurs, late bet detection (performing betting after a game card is issued during the game stage, which is a nonstandard betting mode) is automatically performed, and it is determined that the changed chip is an invalid chip, so that labor costs are saved, the game efficiency is improved, and the negligence of human monitoring is avoided.

Corresponding to the method embodiments above, the present disclosure further provides apparatus embodiments.

As shown in FIG. 7, FIG. 7 is a block diagram of a game stage switching apparatus according to an exemplary embodiment of the present disclosure. The apparatus includes: a video stream obtaining module 210, configured to obtain video streams of a game desktop; an object detection module 220, configured to perform respectively target object detection on a plurality of image frames included in the video streams; and a game stage switching module 230,

configured to, in response to detecting a specific target object in at least one image frame in the video streams, switch a game progress stage at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected.

In some optional embodiments, the video streams include video streams synchronously acquired at a plurality of views of the game desktop, and the game stage switching module includes: a first determining sub-module, configured to determine the first image frame in the plurality of continuous image frames where the specific target object is detected in the video stream at one view; a second determining sub-module, configured to determine synchronous images acquired synchronously with the first image frame from the video streams synchronously acquired at the other views; and a first game stage switching sub-module, configured to, in response to detecting the specific target object in at least one image frame in N image frames acquired before the synchronous images, switch the game progress stage at the time point corresponding to the image where the specific target object is detected earliest in the N image frames acquired before the synchronous images.

In some optional embodiments, the first game stage switching sub-module is configured to: in response to not detecting the specific target object in the N image frames acquired before the synchronous images, switch the game progress stage at the time point corresponding to the first image frame.

In some optional embodiments, the plurality of views includes: a side view and an overhead view, where the side view includes a view of the left side of the game desktop and/or a view of the right side of the game desktop.

In some optional embodiments, the object detection module includes: an object detection sub-module, configured to, for one image frame in the video streams, input the image frame into a neural network for target object detection to obtain a detection result, where the detection result indicates whether the image frame includes the specific target object.

In some optional embodiments, the target object includes at least one of a person, a game chip, a game card, or a game currency.

In some optional embodiments, the specific game object includes a game card, the game stage switching module includes: a second game stage switching sub-module, configured to switch the game progress stage from a betting stage to a game stage at the time point corresponding to the first image frame in the plurality of continuous image frames where the game card is detected.

In some optional embodiments, the apparatus further includes: a prompting module,

configured to provide a prompt of stopping betting after switching from the betting stage to the game stage.

In some optional embodiments, the apparatus further includes: a determining module, configured to, in response to detecting a change in betting chip in the images of the game stage in the video streams, determine that the changed chip is an invalid chip and send warning information.

The apparatus embodiments correspond to the method embodiments substantially, and for the associated part, refer to the descriptions of the method embodiments. The apparatus embodiments described above are merely exemplary. The units described as separate parts may or may not be physically separate, and the parts displayed as units may or may not be physical units, may be located at one position, or may be distributed on a plurality of network units. A part of or all of the modules may be selected according to actual needs to achieve the objectives of the solutions of the present disclosure. A person having ordinary skill in the art can understand and implement same without involving an inventive effort.

Embodiments of the present disclosure further provide a computer readable storage medium, having a computer program stored thereon, where computer program is configured to implement the game stage switching method according to any one of the foregoing items.

In some optional embodiments, embodiments of the present disclosure further provide a computer program product provided, including computer readable codes, where when the computer readable codes run in a device, the processor in the device executes the instructions for implementing the game stage switching method according to any one of the foregoing items.

In some optional embodiments, the embodiments of the present disclosure also provide a computer program product configured to store computer readable instructions, where when the instructions are executed, a computer executes the operations of the game stage switching method in any one of the foregoing embodiment.

The computer program product is specifically implemented by means of hardware, software, or a combination thereof. In one optional embodiment, the computer program product is specifically represented by a computer storage medium. In another optional embodiment, the computer program product is represented by a software product, such as Software Development Kit (SDK).

The embodiments of the present disclosure further provide a game stage switching apparatus, including: a processor; a memory configured to store processor executable instructions; where the processor is configured to invoke the executable instructions stored in the

memory, to implement the game stage switching method according to any one of the foregoing embodiments.

FIG. 5 is a schematic structural diagram of a game stage switching method according to the embodiments of the present application. The game stage switching apparatus 310 includes a processor 311, and further includes an input apparatus 312, an output apparatus 313, and a memory 314. The input apparatus 312, the output apparatus 313, the memory 314, and the processor 311 are interconnected by means of a bus.

The memory includes, but is not limited to, a Random Access Memory (RAM), a Read-Only Memory (ROM), an Erasable Programmable Read Only Memory (EPROM), or a Compact Disc Read-Only Memory (CD-ROM), and is used for related instructions and data.

The input/output interface may be used to input data and/or signals, and output data and/or signals. The output apparatus and the input apparatus may be independent devices, or may be an integrated device.

The processor may include one or more processors, for example, including one or more Central Processing Units (CPUs). If the processor is one CPU, the CPU may be a single-core CPU or a multi-core CPU.

The memory is configured to store program codes and data of a network device.

The processor is configured to invoke the program codes and data in the memory to execute the steps in the method embodiments above. Please refer to the descriptions in the foregoing method embodiments for details, and details are not described herein again.

It can be understood that FIG. 5 merely illustrates a simplified design of a game stage switching apparatus. In actual applications, a game stage switching apparatus may further include other unnecessary elements, including, but not limited to, any number of input/output apparatuses, processors, controllers, memories, etc. Any descriptions that can achieve the game stage switching apparatus in the embodiments of the present application should all be included within the scope of protection of the present application.

After considering the specification and practicing the invention of the present disclosure, other implementations of the present disclosure could easily be conceived of. The present disclosure aims at covering any deformation, usage or adaptive variation of the present disclosure, and the deformation, usage or adaptive variation conforms to the general principles of the present disclosure and include common knowledge or conventional technical measures in the technical field not disclosed in the present disclosure. The specification and the embodiments are

merely considered as exemplary, and the real scope and spirit of the present disclosure are specified in the following claims.

The above descriptions are merely preferred embodiments of the present disclosure and are not intended to limit the present disclosure. Any modification, equivalent replacement, or improvement made within the spirit and principle of the present disclosure shall fall within the scope of protection of the present disclosure.

CLAIMS

1. A game stage switching method, comprising:

obtaining video streams of a game desktop;

performing respectively target object detection on a plurality of image frames comprised in the video streams; and

in response to detecting a specific target object in at least one image frame in the video streams, switching a game progress stage at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected.

2. The method according to claim 1, wherein the video streams comprise video streams synchronously acquired at a plurality of views of the game desktop, and the switching a game progress stage at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected comprises:

determining the first image frame in the plurality of continuous image frames where the specific target object is detected in the video stream at one view;

determining synchronous images acquired synchronously with the first image frame from the video streams synchronously acquired at the other views; and

in response to detecting the specific target object in at least one image frame in N image frames acquired before the synchronous images, switching the game progress stage at the time point corresponding to the image where the specific target object is detected earliest in the N image frames acquired before the synchronous images.

3. The method according to claim 2, further comprising:

in response to not detecting the specific target object in the N image frames acquired before the synchronous images, switching the game progress stage at the time point corresponding to the first image frame.

4. The method according to claim 2 or 3, wherein the plurality of views comprises: a side view and an overhead view, wherein the side view comprises a view of the left side of the game desktop and/or a view of the right side of the game desktop.

5. The method according to any one of claims 1 to 4, wherein the performing respectively target object detection on a plurality of image frames comprised in the video streams comprises:

for one image frame in the video streams, inputting the image frame into a neural network for target object detection to obtain a detection result, wherein the detection result indicates

whether the image frame comprises the specific target object.

6. The method according to any one of claims 1 to 5, wherein the target object comprises at least one of a person, a game chip, a game card, or a game currency.

7. The method according to any one of claims 1 to 6, wherein the specific game object comprises a game card, and the switching a game progress stage at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected comprises:

switching the game progress stage from a betting stage to a game stage at the time point corresponding to the first image frame in the plurality of continuous image frames where the game card is detected.

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

providing a prompt of stopping betting after switching from the betting stage to the game stage.

9. The method according to claim 7 or 8, further comprising:

in response to detecting a change in betting chip in the images of the game stage in the video streams, determining that the changed chip is an invalid chip and sending warning information.

10. A game stage switching apparatus, comprising:

a video stream obtaining module, configured to obtain video streams of a game desktop;

an object detection module, configured to perform respectively target object detection on a plurality of image frames comprised in the video streams; and

a game stage switching module, configured to, in response to detecting a specific target object in at least one image frame in the video streams, switch a game progress stage at a time point corresponding to the first image frame in a plurality of continuous image frames where the specific target object is detected.

11. The apparatus according to claim 10, wherein the video streams comprise video streams synchronously acquired at a plurality of views of the game desktop, and the game stage switching module comprises:

a first determining sub-module, configured to determine the first image frame in the plurality of continuous image frames where the specific target object is detected in the video stream at one view;

a second determining sub-module, configured to determine synchronous images acquired synchronously with the first image frame from the video streams synchronously acquired at the other views; and

a first game stage switching sub-module, configured to, in response to detecting the specific target object in at least one image frame in N image frames acquired before the synchronous images, switch the game progress stage at the time point corresponding to the image where the specific target object is detected earliest in the N image frames acquired before the synchronous images.

12. The apparatus according to claim 11, wherein the first game stage switching sub-module is further configured to:

in response to not detecting the specific target object in the N image frames acquired before the synchronous images, switch the game progress stage at the time point corresponding to the first image frame.

13. The apparatus according to claim 11 or 12, wherein the plurality of views comprises: a side view and an overhead view, wherein the side view comprises a view of the left side of the game desktop and/or a view of the right side of the game desktop.

14. The apparatus according to any one of claims 10 to 13, wherein the object detection module comprises:

an object detection sub-module, configured to, for one image frame in the video streams, input the image frame into a neural network for target object detection to obtain a detection result, wherein the detection result indicates whether the image frame comprises the specific target object.

15. The apparatus according to any one of claims 10 to 14, wherein the target object comprises at least one of a person, a game chip, a game card, or a game currency.

16. The apparatus according to any one of claims 10 to 15, wherein the specific game object comprises a game card, and the game stage switching module comprises:

a second game stage switching sub-module, configured to switch the game progress stage from a betting stage to a game stage at the time point corresponding to the first image frame in the plurality of continuous image frames where the game card is detected.

17. The apparatus according to claim 16, further comprising:

a prompting module, configured to provide a prompt of stopping betting after switching from the betting stage to the game stage.

18. The apparatus according to claim 16 or 17, further comprising:

a determining module, configured to, in response to detecting a change in betting chip in the images of the game stage in the video streams, determine that the changed chip is an invalid chip and send warning information.

19. A computer readable storage medium, having a computer program stored thereon, wherein the computer program is configured to implement the game stage switching method according to any one of claims 1 to 9.

20. A game stage switching apparatus, comprising:

a processor; and

a memory configured to store processor executable instructions;

wherein the processor is configured to invoke the executable instructions stored in the memory, to implement the game stage switching method according to any one of claims 1 to 9.