CLAIMS

1. A method for detecting dealing sequence, comprising:

obtaining a video stream of a game desktop, and performing game card detection on multiple image frames included in the video stream;

in response to detecting a newly added game card in at least one image frame in the video stream, determining whether the newly added game card is in a target state in which allocation ends;

after the newly added game card is in the target state in which allocation ends, determining game information corresponding to the newly added game card; and

determining, based on the game information, whether a sequence of allocating the newly added game card conforms to a predetermined dealing sequence;

wherein the determining whether the newly added game card is in a target state in which allocation ends comprises:

determining, in a predetermined number of image frames that comprise the newly added game card, a distance between locations of the newly added game card in any two image frames among the predetermined number of image frames;

determining whether the distance between the locations satisfies a predetermined distance condition; and

under the condition that the distance satisfies the predetermined distance condition, determining that the newly added game card is in the target state in which allocation ends.

2. The method according to claim 1, wherein the performing game card detection on multiple image frames included in the video stream comprises:

inputting each image frame in the video stream into an object detection neural network to obtain an object detection result output by the object detection neural network, wherein the object detection result at least comprises whether each image frame in the video stream comprises a game card and a location of a game card in an image that comprises the game card.

3. The method according to claim 1, wherein the determining, in a predetermined number of image frames that comprise the newly added game card, a distance between locations of the newly

added game card in any two image frames among the predetermined number of image frames comprises:

determining respectively, in at least two adjacent image frames among the predetermined number of image frames, a motion trajectory of each game card included in the at least two adjacent image frames, wherein the at least two adjacent image frames comprise a current image frame and a previous image frame that is adjacent to the current image frame;

predicting, based on the motion trajectory of each game card in the at least two adjacent image frames, a predicted location of each game card in a next image frame that is adjacent to the current image frame;

obtaining a detected location of each game card included in the next image frame;

matching the predicted location with the detected location to determine a location of the newly added game card in the next image frame; and

determining the distance between the locations of the newly added game card in any two image frames among the predetermined number of image frames based on the locations of the newly added game card in any two image frames among the predetermined number of image frames.

4. The method according to any one of claims 1 to 3, wherein the determining whether the distance between the locations satisfies a predetermined distance condition comprises:

determining a first area of an overlapping part of target bounding boxes of the newly added game card in any two image frames among the predetermined number of image frames, and a second area occupied by the target bounding boxes of the newly added game card in any two image frames among the predetermined number of image frames other than the first area;

taking a sum of the first area and the second area as a third area; and

if a quotient of the first area and the third area is greater than a predetermined value, determining that the distance between the locations of the newly added game card in any two image frames among the predetermined number of image frames satisfies the predetermined distance condition.

5. The method according to any one of claims 1 to 4, wherein the game information corresponding to the newly added game card comprises at least one of the following:

game location information of the newly added game card on the game desktop, allocation

sequence information of the newly added game card in a game, or game identifier information of the newly added game card, wherein the game identifier information comprises at least one of a pattern or a figure.

6. The method according to claim 5, wherein the game information comprises the game location information of the newly added game card on the game desktop, and the determining game information corresponding to the newly added game card comprises:

taking, based on a location of the newly added game card in at least one image frame when the newly added game card is in the target state in which allocation ends, and on regions that are divided on the game desktop in advance and correspond to different game players, a region of a game player to which the location of the newly added game card belongs as the game location information of the newly added game card on the game desktop; and

the determining, based on the game information, whether a sequence of allocating the newly added game card conforms to a predetermined dealing sequence comprises:

determining, based on a specified allocation sequence of regions corresponding to different game players, a specified region where the newly added game card is located; and

under the condition that the region of the game player to which the location of the newly added game card belongs is consistent with the specified region, and a total number of game cards currently included in the region of the game player to which the location of the newly added game card belongs is less than or equal to a first predetermined value, determining that the sequence of allocating the newly added game card conforms to the predetermined dealing sequence.

7. The method according to claim 5, wherein the game information comprises the allocation sequence information of the newly added game card in the game, and the determining game information corresponding to the newly added game card comprises:

determining the number of game cards in a target region when the newly added game card is in the target state in which allocation ends, wherein the target region is a region where game cards in the target state in which allocation ends on the game desktop are located; and

taking the number of the game cards in the target region as the allocation sequence information of the newly added game card in the game; and

the determining, based on the game information, whether a sequence of allocating the newly added game card conforms to a predetermined dealing sequence comprises:

determining whether the number of the game cards in the target region is less than or equal to a second predetermined value; and

under the condition that the number of the game cards in the target region is less than or equal to the second predetermined value, determining that the sequence of allocating the newly added game card conforms to the predetermined dealing sequence.

8. The method according to claim 5, wherein the game information comprises the game identifier information of the newly added game card and the allocation sequence information of the newly added game card in the game, and the determining game information corresponding to the newly added game card comprises:

determining a figure of the newly added game card based on at least one image frame that comprises the newly added game card;

determining the number of game cards in a target region when the newly added game card is in the target state in which allocation ends, wherein the target region is a region where game cards in the target state in which allocation ends on the game desktop are located; and

taking the number of the game cards in the target region as the allocation sequence information of the newly added game card in the game; and

the determining, based on the game information, whether a sequence of allocating the newly added game card conforms to a predetermined dealing sequence comprises:

determining a sum of figure of all the game cards except the newly added game card in the target region; and

under the condition that the number of the game cards in the target region is greater than or equal to a second predetermined value and less than a third predetermined value, and the sum of figure does not exceed a preset sum of figure, determining that the sequence of allocating the newly added game card conforms to the predetermined dealing sequence.

9. An apparatus for detecting dealing sequence, comprising:

an execution module, configured to: obtain a video stream of a game desktop, and perform game card detection on multiple image frames included in the video stream;

a first determining module, configured to: in response to detecting a newly added game card in at least one image frame in the video stream, determine whether the newly added game card is in a target state in which allocation ends;

a second determining module, configured to: after the newly added game card is in the target state in which allocation ends, determine game information corresponding to the newly added game card; and

a third determining module, configured to determine, based on the game information, whether a sequence of allocating the newly added game card conforms to a predetermined dealing sequence;

wherein the first determining module comprises:

a first determining sub-module, configured to determine, in a predetermined number of image frames that comprise the newly added game card, a distance between locations of the newly added game card in any two image frames among the predetermined number of image frames;

a second determining sub-module, configured to determine whether the distance between the locations satisfies a predetermined distance condition; and

a third determining sub-module, configured to: under the condition that the distance satisfies the predetermined distance condition, determine that the newly added game card is in the target state in which allocation ends.

10. The apparatus according to claim 9, wherein the execution module is configured to:

input each image frame in the video stream into an object detection neural network to obtain an object detection result output by the object detection neural network, wherein the object detection result at least comprises whether each image frame in the video stream comprises a game card and a location of a game card in an image that comprises the game card.

11. The apparatus according to claim 9, wherein the first determining sub-module comprises:

a first determining unit, configured to determine respectively, in at least two adjacent image frames among the predetermined number of image frames, a motion trajectory of each game card included in the at least two adjacent image frames, wherein the at least two adjacent image frames comprise a current image frame and a previous image frame that is adjacent to the current image frame;

a predicting unit, configured to predict, based on the motion trajectory of each game card in the at least two adjacent image frames, a predicted location of each game card in a next image frame that is adjacent to the current image frame;

an obtaining unit, configured to obtain a detected location of each game card included in the

next image frame;

a second determining unit, configured to match the predicted location with the detected location to determine a location of the newly added game card in the next image frame; and

a third determining unit, configured to determine the distance between the locations of the newly added game card in any two image frames among the predetermined number of image frames based on the locations of the newly added game card in any two image frames among the predetermined number of image frames.

12. The apparatus according to any one of claims 9 to 11, wherein the second determining sub-module comprises:

a fourth determining unit, configured to determine a first area of an overlapping part of target bounding boxes of the newly added game card in any two image frames among the predetermined number of image frames, and a second area occupied by the target bounding boxes of the newly added game card in any two image frames among the predetermined number of image frames other than the first area;

a fifth determining unit, configured to take a sum of the first area and the second area as a third area; and

a sixth determining unit, configured to: if a quotient of the first area and the third area is greater than a predetermined value, determine that the distance between the locations of the newly added game card in any two image frames among the predetermined number of image frames satisfies the predetermined distance condition.

13. The apparatus according to any one of claims 9 to 12, wherein the game information corresponding to the newly added game card comprises at least one of the following:

game location information of the newly added game card on the game desktop, allocation sequence information of the newly added game card in a game, or game identifier information of the newly added game card, wherein the game identifier information comprises at least one of a pattern or a figure.

14. The apparatus according to claim 13, wherein the game information comprises the game location information of the newly added game card on the game desktop, and the second determining module comprises:

a fourth determining sub-module, configured to take, based on a location of the newly added

game card in at least one image frame when the newly added game card is in the target state in which allocation ends, and on regions that are divided on the game desktop in advance and correspond to different game players, a region of a game player to which the location of the newly added game card belongs as the game location information of the newly added game card on the game desktop; and

the third determining module comprises:

a fifth determining sub-module, configured to determine, based on a specified allocation sequence of regions corresponding to different game players, a specified region where the newly added game card is located; and

a sixth determining sub-module, configured to: under the condition that the region of the game player to which the location of the newly added game card belongs is consistent with the specified region, and a total number of game cards currently included in the region of the game player to which the location of the newly added game card belongs is less than or equal to a first predetermined value, determine that the sequence of allocating the newly added game card conforms to the predetermined dealing sequence.

15. The apparatus according to claim 13, wherein the game information comprises the allocation sequence information of the newly added game card in the game, and the second determining module comprises:

a seventh determining sub-module, configured to determine the number of game cards in a target region when the newly added game card is in the target state in which allocation ends, wherein the target region is a region where game cards in the target state in which allocation ends on the game desktop are located; and

an eighth determining sub-module, configured to take the number of the game cards in the target region as the allocation sequence information of the newly added game card in the game; and

the third determining module comprises:

a ninth determining sub-module, configured to determine whether the number of the game cards in the target region is less than or equal to a second predetermined value; and

a tenth determining sub-module, configured to: under the condition that the number of the game cards in the target region is less than or equal to the second predetermined value, determine that the sequence of allocating the newly added game card conforms to the predetermined dealing

sequence.

16. The apparatus according to claim 13, wherein the game information comprises the game identifier information of the newly added game card and the allocation sequence information of the newly added game card in the game, and the second determining module comprises:

an eleventh determining sub-module, configured to determine a figure of the newly added game card based on at least one image frame that comprises the newly added game card;

a twelfth determining sub-module, configured to determine the number of game cards in a target region when the newly added game card is in the target state in which allocation ends, wherein the target region is a region where game cards in the target state in which allocation ends on the game desktop are located; and

a thirteenth determining sub-module, configured to take the number of the game cards in the target region as the allocation sequence information of the newly added game card in the game; and

the third determining module comprises:

a fourteenth determining sub-module, configured to determine a sum of figure of all the game cards except the newly added game card in the target region; and

a fifteenth determining sub-module, configured to: under the condition that the number of the game cards in the target region is greater than or equal to a second predetermined value and less than a third predetermined value, and the sum of figure does not exceed a preset sum of figure, determine that the sequence of allocating the newly added game card conforms to the predetermined dealing sequence.

17. A computer-readable storage medium, wherein the storage medium stores a computer program, and the computer program is configured to perform the method for detecting dealing sequence according to any one of claims 1 to 8.

18. An electronic device, comprising:

a processor; and

a memory configured to store instructions executable by the processor; wherein

the processor is configured to invoke the executable instructions stored in the memory to implement the method for detecting dealing sequence according to any one of claims 1 to 8.