CLAIMS

1. An image processing method, comprising:

obtaining video streams of a game tabletop;

detecting target objects in a plurality of image frames comprised in the video streams;

determining a current game stage based on the target objects; and

determining game detecting results according to the target objects and the determined game stage,

wherein determining the current game stage based on the target objects comprises:

determining, in response to a specific target object being detected in a specific region of the game tabletop in at least one image frame in the video streams, a time point corresponding to a first image frame in a plurality of continuous image frames in which the specific target object is detected in the specific region of the game tabletop; and

taking the determined time point as a start time point of a game stage,

the video streams comprise video streams synchronously acquired in a plurality of views of the game tabletop, and determining the time point corresponding to the first image frame in the plurality of continuous image frames in which the specific target object is detected in the specific region of the game tabletop comprises:

determining the first image frame in the plurality of continuous image frames in which the specific target object is detected in the specific region of the game tabletop in a video stream in one view;

determining a synchronous image acquired synchronously with the first image frame from a video stream synchronously acquired in another view; and

determining, in response to the specific target object being detected in the specific region of the game tabletop in at least one of N image frames before the synchronous image, a time point corresponding to an image in which the specific target object is detected in the specific region of the game tabletop earliest among the N image frames before the synchronous image.

2. The method according to claim 1, wherein the video streams comprise video

streams synchronously acquired in a plurality of views of the game tabletop, and detecting the target objects in the plurality of image frames comprised in the video streams comprises:

performing target detection on a first image acquired in a first view to determine target objects in the first image;

performing target detection on a second image synchronously acquired in a second view to determine target objects in the second image; and

determining association relationships between the target objects in the first image and the target objects in the second image based on appearance information and surrounding information of the target objects in the first image and appearance information and surrounding information of the target objects in the second image, wherein the appearance information of a target object is determined according to pixels within a bounding box of the target object in an image in which the target object is located, and the surrounding information of a target object is determined according to pixels within a set range around a bounding box of the target object in an image in which the target object is located.

3. The method according to claim 2, wherein determining the association relationships between the target objects in the first image and the target objects in the second image based on the appearance information and the surrounding information of the target objects in the first image and the appearance information and the surrounding information of the target objects in the second image comprises:

determining first feature distances based on the appearance information of the target objects in the first image and the appearance information of the target objects in the second image, wherein a first feature distance represents a similarity between a target object in the first image and a target object in the second image;

determining second feature distances based on the surrounding information of the target objects in the first image and the surrounding information of the target objects in the second image, wherein a second feature distance represents a similarity between the surrounding information of a target object in the first image and the surrounding information of a target object in the second image;

for a target object in the first image and a target object in the second image, determining a feature distance between the two target objects according to the first feature distance and the second feature distance between the two target objects; and

determining the association relationships between the target objects in the first image and the target objects in the second image based on the determined feature distances.

4. The method according to claim 3, wherein determining the feature distance between the two target objects according to the first feature distance and the second feature distance between the two target objects comprises:

performing weighted summation on the first feature distance and the second feature distance between the two target objects to obtain the feature distance between the two target objects, wherein the higher the similarity between the two target objects, the greater a weight coefficient of the second feature distance between the two target objects during weighted summation.

5. The method according to claim 3 or 4, wherein the method further comprises:

determining geometric distances between the target objects in the first image and the target objects in the second image; and

determining the association relationships between the target objects in the first image and the target objects in the second image based on the determined feature distances comprises:

for a target object in the first image and a target object in the second image, determining a distance between the two target objects according to the feature distance and the geometric distance between the two target objects; and

determining the association relationships between the target objects in the first image and the target objects in the second image according to the distances between the target objects in the first image and the target objects in the second image.

6. The method according to claim 5, wherein determining the association relationships between the target objects in the first image and the target objects in the second image according to the distances between the target objects in the first image and the target objects in the second image comprises:

forming a distance matrix according to the distances between the target objects in the first image and the target objects in the second image, wherein the value of an element in the distance matrix represents the distance between a target object in the first image and a target object in the second image; and

determining an adjacency matrix between the first image and the second image

according to the distance matrix, wherein the value of an element in the adjacency matrix represents whether a target object in the first image is associated or not associated with a target object in the second image.

7. The method according to claim 1, further comprising:

determining, in response to no specific target object being detected in the specific region of the game tabletop in the N image frames before the synchronous image, the time point corresponding to the first image frame.

8. The method according to any one of claims 1 to 7, wherein determining, in response to the specific target object being detected in the specific region of the game tabletop in the at least one image frame in the video streams, the time point corresponding to the first image frame in the plurality of continuous image frames in which the specific target object is detected in the specific region of the game tabletop comprises:

determining, in response to a game currency being detected in a game participation region of the game tabletop in the at least one image frame in the video streams, a time point corresponding to a first image frame in a plurality of continuous image frames in which a game currency is detected in a game participation region of the game tabletop; and

taking the determined time point as the start time point of the game stage comprises:

taking the determined time point as a start time point of a first game stage.

9. The method according to any one of claims 1 to 7, wherein determining, in response to the specific target object being detected in the specific region of the game tabletop in the at least one image frame in the video streams, the time point corresponding to the first image frame in the plurality of continuous image frames in which the specific target object is detected in the specific region of the game tabletop comprises:

determining, in response to a game card being detected in a game play region of the game tabletop in the at least one image frame in the video streams, a time point corresponding to a first image frame in a plurality of continuous image frames in which a game card is detected in the game play region of the game tabletop; and

taking the determined time point as the start time point of the game stage comprises:

taking the determined time point as an end time point of a first game stage and a start time point of a second game stage.

10. The method according to any one of claims 1 to 7, wherein determining, in response to the specific target object being detected in the specific region of the game tabletop in the at least one image frame in the video streams, the time point corresponding to the first image frame in the plurality of continuous image frames in which the specific target object is detected in the specific region of the game tabletop comprises:

determining, in response to the number of game cards or the sum of points thereof in the game play region of the game tabletop being detected to reach a preset condition in the at least one image frame in the video streams, a time point corresponding to a first image frame in a plurality of continuous image frames in which the number of game cards or the sum of points thereof in the game play region of the game tabletop is detected to reach the preset condition; and

taking the determined time point as the start time point of the game stage comprises:

taking the determined time point as an end time point of a second game stage and a start time point of a third game stage.

11. The method according to claim 1, wherein the current game stage is a first game stage, the target objects comprise a person object and an item object, and determining the game detecting results according to the target objects and the determined current game stage comprises:

determining correspondence relationships between game currencies and players; and

determining game participation results of the players according to the determined correspondence relationships and rules at the first game stage, wherein the game participation result comprises the total value of game currencies of the player involved in a game and a sub-region where the game currencies involved in the game are located in a game participation region.

12. The method according to claim 1, wherein the current game stage is a second game stage, and determining the game detecting results according to the target objects and the determined game stage comprises:

issuing prompt information if any of the following occurs:

if it is detected that a game participation result in a game participation region of the game tabletop changes; and

if it is detected that the type, position, or appearance order of a game card in a game

play region of the game tabletop is different from a preset rule.

13. The method according to claim 1, wherein determining the game detecting results according to the target objects and the determined game stage comprises:

determining game results according to positions and points of game cards in a game play region of the game tabletop at an end time point of a second game stage.

14. The method according to claim 1, wherein the current game stage is a third game stage, and determining the game detecting results according to the target objects and the determined game stage comprises:

determining payment results of players according to game results determined at the end of a second game stage, game participation results of the players at the end of a first game stage, and payment rules.

15. The method according to claim 14, further comprising:

determining payment results performed by an operator;

comparing the payment results of the players with the payment results performed by the operator to determine whether the payment results are performed correctly; and

issuing alarm information if the payment results are performed incorrectly.

16. An image processing apparatus, comprising:

an obtaining module, configured to obtain video streams of a game tabletop;

a detecting module, configured to detect target objects in a plurality of image frames comprised in the video streams;

a game stage determining module, configured to determine a current game stage based on the target objects; and

a result determining module, configured to determine game detecting results according to the target objects and the determined game stage,

wherein, in order to determine a current game stage based on the target objects, the game stage determining module is configured to:

determine, in response to a specific target object being detected in a specific region of the game tabletop in at least one image frame in the video streams, a time point corresponding to a first image frame in a plurality of continuous image frames in which the

specific target object is detected in the specific region of the game tabletop; and

take the determined time point as a start time point of a game stage,

the video streams comprise video streams synchronously acquired in a plurality of views of the game tabletop, and in order to determine a time point corresponding to a first image frame in a plurality of continuous image frames in which the specific target object is detected in the specific region of the game tabletop, the game stage determining module is configured to:

determine the first image frame in the plurality of continuous image frames in which the specific target object is detected in the specific region of the game tabletop in a video stream in one view;

determine a synchronous image acquired synchronously with the first image frame from a video stream synchronously acquired in another view; and

determine, in response to the specific target object being detected in the specific region of the game tabletop in at least one of N image frames before the synchronous image, a time point corresponding to an image in which the specific target object is detected in the specific region of the game tabletop earliest among the N image frames before the synchronous image.

17. An electronic device, comprising:

a processor; and

a memory configured to store processor-executable instructions;

wherein the processor is configured to invoke the instructions stored in the memory to implement the method according to any one of claims 1 to 15.

18. A computer-readable storage medium, having computer program instructions stored thereon, wherein when the computer program instructions are executed by a processor, the method according to any one of claims 1 to 15 is implemented.