[0005] In this specification, a statement that an element may be “at least one of” a list of options is to be understood that the element may be any one of the listed options, or may be any combination of two or more of the listed options.

[0006] Any discussion of documents, acts, materials, devices, articles or the like which has been included in the present specification is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present disclosure as it existed before the priority date of each claim of this application.

Summary

[0006a] According to an aspect of the present invention, there is provided a system for monitoring gaming activity in a gaming area comprising a gaming table, the system comprising: at least one camera configured to capture images of the gaming area; at least one processor configured to communicate with the at least one camera and a memory; the memory storing instructions executable by the at least one processor to configure the at least one processor to: determine presence of a first gaming object on the gaming table in a first image from a series of images of the gaming area captured by the at least one camera, the series of images comprising one or more images, responsive to determining the presence of the first gaming object in the first image, process the first image to estimate postures of one or more players in the first image, and based on the estimated postures, determine a first target player associated with the first gaming object among the one or more players.

[0007] Some embodiments relate to a system for monitoring gaming activity in a gaming area comprising a gaming table, the system comprising: at least one camera configured to capture images of the gaming area; at least one processor configured to communicate with the at least one camera and a memory; the memory storing instructions executable by the at least one processor to configure the at least one processor to: determine a presence of a first gaming object on the gaming table in a first image from a series of images of the gaming area captured by the at least one camera,

the series of images comprising one or more images, responsive to determining the presence of the first gaming object in the first image, process the first image to estimate postures of one or more players in the first image, and based on the estimated postures, determine a first target player associated with the first gaming object among the one or more players.

[0008] In some embodiments, the at least one processor is further configured to execute instructions stored in the memory to determine in the series of images an image region of a face of the first target player associated with the first gaming object.

[0009] In some embodiments, processing the image to estimate postures of one or more players in the first image comprises identifying one or more periphery indicator

Claims

1. A system for monitoring gaming activity in a gaming area comprising a gaming table, the system comprising:

at least one camera configured to capture images of the gaming area;

at least one processor configured to communicate with the at least one camera and a memory;

the memory storing instructions executable by the at least one processor to configure the at least one processor to:

determine presence of a first gaming object on the gaming table in a first image from a series of images of the gaming area captured by the at least one camera, the series of images comprising one or more images,

responsive to determining the presence of the first gaming object in the first image, process the first image to estimate postures of one or more players in the first image, and

based on the estimated postures, determine a first target player associated with the first gaming object among the one or more players.

2. The system of claim 1, wherein the instructions are executable to configure the at least one processor to determine in the series of images an image region of a face of the first target player associated with the first gaming object.

3. The system of claim 1, wherein processing the first image to estimate postures of one or more players in the first image comprises identifying one or more periphery indicator regions in the first image, each periphery indicator region corresponding to a distal hand periphery of one or more players.

4. The system of claim 3, wherein each of the one or more periphery indicator regions corresponds to a distal left hand periphery or a distal right hand periphery.

5. The system of claim 1, wherein the instructions are executable to configure the at least one processor to determine the first target player associated with the first gaming object by:

estimating a distance of each periphery indicator region from the first gaming object in the first image;

identifying a closest periphery indicator region based on the estimated distance; and

determining the first target player associated with the first gaming object based on the identified closest periphery indicator region.

6. The system of claim 5, wherein processing the first image to estimate postures of one or more players in the first image comprises: estimating a skeletal model of one or more players, and determining the first target player associated with the first gaming object based on the estimated skeletal model of one or more players.

7. The system of claim 6, wherein estimating the skeletal model of one or more players comprises estimating key points in the first image associated with one or more of: wrists, elbows, shoulders, neck, nose, eyes or ears of the one or more players.

8. The system of claim 1, wherein the instructions are executable to further configure the at least one processor:

determine presence of a second gaming object on the gaming table in a second image from the series of images;

responsive to determining the presence of the second gaming object in the second image, process the second image to estimate postures of players in the second image;

based on the estimated postures, determine a second target player associated with the second gaming object among the players.

9. The system of claim 1, wherein the first gaming object comprises any one of: a game object, a token, a currency note or a coin.

10. The system of claim 1, wherein the memory comprises one or more posture estimation machine learning models trained to estimate postures of one or more players in the series of images.

11. The system of claim 10, wherein the one or more posture estimation machine learning models comprise one or more deep learning artificial neural networks trained to estimate postures of one or more players in the captured images.

12. The system of claim 2, wherein identifying a face of the first target player further comprises determining a vector representation of the image region of the face of the first target player using a face recognition machine learning model stored in the memory.

13. The system of claim 1, wherein the instructions are executable to further configure the at least one processor to estimate a game object value associated with the first gaming object.

14. The system of claim 1, wherein determining a presence of a first gaming object on the gaming table further comprises determining a position on the gaming table zone of the first gaming object.

15. The system of claim 1, wherein the at least one processor is further configured to execute instructions stored in the memory to identify in the series of images a plurality of face regions corresponding to a face of the first target player associated with the first gaming object.

16. The system of claim 15, wherein the instructions are executable to further configure the at least one processor to process the plurality of face regions to determine face orientation information of the first target player's face in each of the plurality of face regions.

17. The system of claim 16, wherein the instructions are executable to further configure the at least one processor to process the face orientation information of the first target player's face in each of the plurality of face regions to determine a most head-on face region corresponding to the target player.