amount of wagered chips, proposed is a technique of attaching an wireless IC (RFID) tag to each chip to recognize the amount of the chip.

[0005]

In a card game monitoring system disclosed in WO 2015/107902 A, fraud monitoring is performed by determining through image analysis of movement of chips whether or not the chips placed on a gaming table are collected or redeemed in accordance with a win or lose result.

SUMMARY

[0006]

The present disclosure seeks to provide a new system for detecting fraud in a game in a casino or an error or fraud at the time of wagering chips or doing settlement.

[0006a]

According to an aspect of the present disclosure, there is provided a management system of table game in casino having a plurality of gaming tables, each of the plurality of gaming tables having a plurality of player positions and a plurality of betting areas, the betting areas arranged in a two-dimensional orientation, the management system comprising:

at least one game recording apparatus configured to record a progress of a game played in the gaming table as an image;

an image analyzing apparatus configured to perform image analysis on the image of the recorded progress of the game;

a control device configured to recognize positions, types, and numbers of chips on the gaming table

wagered on each of the player positions through the image analyzing apparatus,

wherein the control device further has function that is capable of recognizing positions, types, and amount of the chips wagered on each of the player positions in each game using artificial intelligence technology;

wherein the at least one game recording apparatus has an offset viewing angle capturing the plurality of betting areas on which can be recognized the positions, types, and numbers of wagered chips on each of the player positions.

[0006b]

According to another aspect of the present disclosure, there is provided a management system of one or more table games in a casino having a plurality of gaming tables, the management system comprising:

a camera configured to capture an image of a gaming table of the plurality of gaming tables including a plurality of betting areas and chips wagered on the betting areas, each of the betting areas corresponding to a respective player position of a plurality of player positions, the betting areas arranged in a two-dimensional orientation, wherein the camera is positioned raised from a top surface of the gaming table and oriented so that a direction of an optical axis of the camera is oblique relative to the top surface of the gaming table; and

a control device configured to:

process the image using artificial intelligence technology or a neural network based image recognition

technology to determine one or more positions, one or more types, and one or more numbers of the wagered chips; and

calculate respective amounts of the wagered chips of the player positions respectively.

[0006c]

According to another aspect of the present disclosure, there is provided a management system of table game in casino having a plurality of gaming tables, comprising:

a camera configured to capture an image of a gaming table including a plurality of betting areas and chips wagered on each of the betting areas, each of the betting areas respectively corresponding to each of a plurality of player positions, the betting areas arranged in a two-dimensional orientation; and

a control device configured to perform, by using a neural network based image recognition technology, image analyzing on the image to determine positions, types, and numbers of the chips,

wherein the control device is configured to calculate amount of the wagered chips of each of the betting areas,

wherein the camera has an offset viewing angle capturing a plurality of betting areas on which can be recognized the positions, types, and numbers of wagered chips by each of the player positions.

[0007]

There is also disclosed a fraud detection system in a casino having a plurality of gaming tables, including: a game recording apparatus which records a progress of a game played in the gaming table as an image; an image analyzing apparatus

which performs image analysis on the image of the recorded progress of the game; a win/lose result determining apparatus which determines a win or lose result of each game in the gaming table; and a control device which detects fraud practiced in the gaming table by using a result of the image analysis by the image analyzing

CLAIMS

1. A management system of table game in casino having a plurality of gaming tables, each of the plurality of gaming tables having a plurality of player positions and a plurality of betting areas, the betting areas arranged in a two-dimensional orientation, the management system comprising:

at least one game recording apparatus configured to record a progress of a game played in the gaming table as an image;

an image analyzing apparatus configured to perform image analysis on the image of the recorded progress of the game;

a control device configured to recognize positions, types, and numbers of chips on the gaming table wagered on each of the player positions through the image analyzing apparatus,

wherein the control device further has function that is capable of recognizing positions, types, and amount of the chips wagered on each of the player positions in each game using artificial intelligence technology;

wherein the at least one game recording apparatus has an offset viewing angle capturing the plurality of betting areas on which can be recognized the positions, types, and numbers of wagered chips on each of the player positions.

2. The management system of table game according to

claim 1, wherein the control device has a structure capable of recognizing amount of increase/decrease of chips of each of the player positions in a game calculated from a win or lose result of the game, recognizing history within a predetermined game, and recognizing history of win or lose and amount of income/expenditure of each of the player positions at timings when each predetermined number of games have elapsed.

3. The management system of table game according to claim 2, further comprising a win or lose result determining device configured to determine the win or lose result of each game in the gaming table, wherein

the win or lose result of game is obtained by the win or lose result determining device.

4. The management system of table game according to any one of claims 1 to 3, wherein the control device has a structure capable of specifying a player position in a strange situation in which amount of betting, winning amount, and/or win and lose history is strange comparing with statistical data, and has a function of informing existence of the specified player position.

5. The management system of table game according to claim 4, wherein the strange situation is at least one of:

1) a situation in which a winning amount more than a predetermined amount occurs;

2) a situation in which a state that the amount of betting chips at lose time is small and the amount of betting chips at the win time is large continues for several games and the state is strange compared with statistical data;

3) a situation in which an actual winning amount of each of the player positions is strange comparing with an average wining amount statistically expected based on history of the amount of betting;

4) a situation in which the position of chips wagered on each of the player positions and the amount of chips obtained at each of the player positions are strange compared with statistical data; or

5) a situation in which a winning rate when the amount of betting is more than a predetermined amount is strange compared with statistical data.

6. The management system of table game according to claim 4 or 5, wherein the function of specifying player position of the control device has a structure configured to specify and extract a face image of players of each of the player positions by using artificial intelligence technology or machine learning technology.

7. The management system of table game according to any one of claims 1 to 6, wherein there comprises two game recording apparatuses.

8. A management system of one or more table games in a casino having a plurality of gaming tables, the management system comprising:

a camera configured to capture an image of a gaming table of the plurality of gaming tables including a plurality of betting areas and chips wagered on the betting areas, each of the betting areas corresponding to a respective player position of a plurality of player positions, the betting areas arranged in a two-dimensional orientation, wherein the camera is positioned raised from a top surface of the gaming table and oriented so that a direction of an optical axis of the camera is oblique relative to the top surface of the gaming table; and

a control device configured to:

process the image using artificial intelligence technology or a neural network based image recognition technology to determine one or more positions, one or more types, and one or more numbers of the wagered chips; and

calculate respective amounts of the wagered chips of the player positions respectively.

9. The management system according to claim 8, wherein the management system is configured to identify respective players at the player positions.

10. The management system according to claim 9, wherein the control device is configured to calculate a respective amount of the wagered chips for each of the player

positions, and thereby associate the respective calculated amounts with the respective identified players.

11. The management system according to claim 9, further comprising a data storage, wherein the control device is configured to store a history of the respective amount of the wagered chips of the respective players.

12. The management system according to claim 9, wherein the identification of the respective players is performed by identifying respective identifications (ID) provided to the players.

13. The management system according to claim 8, wherein the control device is further configured to calculate a total amount of the wagered chips of the betting areas.

14. The management system according to claim 12, wherein the control device is configured to calculate the total amount each time a predefined number of the games are over.

15. The management system according to claim 12, further comprising a data storage, wherein the control device is configured to store a history of the total amount of the wagered chips of the betting areas.

16. The management system according to claim 8, wherein the control device is further configured to calculate a total

amount of the wagered chips of the betting areas for each of the players respectively, a total amount of winning chips for each of the players respectively, or a total amount of losing chips for each of the players respectively.

17. The management system according to claim 8, wherein the control device is configured to:

for each of the games:

recognize a history of the respective game; and

for each of the players, calculate a respective amount of a change of chips, by increase or decrease, in the respective game based on a respective win or lose result of the respective game; and

for each of the players, recognize a history of win or lose and amounts of income/expenditure of the respective player at each lapse of a predetermined number of the games.

18. The management system according to claim 16, further comprising a game result processor, wherein the game result processor is configured to determine the respective win or lose results of each of the one or more games.

19. The management system according to claim 8, wherein the control device is configured to:

identify an individual one of the players as being in a strange situation in which a respective betting amount, a

respective winning amount, and/or a respective win and lose history is strange compared with statistical data; and

output an indication of existence of the identified individual player.

20. The management system according to claim 19, wherein the strange situation is at least one of:

1) a situation in which the respective winning amount is more than a predetermined winning amount;

2) a situation in which a state of a respective betting amount of betting chips at a lose time being small and a respective betting amount of betting chips at a win time being large continues for several games and the state is aberrant compared with statistical data;

3) a situation in which respective actual winning amounts of the respective players is strange compared with an average wining amount statistically expected based on a history of betting amounts;

4) a situation in which a respective one or more positions of chips wagered by a respective one of the players and a respective amount of chips obtained by the respective player are strange compared with statistical data; or

5) a situation in which a winning rate when the amount of betting is more than a predetermined amount is strange compared with statistical data.

21. The management system according to claim 8, wherein the

management system is configured to perform the identification of the respective players playing the player positions from respective face images of the players by using a neural network based image recognition technology.

22. A management system of table game in casino having a plurality of gaming tables, comprising:

a camera configured to capture an image of a gaming table including a plurality of betting areas and chips wagered on each of the betting areas, each of the betting areas respectively corresponding to each of a plurality of player positions, the betting areas arranged in a two-dimensional orientation; and

a control device configured to perform, by using a neural network based image recognition technology, image analyzing on the image to determine positions, types, and numbers of the chips,

wherein the control device is configured to calculate amount of the wagered chips of each of the betting areas,

wherein the camera has an offset viewing angle capturing a plurality of betting areas on which can be recognized the positions, types, and numbers of wagered chips by each of the player positions.

23. The management system of table game according to claim 22, further comprising a data storage device configured to store history of the amount of the wagered chips of each of the player positions.

24. The management system of table game according to claim 22, further comprising a player identifying device configured to identify a player playing at the player position and a data storage device configured to store history of the amount of the wagered chips of each of the player.

25. The management system of table game according to claim 22, wherein the control device is further configured to calculate a total amount of the wagered chips of the betting areas.

26. The management system of table game according to claim 25, further comprising a data storage device configured to store history of the total amount of the wagered chips of the betting areas.

27. The management system of table game according to claim 22, wherein the control device is configured to recognize amount of increase/decrease of chips of the player in a game calculated from a win or lose result of the game, recognize history within a predetermined game, and recognize history of win or lose and amount of income/expenditure of each player at timings when each predetermined number of games have elapsed.

28. The management system of table game according to

claim 27, further comprising a win or lose result determining device is configured to determine the win or lose result of each game in the gaming table, wherein the win or lose result of game is obtained by the win or lose result determining device.

29. The management system of table game according to claim 22, wherein the control device is configured to specify individual player in a strange situation in which amount of betting, winning amount, and/or win and lose history is strange comparing with statistical data, and inform existence of the specified player.

30. The management system of table game according to claim 29, wherein the strange situation is at least one of:

1) a situation in which a winning amount more than predetermined amount occurs;

2) a situation in which a state that the amount of betting chips at lose time is small and the amount of betting chips at a win time is large continues for several games and the state is strange compared with statistical data;

3) a situation in which an actual winning amount of each player is strange comparing with an average wining amount statistically expected based on history of the amount of betting;

4) a situation in which the position of chips wagered by each player and the amount of chips obtained by each

player are strange compared with statistical data; or

5) a situation in which winning rate when the amount of betting is more than a predetermined amount is strange compared with statistical data.

31. The management system of table game according to claim 24, wherein the player identifying device is configured to identify a player from a face image of the player by using a neural network based image recognition technology.