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]

Embodiments of the invention seek 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.

[0007]

According to an aspect of the invention, there is provided 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 apparatus and the win or lose result determined by the win/lose result determining apparatus,

determining apparatus may be a card distribution device which distributes the cards in the gaming table or a control device which determines the win or lose result of each game from information of the image analyzing apparatus reading the cards distributed in the gaming table by using a camera.

[0020a]

According to another aspect of the invention, there is provided a fraud detection system in a casino having a plurality of gaming tables, comprising:

a game recording apparatus which records a progress of a game played in the gaming table including a dealer and a player as an image through a camera;

an image analyzing apparatus which performs image analysis on the image of the recorded progress of the game;

a card distribution device which determines a win or lose result of each game in the gaming table; and

an intelligence type control device which detects fraud practiced in the gaming table by using a result of the image analysis by the image analyzing apparatus and a win or lose result determined by the card distribution device.

[0020b]

According to another aspect of the invention, there is provided a fraud detection system in a casino having a plurality of gaming tables, comprising:

a game recording apparatus which records a progress of a game played in the gaming table including a dealer and a player as an image through a camera;

a card distribution device which determines a win or lose result of each game in the gaming table;

an image analyzing apparatus which performs image analysis on the image of the recorded progress of the game; and

an intelligence type control device which can detect cash and chips in the game table by using a result of the image analysis by the image analyzing apparatus,

wherein the image analyzing apparatus or the intelligence type control device has an artificial intelligence utilizing type structure or a deep learning structure capable of detecting the exchange of cash and chips in the gaming table in a situation other than the state that the dealer is dealing based on information from the card distribution device or the dealer, capable of recognizing the total amount of the cash which is genuine cash verified by black light and recognizing the total amount of the chips even in the state that a portion of or entire one chip among a plurality of the chips placed on the gaming table as an exchange object is concealed due to a blind spot of the camera, and capable of comparing the total amount of cash placed on the gaming table by the player and the total amount of chips placed by the dealer to determine whether or not the two amounts match with each other.

[0020c]

According to another aspect of the invention, there is provided a game fraud detection system, comprising:

a game monitoring device which monitors a progress of a game played on the gaming table by using a camera;

an image analyzing apparatus which performs image analysis on an image obtained from the camera;

a card distribution device which determines a win or lose result of each game in the game table; and

a control device which specifies positions of chips placed on the gaming table by game participants by using a result of the analysis of the image analyzing apparatus in each game and determines a winner and losers among the participants of each game by using the win or lose result,

wherein the control device further comprises a function of determining at least one of:

1) whether or not there is movement of chips during the time interval from the start of extraction of cards or from the game start operation of the dealer before the win or lose result of the game is displayed by the card distribution device in each game;

2) whether or not there is movement of chips by a person other than the dealer during the time interval when the dealer collects chips wagered by the losers among the game participants after the end of each game;

3) whether or not a chip is added during the time interval when the dealer collects chips wagered by the losers among the game participants after the end of each game;

4) whether or not the dealer performs payment for a position of chips wagered by the winner among the game

participants after the end of each game; and

5) whether or not the winner among the game participants receives wagered chips and paid chips after the end of each game.

[0021]

According to the fraud detection system of the invention, it is possible to detect fraud in collection and redemption of chips in accordance with a win or lose result of a game.

[0022]

In addition, according to the system of the invention, although the cards are slanted by "card squeegee" frequently performed by players in a baccarat game or the like, the rank and suit of the cards can be determined by image analysis, so that the total amount of chips being overlapped or being in a blind spot together with the positions can be recognized. In addition, fraud at the time of exchanging cash and chips can be detected.

BRIEF DESCRIPTION OF DRAWINGS

[0023]

FIG. 1 is a diagram illustrating an overview of a fraud detection system in a casino having a plurality of gaming tables according to a first embodiment of the invention;

FIG. 2A is a perspective diagram of chips illustrating an example of different overlapped states of chips recognized in the first embodiment of the invention;

15. A fraud detection system in a casino having a plurality of gaming tables, comprising:

a game recording apparatus which records a progress of a game played in the gaming table including a dealer and a player as an image through a camera;

an image analyzing apparatus which performs image analysis on the image of the recorded progress of the game;

a card distribution device which determines a win or lose result of each game in the gaming table; and

an intelligence type control device which detects fraud practiced in the gaming table by using a result of the image analysis by the image analyzing apparatus and a win or lose result determined by the card distribution device.

16. The fraud detection system according to claim 15, wherein the card distribution device has a structure capable of reading ranks of the cards distributed, and

the intelligence type control device has a structure capable of determining match or mismatch by checking information on the rank obtained from the image of each card distributed in the gaming table by the image analyzing apparatus and information on the rank of the card read by the card distribution device.

17. The fraud detection system according to claim 15 or 16, wherein the image analyzing apparatus or the intelligence type control device has an artificial intelligence utilizing type

structure or a deep learning structure capable of obtaining information on rank of a card from the card which is distributed in the gaming table and is folded or stained by a player.

18. The fraud detection system according to claim 15, wherein the intelligence type control device recognizes positions, types, and numbers of chips wagered by players through the image analyzing apparatus and determines by image analysis of a progress of the game through the image analyzing apparatus whether or not the collection of the lost chips wagered by each player and the redemption for the winning chips are correctly performed in accordance with a win or lose result of the game.

19. The fraud detection system according to claim 18, wherein the image analyzing apparatus or the intelligence type control device has an artificial intelligence utilizing type structure or a deep learning structure where, although a portion of or the entire chips among a plurality of the chips placed on the gaming table is concealed due to a blind spot of the camera, the information on the type, number, and position of the wagered chips can be obtained.

20. The fraud detection system according to claim 18, wherein the intelligence type control device has an artificial intelligence utilizing type structure or a deep learning structure where comparison calculation according to the win or lose result of the game can be performed on whether or not the

recognized amount of the chips in the chip tray of the dealer of the gaming table is increased/decreased according to the collected amount of the lost chips wagered by each player and the paid amount of the winning chips after the end of the game and the settlement.

21. The fraud detection system according to claim 15, wherein the intelligence type control device has an artificial intelligence utilizing type structure or a deep learning structure capable of recognizing the position and amount of the chips wagered in each play position of the game table and comparing the history of win and lose of each player obtained from the win or lose result of each game and the amount of the acquired chips and the statistical data of previous games to extract a strange situation.

22. The fraud detection system according to claim 21, wherein the intelligence type control device has an artificial intelligence utilizing type structure or a deep learning structure capable of comparing a state that, at a play position of a certain gaming table, the amount of betting chips at the lost time is smaller than the amount of betting chips at the win time and the statistical data of previous games to extract a strange situation.

23. The fraud detection system according to claim 21 or 22, wherein the intelligence type control device has a structure

capable of extracting the strange situation through the image analyzing apparatus or specifying individual players at the player positions where winning of a predetermined amount or more occurs.

24. The fraud detection system according to claim 23, wherein the intelligence type control device has a caution function of informing about the existence of the specified player in another gaming table when the specified player departs and arrives at the other gaming table.

25. A fraud detection system in a casino having a plurality of gaming tables, comprising:

a game recording apparatus which records a progress of a game played in the gaming table including a dealer and a player as an image through a camera;

a card distribution device which determines a win or lose result of each game in the gaming table;

an image analyzing apparatus which performs image analysis on the image of the recorded progress of the game; and

an intelligence type control device which can detect cash and chips in the game table by using a result of the image analysis by the image analyzing apparatus,

wherein the image analyzing apparatus or the intelligence type control device has an artificial intelligence utilizing type structure or a deep learning structure capable of detecting the exchange of cash and chips in the gaming table in a situation

other than the state that the dealer is dealing based on information from the card distribution device or the dealer, capable of recognizing the total amount of the cash which is genuine cash verified by black light and recognizing the total amount of the chips even in the state that a portion of or entire one chip among a plurality of the chips placed on the gaming table as an exchange object is concealed due to a blind spot of the camera, and capable of comparing the total amount of cash placed on the gaming table by the player and the total amount of chips placed by the dealer to determine whether or not the two amounts match with each other.

26. The fraud detection system according to claim 25, wherein the intelligence type control device has an artificial intelligence utilizing type structure or a deep learning structure capable of performing comparison calculation as to whether or not the recognized amount of chips in a chip tray of a dealer of the gaming table is increased or decreased according to a paid amount of the chips corresponding to the exchanged cash after exchange of cash and chips for settlement.

27. The fraud detection system according to claim 25, wherein the intelligence type control device has an artificial intelligence utilizing type structure or a deep learning structure where, after the exchange of the cash and the chips for settlement, comparison calculation of match or mismatch between the input amount of the cash according to the input by

the dealer and the total amount of the cash according to the result of the image analysis by the image analyzing apparatus can be performed.

28. The fraud detection system according to claim 25, wherein the intelligence type control device has an artificial intelligence utilizing type structure or a deep learning structure capable of performing comparison calculation of match or mismatch between the total input amount of the cash according to the input by the dealer in the gaming table for which the dealer is responsible and the total amount of the cash according to the result of the image analysis by the image analyzing apparatus.

29. A game fraud detection system, comprising:

a game monitoring device which monitors a progress of a game played on the gaming table by using a camera;

an image analyzing apparatus which performs image analysis on an image obtained from the camera;

a card distribution device which determines a win or lose result of each game in the game table; and

a control device which specifies positions of chips placed on the gaming table by game participants by using a result of the analysis of the image analyzing apparatus in each game and determines a winner and losers among the participants of each game by using the win or lose result,

wherein the control device further comprises a function

of determining at least one of:

1) whether or not there is movement of chips during the time interval from the start of extraction of cards or from the game start operation of the dealer before the win or lose result of the game is displayed by the card distribution device in each game;

2) whether or not there is movement of chips by a person other than the dealer during the time interval when the dealer collects chips wagered by the losers among the game participants after the end of each game;

3) whether or not a chip is added during the time interval when the dealer collects chips wagered by the losers among the game participants after the end of each game;

4) whether or not the dealer performs payment for a position of chips wagered by the winner among the game participants after the end of each game; and

5) whether or not the winner among the game participants receives wagered chips and paid chips after the end of each game.

30. The game fraud detection system according to claim 29, wherein the control device is configured so as to determine at least one of the 1) to 5) by detecting movement of hands of the dealer and the game participants, movement of the chips, or the movement of hands and the movement of chips by using the result of the analysis of the image analyzing apparatus.

31. The game fraud detection system according to claim 29 or

30, wherein the control device is configured so as to determine whether or not the amount of chips paid to the winner by the dealer is correct in accordance with the amount wagered by the winner among the game participants.

32. The game fraud detection system for baccarat game according to any one of claims 29 to 31, wherein the game fraud detection system further comprises a monitor or lamp which receives the determination result and performs caution or display.

33. The game fraud detection system for baccarat game according to any one of claims 29 to 32, wherein the card distribution device further comprises distribution restricting device which receives the determination result and operates through an output means to restrict distribution of cards.