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, there is provided a table game management system used at a game table for playing games by betting chips and utilizing deep learning, wherein the game table has a plurality of player positions arranged horizontally, and each player position has a plurality of betting areas laid out vertically, resulting in the plurality of betting areas being laid out on a two-dimensional plane, the game table management system comprising: a camera configured to obtain a single captured image of a chip stack placed in a plurality of betting areas arranged in a two-dimensional pattern in the shooting and angle-of-view

directions so that the top and sides of the stack are captured by shooting a predetermined area including a plurality of betting areas of the game table from diagonally above, wherein in the single captured image, the chip stacks can include chips that receive different amounts of light or chips that are partially hidden due to blind spots, and wherein the camera is configured to capture a plurality of chip stacks at different distances from the camera in the single captured image; and a control device configured to, based on the single captured image, determine the position in said two-dimensional plane of the chip stacks wagered on the game table, the single captured image showing the top and sides of a chip stack obtained by capturing the chip stack, including the multiple betting areas, from diagonally above the betting area of the game table with the camera, wherein the chips comprising the chip stack are identifiable as to type by at least color information or pattern of at least the side surface, the control device is configured to determine the type and number of chips comprising the chip stack based on the color information or pattern of at least the sides of the chips in the single captured image, and the control device is configured to, by extracting features and performing image recognition on the captured image in which the color information or pattern appears, recognize targets including chips that receive different amounts of light and chips that are partially hidden due to blind spots in the single captured image.

[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 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.

[0021]

According to the fraud detection system of the present disclosure, 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 present disclosure, 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;