CHIP RECOGNIZING AND LEARNING SYSTEM

FIELD

[0001]

The present invention relates to a chip recognizing and learning system.

BACKGROUND

[0002]

In a game such as a baccarat game, a customer (player) makes a bet by piling up a plurality of chips on a table. Therefore, it is necessary to accurately recognize the piled up chips. Note that International Publication No. WO2008/120749 discloses an example of chips used in a game.

SUMMARY

[0003]

Embodiments of the present disclosure seek to provide a chip recognizing and learning system capable of accurately recognizing chips bet by a player.

[0003a]

An aspect of the present invention provides a chip recognizing and learning system in a casino having a gaming table, wherein the gaming table is a baccarat table, the chip recognizing and learning system comprising a game recording device that records a state of chips stacked on the gaming table as an image using a single camera that captures an image including a plurality of areas indicating betting targets; a chip determining device including an artificial intelligence device that analyzes the recorded image of the state

of the chips to determine the number and types of chips bet by a player and a betting target of the chips bet by the player; and a teaching device that, in a case where it is determined that there is a doubt for an error in a determining result of the chip determining device, inputs the image used for determination of the chip determining device and the correct number and correct types of the chips for the error as teaching data to the artificial intelligence device to allow the artificial intelligence device to perform learning.

[0003b]

Another aspect of the present invention provides a chip recognizing and learning system in a casino having a gaming table, wherein the gaming table is a baccarat table, the chip recognizing and learning system comprising a game recording device that records a state of chips stacked on the gaming table as an image using a single camera that captures an image including a plurality of areas indicating betting targets; and a chip determining device including an artificial intelligence device that analyzes the recorded image of the state of the chips to determine the number and types of chips bet by a player and a betting target of the chips bet by the player, wherein in a case where it is determined that there is a doubt for an error in a determining result of the chip determining device, the artificial intelligence device receives and learns the image used for determination of the chip determining device and the correct number or correct types of the chips for the error, the image and the correct number or correct types being input as teaching data by a teaching device.

[0003c]

Another aspect of the present invention provides a chip

recognizing and learning method in a casino having a gaming table, wherein the gaming table is a baccarat table, the chip recognizing and learning system comprising a game recording step of recording a state of chips stacked on the gaming table as an image by a single camera that captures an image including a plurality of areas indicating betting targets; a chip determining step of analyzing, by an artificial intelligence device, the recorded image of the state of the chips to determine the number and types of chips bet by a player and a betting target of the chips bet by the player; and a teaching step of inputting, in a case where it is determined that there is a doubt for an error in a determining result of the chip determining step, the image used for determination of the chip determining step and the correct number and correct types of the chips for the error as teaching data to the artificial intelligence device to allow the artificial intelligence device to perform learning.

[0003d]

Another aspect of the present invention provides a chip recognizing and learning system in a casino having a gaming table, wherein the gaming table is a baccarat table, the chip recognizing and learning system comprising a game recording device that records a state of chips stacked on the gaming table as an image by a single camera that captures an image including a plurality of areas indicating betting targets; a chip determining device including an artificial intelligence device that analyzes the recorded image of the state of the chips to determine the number and types of chips bet by a player and a betting target of the chips bet by the player; and a teaching device that, in a case where it is determined that the determining result of the chip determining device is correct,

inputs the image used for determination of the chip determining device and the number and types of chips of a determining result as teaching data to the artificial intelligence device to allow the artificial intelligence device to perform learning.

[0003e]

Another aspect of the present invention provides a chip recognizing and learning system in an amusement place having a gaming table, wherein the gaming table is a baccarat table, the chip recognizing and learning system comprising a game recording device that records a state of chips stacked on the gaming table as an image by a single camera that captures an image including a plurality of areas indicating betting targets; and a chip determining device including an artificial intelligence device that analyzes the recorded image of the state of the chips to determine the number and types of chips bet by a player and a betting target of the chips bet by the player, wherein in a case where it is determined that the determining result of the chip determining device is correct, the artificial intelligence device receives and learns the image used for determination of the chip determining device and the number or types of chips of a determining result, the image and the number or types being input as teaching data by a teaching device.

[0003f]

Another aspect of the present invention provides a chip recognizing and learning method in an amusement place having a gaming table, wherein the gaming table is a baccarat table, the chip recognizing and learning system comprising a game recording step of recording a state of chips stacked on the gaming table as an image by a single camera that captures an image including a

plurality of areas indicating betting targets; a chip determining step of analyzing, by an artificial intelligence device, the recorded image of the state of the chips to determine the number and types of chips bet by a player and a betting target of the chips bet by the player; and a teaching step of inputting, in a case where it is determined that the determining result of the chip determining step is correct, the image used for determination of the chip determining step and the number and types of chips of a determining result as teaching data to the artificial intelligence device to allow the artificial intelligence device to perform learning.

[0004]

According to the present disclosure, a chip recognizing and learning system in an amusement place having a gaming table includes:

a game recording device configured to record a state of chips piled up on the gaming table as an image by a camera;

a chip determining device including an artificial

intelligence device configured to analyze the recorded image of the state of the chips to determine the numbers and kinds of chips bet by a player; and

a teaching device configured to input, in a case where it is determined that there is a doubt for an error in a determining result of the chip determining device, the image used for the determination of the chip determining device and the correct numbers and correct kinds of the chips for the error as teaching data to the artificial intelligence device to allow the artificial intelligence device to perform learning.

[0005]

According to the present disclosure, in the case where it is determined that there is the doubt for the error in the determining result of the chip determining device, the teaching device inputs the image used for the determination of the chip determining device and the correct numbers and the correct kinds of the chips for the error as the teaching data to the artificial intelligence device to allow the artificial intelligence device to perform the learning. Therefore, the artificial intelligence device can efficiently learn an image pattern for which accuracy of the determination of the chip determining device is relatively low to intensively improve the accuracy of the determination of the chip determining device for the image pattern. This teaching and learning is repeated, such that the chip determining device can accurately recognize the chips bet by the player in whatever state the chips are piled up.

[0006]

In the chip recognizing and learning system according to the present disclosure, in a case where it is determined that the determining result of the chip determining device is correct, the teaching device may further input the image used for determination of the chip determining device and the numbers and kinds of the chips of the determining result as teaching data to the artificial intelligence device to allow the artificial intelligence device to perform learning.

[0007]

According to the present disclosure, accuracy of the determination can be further improved for an image pattern for which accuracy of the determination of the chip determining device is relatively high as well as the image pattern for which the accuracy of the determination of the chip determining device is relatively low. Therefore, the chip determining device can more accurately recognize the chips bet by the player.

[0008]

According to the present disclosure, a chip recognizing and learning system in an amusement place having a gaming table includes:

a game recording device configured to record a state of chips piled up on the gaming table as an image by a camera; and

a chip determining device including an artificial intelligence device configured to analyze the recorded image of the state of the chips to determine the numbers and kinds of chips bet by a player,

wherein, in a case where it is determined that there is a doubt for an error in a determining result of the chip determining device, the artificial intelligence device receives and learns the image used for determination of the chip determining device and the correct numbers or correct kinds of the chips for the error, the image and the correct numbers or correct kinds being input as teaching data by a teaching device.

[0009]

According to the present disclosure, in the case where it is determined that there is the doubt for the error in the determining result of the chip determining device, the artificial intelligence device receives and learns the image used for the determination of the chip determining device and the correct numbers or the correct kinds of the chips for the error, which are input as the teaching data by the teaching device. Therefore, the artificial intelligence device can efficiently learn the image pattern for which accuracy of the determination of the chip determining device is relatively low to intensively improve the accuracy of the determination of the chip determining device for the image pattern. By repetition of this, the chip determining device can accurately recognize the chips bet by the player in whatever state the chips are piled up.

[0010]

According to the present disclosure, the chip recognizing and learning system may further include a control device configured to determine whether or not the determining

result of the chip determining device is correct,

wherein the chip determining device can determine kinds and the numbers of chips in a chip tray included in the gaming table and positions, kinds, and the number of chips bet by each player in a game performed on the gaming table from the image recorded in the game recording device, and

the control device may grasp the actual total amount of the chips in the chip tray when retrieval of all the losing chips bet by each player ends, calculate the necessary total amount of the chips in the chip tray by adding an increased amount of the chip tray in the game calculated from kinds and the numbers of chips bet by a losing player to the total amount of the chips in the chip tray before settlement of each game on the basis of the determining result of the chip determining device, compare the necessary total amount of the chips in the chip tray and the actual total amount of the chips in the chip tray with each other, and determine that there is the doubt for the error in the determining result of the chip determining device when there is a difference between the necessary total amount and the actual total amount.

[0011]

According to the present disclosure, the control device can automatically determine whether or not there is the doubt for the error in the determining result of the chip determining device.

[0012]

According to the present disclosure, a chip

recognizing and learning system in an amusement place having a gaming table includes:

a game recording device configured to record a state of chips piled up on the gaming table as an image by a camera;

a chip determining device including an artificial intelligence device configured to analyze the recorded image of the state of the chips to determine the numbers and kinds of chips bet by a player; and

a teaching device configured to input, in a case where it is determined that the determining result of the chip determining device is correct, the image used for determination of the chip determining device and the numbers and kinds of the chips of a determining result as teaching data to the artificial intelligence device to allow the artificial intelligence device to perform learning.

[0013]

According to the present disclosure, a chip recognizing and learning system in an amusement place having a gaming table includes:

a game recording device configured to record a state of chips piled up on the gaming table as an image by a camera; and

a chip determining device including an artificial intelligence device configured to analyze the recorded image of the state of the chips to determine the numbers and kinds of chips bet by a player,

wherein, in the case where it is determined that the determining result of the chip determining device is correct,

the artificial intelligence device receives and learns the image used for determination of the chip determining device and the numbers or kinds of the chips of a determining result, the image and the numbers or kinds being input as teaching data by a teaching device.

[0014]

According to the present disclosure, the chip recognizing and learning system further includes a control device configured to determine whether or not the determining result of the chip determining device is correct,

wherein the chip determining device can determine kinds and the numbers of chips in a chip tray included in the gaming table and positions, the kinds, and the number of the chips bet by each player in a game performed on the gaming table from the image recorded in the game recording device, and

the control device may grasp the actual total amount of the chips in the chip tray when retrieval of all the losing chips bet by each player ends, calculate the necessary total amount of the chips in the chip tray by adding an increased amount of the chip tray in the game calculated from the kinds and the numbers of the chips bet by a losing player to the total amount of the chips in the chip tray before settlement of each game on the basis of the determining result of the chip determining device, compare the necessary total amount of the chips in the chip tray and the actual total amount of the chips in the chip tray with each other, and determine that the determining result of the chip determining device is correct when the necessary

total amount coincides with the actual total amount.

[0015]

In the chip recognizing and learning system according to the present disclosure, the control device may grasp the actual total amount of the chips in the chip tray based on radio frequency identifications (RFIDs) provided in the chips.

[0016]

According to the present disclosure, the control device can automatically grasp the actual total amount of the chips in the chip tray using the RFIDs to improve measurement accuracy as compared with measurement performed with naked eyes of a worker.

[0017]

In the chip recognizing and learning system according to the present disclosure, the control device may include an artificial intelligence device for deciding a correct answer, which grasps the actual total amount of the chips in the chip tray from the image recorded in the game recording device and is different from the artificial intelligence device of the chip determining device.

[0018]

According to the present disclosure, the control device can automatically grasp the actual total amount of the chips in the chip tray using the artificial intelligence device for deciding a correct answer to improve measurement accuracy as compared with measurement performed with the naked eyes of the worker.

[0019]

In the chip recognizing and learning system according to

the present disclosure, the game recording device may record the image acquired from the camera after giving, to the image, an index or a time, or a tag specifying a retrieval scene or a payment scene of the chips, such that the chip determining device can analyze a record of the game.

[0020]

According to the present disclosure, the chip determining device can easily specify the image of a state of the chips that should be analyzed from recorded contents of the game recording device by using the index, the time, or the tag given to the image to shorten a time required for specifying the image.

[0021]

In the chip recognizing and learning system according to the present disclosure, the chip determining device may determine the kinds, the numbers, and the positions of the bet chips even when some of a plurality of the chips put on the gaming table are partially or entirely hidden due to a blind spot of the camera.

[0022]

According to the present disclosure, particularly in the case where some of the plurality of the chips put on the gaming table are partially or entirely hidden due to a blind spot of the worker, it is possible to improve the measurement accuracy as compared with the measurement performed with the naked eyes of the worker by allowing the chip determining device to determine the chips bet by the player.

[0023]

According to the present disclosure, a chip recognizing and learning method in an amusement place having a gaming table includes:

a game recording step of recording a state of chips piled up on the gaming table as an image by a camera;

a chip determining step of analyzing, by an artificial intelligence device, the recorded image of the state of the chips to determine the numbers and kinds of chips bet by a player; and

a teaching step of inputting, in a case where it is determined that there is a doubt for an error in a determining result of the chip determining step, the image used for determination of the chip determining step and the correct numbers and correct kinds of the chips for the error as teaching data to the artificial intelligence device to allow the artificial intelligence device to perform learning.

[0024]

According to the present disclosure, in the case where it is determined that there is the doubt for the error in the determining result of the chip determining step, in the teaching step, the image used for the determination of the chip determining step and the correct numbers and the correct kinds of the chips for the error are input as the teaching data to the artificial intelligence device to allow the artificial intelligence device to perform the learning. Therefore, the artificial intelligence device can efficiently learn an image pattern for which accuracy of the determination of the chip

determining step is relatively low to intensively improve the accuracy of the determination for the image pattern. By repeating this, the chips bet by the player can be accurately recognized in whatever state the chips are piled up, in the chip determining step.

[0025]

According to the present disclosure, a chip recognizing and learning method in an amusement place having a gaming table includes:

a game recording step of recording a state of chips piled up on the gaming table as an image by a camera;

a chip determining step of analyzing, by an artificial intelligence device, the recorded image of the state of the chips to determine the numbers and kinds of chips bet by a player; and

a teaching step of inputting, in a case where it is determined that the determining result of the chip determining step is correct, the image used for determination of the chip determining step and the numbers and kinds of the chips of a determining result as teaching data to the artificial intelligence device to allow the artificial intelligence device to perform learning.

BRIEF DESCRIPTION OF DRAWINGS

[0026]

FIG. 1 is a diagram schematically illustrating an amusement place equipped with a chip recognizing and learning