RECOGNITION SYSTEM

BACKGROUND

Technical Field

[0001]

The present invention relates to a recognition system, and particularly to a recognition system of a chip.

Related Art

[0002]

In a game such as a baccarat game, a client (player) stacks a plurality of chips on a table to bet. Therefore, the stacked chips are needed to be recognized with accuracy. Further, WO 2008/120749 discloses an example of the chip used in the game.

SUMMARY

[0003]

Embodiments of the present disclosure seek to provide a recognition system which can recognize a plurality of types of targets.

[0003a]

According to an aspect, there is provided a recognition system of a chip in a game parlor where a game table is provided, the recognition system comprising: a game recording device configured to record a state of chips stacked on the game table as an image captured by a camera diagonally from above the game table, wherein the game recording device is configured to assign a tag to the image, the tag specifying the state of the chips;

and a chip determination device configured to use an artificial intelligence to analyze the image of the state of the chips to make a determination of a number and a type of the chips bet by a player based at least in part on the tag, wherein the chip determination device further has a function of self-determining an accuracy of the determination of the number and the type of the chips, wherein the chip determination device is further configured to, if the accuracy is equal to or less than a threshold level, display an indicator of an unclear determination as a determination result of the function.

[0003b]

According to another aspect, there is provided a recognition system comprising: a recording device configured to record, using a camera, a state of an image captured by a camera diagonally from above a game table, the image including a target, wherein the recording device is configured to assign a tag to the image, the tag specifying the state of the target; and a determination device including an artificial intelligence device configured to analyze the image to determine, for each determination target type of a plurality of determination target types, a number of determination targets having the target type, based at least in part on the tag, wherein the determination device has learnt a past determination result as training data and has: a function of self-determining an accuracy in a determination of the artificial intelligence device based on analyzing the image, and a function of: self-determining that there is a doubt in the determination

based on the accuracy less than or equal to a threshold level, and outputting and displaying an indicator of an unclear determination as a determination result of the artificial intelligence device.

[0004]

A recognition system of a chip according to the present disclosure is

a recognition system of a chip in a game parlor where a game table is provided, the system includes:

a game recording device which records a state of chips stacked on the game table as an image using a camera; and

a chip determination device which analyzes the image of the recorded state of the chips to determine a number and a type

of the chips bet by a player, and

the chip determination device further has a function of storing a characteristic of an image of a predetermined state of the chip and of outputting and displaying the fact of an unclear determination as a determination result when it is determined that the image obtained from the game recording device is the image of the predetermined state at the time of determining.

[0005]

According to the present disclosure, the chip determination device stores an image as an image of a predetermined state which is less accuracy in reading the chip for example. When the image obtained from the game recording device at the time of determining is determined as an image of the predetermined state, the chip determination device outputs and displays the fact of an unclear determination without forcibly outputting an answer. With this configuration, the determination result in a case where an answer is forcibly output with respect to the image having a less accuracy in reading the chip can be excluded from the determination result of the number and the type of the chips (that is, the determination result of a high possibility to be incorrect). In other words, the number and the type of the chips can be determined only from the image which can be correctly read. As a result, it is possible to recognize the chip with accuracy.

[0006]

In the recognition system of the chip according to the present disclosure,

the chip determination device includes an artificial intelligence device, the artificial intelligence device learns a plurality of images used in a past determination in a case where there is an error in determination in the chip determination device as training data, and

the chip determination device further has a function of self-determining a determination accuracy on the basis of an image where there is an error in a determination result as a result of the learning, and of outputting and displaying the fact of an unclear determination that there is a doubt in determination as the determination result.

[0007]

According to the present disclosure, the artificial intelligence device of the chip determination device learns the plurality of images used in the past (incorrect) determination in a case where there is an error in determination as the training data. Therefore, it is possible to increase the accuracy of the self-determination when the determination accuracy is self-determined. With this configuration, it is possible to reduce a situation that a correctly read image is erroneously determined as unclear to be output and displayed.

[0008]

In the recognition system of the chip according to the present disclosure,

the chip determination device further has a function of analyzing an image of the game recording device in a case where the self-determination is unclear, determining whether a cause of the unclear determination is a state where the chips stacked on the game table overlap each other or a state where a part of or an entire single chip is hidden by other chips, and stores the cause.

[0009]

According to the present disclosure, it is possible for a dealer to easily confirm a cause of the unclear determination from the determination result stored in the chip determination device. With this configuration, the dealer can quickly eliminate the cause of the unclear determination by replacing the chips at positions not shadowing the other chips or by clearly stacking the chips stacked in a zigzag (the dealer may call attention to the player when the player does not like the dealer touch the chips).

[0010]

In the recognition system of the chip according to the present disclosure,

the game recording device assigns an index or a time to an image acquired from the camera, or assigns a tag which specifies a stacking state of the chips such that the record of the game can be analyzed subsequently by the chip determination device.

[0011]

According to the present disclosure, the chip determination device uses the index, the time, and the tag assigned to the image to easily specify the image of the state of the chip of an analysis target from the recorded content of the game recording device. Thus, it is possible to reduce time required to the specification.

[0012]

In the recognition system of the chip according to the present disclosure,

the chip determination device includes a second artificial intelligence device, and the second artificial intelligence device learns a plurality of images used in a past determination in a case where the chip determination device makes a correct determination and information of the chip as training data.

[0013]

According to the present disclosure, the second artificial intelligence device of the chip determination device learns the plurality of images used in the past (correct) determination in a case where the chip determination device makes a correct determination and the information of the chips as the determination result as the training data. Therefore, it is possible to increase the determination accuracy when the number and the type of the chips are determined.

[0014]

In the recognition system of the chip according to the present disclosure,

the chip determination device analyzes an image recorded by a camera different from the camera in a case where a self-determination is unclear to determine the number and the type of the chips bet by the player.

[0015]

In the recognition system of the chip according to the present disclosure,

the chip determination device determines that it is the image of the predetermined state in a case where a next chip is recognized while a certain number of chips or more in a vertical direction are not recognized, and outputs and displays the fact of the unclear determination as a determination result.

[0016]

In the recognition system of the chip according to the present disclosure,

the chip determination device compares a number of chips determined from a height of the chips and a number determined by analyzing an image of a state of the chips, and in a case where the numbers are different, the chip determination device determines that it is the image of the predetermined state, and outputs and displays the fact of an unclear determination as a determination result.

[0017]

A recognition system according to the present disclosure is

a recognition system which has a plurality of types of determination targets, determines a target for each type to determine a number of the targets for each type, the system includes:

a recording device which records a state of the state as an image using a camera; and

a determination device including an artificial intelligence device which analyzes the image of the recorded target to determine the number of the types of the targets, and

the determination device has learnt a past determination result as training data and has a function of self-determining an accuracy in determination, and a function of self-determining that there is a doubt in a determination result in a case the accuracy is equal to or less than a certain level and of outputting and displaying the fact of an unclear determination as the determination result.

[0018]

According to the present disclosure, the determination device learns the past determination result as the training data. With respect to new image, the determination device first self-determines the accuracy in determination. In a case where the accuracy is equal to or less than a certain level, the determination device outputs and displays the fact of the unclear determination without forcibly outputting an answer. With this configuration, the determination result in a case where an answer is forcibly output with respect to the image