is requested that not only the outlines of the chips be recognized but also the differences in colors of the chips be recognized, and further, that the quantity of chips stacked up be grasped for each type of chip. However, chips recognized by cameras, even if the chips have the same color, are imaged or recognized as having different colors due to the difference in lighting environments in which the chips are placed, and are not recognized as having the same color. Conventionally, it has been thus difficult for example to count the quantity of chips type-by-type from images.

[0005]

The present disclosure has been made in view of such a problem, and provides a chip recognition system having a mechanism enabling the recognition of chip color via images and the counting of the quantity of chips even under different lighting environments.

[0005a]

According to an aspect, there is provided a learning system comprising: one or more cameras for photographing a plurality of betting areas arranged in a two-dimensional direction on a game table from an obliquely upward direction enough to recognize which bet target a chip is on, and generating an image including a plurality of chips bet on the plurality of betting areas; a learning model for recognizing the positions, types, and numbers of chips bet on the plurality of betting areas, by analyzing the image using learned artificial intelligence or deep learning; a device for acquiring training data for generating or learning the learning model by

photographing; and a learning device for learning the learning model using the training data, wherein the training data comprises a plurality of images having different lighting conditions and different hidden states of chips.

[0005b]

According to another aspect, there is provided a learning system comprising: one or more cameras for photographing a plurality of betting areas arranged in a two-dimensional direction on a game table from an obliquely upward direction enough to recognize which bet target a chip is on, and generating an image including a plurality of chips bet on the plurality of betting areas; a learning model for recognizing the positions, types, and numbers of chips bet on the plurality of betting areas, by analyzing the image using learned artificial intelligence or deep learning; a device for acquiring training data for generating or learning the learning model by photographing; and a learning device for learning the learning model using the training data, wherein the training data comprises an image in which a plurality of chips having different specific colors on the sides stacked one on top of another is visible.

[0005c]

According to another aspect, there is provided a learning system comprising: one or more cameras for photographing a plurality of betting areas arranged in a two-dimensional direction on a game table from an obliquely upward direction enough to recognize which bet target a chip is on, and generating an image including a plurality of chips bet on the plurality

of betting areas; a learning model for recognizing the positions, types, and numbers of chips bet on the plurality of betting areas, by analyzing the image using learned artificial intelligence or deep learning; a device for acquiring training data for generating or learning the learning model by photographing; and a learning device for learning the learning model using the training data, wherein

the training data comprises an image in which a plurality of chips that are stacked misaligned from each other are visible.

[0006]

A chip recognition system as disclosed is a recognition system for recognizing a chip used on a game table of a game house, the chip configured to at least partially have a specific color indicative of a value of the chip, the recognition system including:

a recording device that uses a camera and records a state of the chip as an image;

an image analysis device that subjects the image so recorded to image analysis and recognizes at least two colors being the specific color and a reference color that is present

CLAIMS:

1. A learning system comprising:

one or more cameras for photographing a plurality of betting areas arranged in a two-dimensional direction on a game table from an obliquely upward direction enough to recognize which bet target a chip is on, and generating an image including a plurality of chips bet on the plurality of betting areas;

a learning model for recognizing the positions, types, and numbers of chips bet on the plurality of betting areas, by analyzing the image using learned artificial intelligence or deep learning;

a device for acquiring training data for generating or learning the learning model by photographing; and

a learning device for learning the learning model using the training data, wherein

the training data comprises a plurality of images having different lighting conditions and different hidden states of chips.

2. A learning system comprising:

one or more cameras for photographing a plurality of betting areas arranged in a two-dimensional direction on a game table from an obliquely upward direction enough to recognize which bet target a chip is on, and generating an image including a plurality of chips bet on the plurality of betting areas;

a learning model for recognizing the positions, types,

and numbers of chips bet on the plurality of betting areas, by analyzing the image using learned artificial intelligence or deep learning;

a device for acquiring training data for generating or learning the learning model by photographing; and

a learning device for learning the learning model using the training data, wherein

the training data comprises an image in which a plurality of chips having different specific colors on the sides stacked one on top of another is visible.

3. A learning system comprising:

one or more cameras for photographing a plurality of betting areas arranged in a two-dimensional direction on a game table from an obliquely upward direction enough to recognize which bet target a chip is on, and generating an image including a plurality of chips bet on the plurality of betting areas;

a learning model for recognizing the positions, types, and numbers of chips bet on the plurality of betting areas, by analyzing the image using learned artificial intelligence or deep learning;

a device for acquiring training data for generating or learning the learning model by photographing; and

a learning device for learning the learning model using the training data, wherein

the training data comprises an image in which a plurality of chips that are stacked misaligned from each other are

visible.

4. The learning system according to any one of claims 1 to 3, wherein

the training data comprises an image in which a single chip that is not stacked is visible.

5. The learning system according to any one of claims 1 to 3, wherein

the training data comprises an image in which a plurality of chips that are stacked one on top of another are visible.

6. The learning system according to any one of claims 1 to 3, wherein

the training data comprises an image in which a chip partially hidden by the camera’s blind spot is visible.