Claims:

1. 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.

2. The table game management system according to claim 1, wherein the control unit is configured to utilize a convolutional neural network as the deep learning to extract features and perform the image recognition.

3. The table game management system according to claim 1, wherein the chips that receive different amounts of light are chips that are in shadow.

4. The table game management system according to claim 1, wherein the control device is configured to recognize a plurality of chips placed in a plurality of betting areas at different distances or angles to the camera by utilizing a convolutional neural network.

5. The table game management system according to claim 1, wherein the control device is configured to utilize deep learning to extract candidate regions from a target image, perform classification to the extracted candidate regions, and obtain the candidate with the highest confidence level classified as a recognition result to determine the types of chips.

6. The table game management system according to claim 1, wherein the control device is configured to recognize an object including the chips from a single captured image showing a plurality of the chip stacks in one betting area to determine the position, type and number of chips.

7. The table game management system according to claim 1, wherein

the table game management system comprises a plurality of the cameras,

the plurality of cameras capture the game table at different angles from each other, and

the control device is configured to be able to accurately

determine the position and type of chips even if the chips are completely hidden due to blind spots in an image captured by some of the cameras, by using a plurality of the images captured by the plurality of cameras.

8. The table game management system according to claim 1, wherein the control device is configured to be capable of determining, by utilizing the convolutional neural network, the position, type, and number of chips that are stacked in such a way that they are displaced from and overlap in the single captured image.

9. The table game management system according to claim 1, wherein the control device is configured to be capable of determining, for a plurality of the game tables, the position, type, and number of chips placed on those game tables.

10. The table game management system according to claim 1, wherein the deep learning is a multi-layered neural network, and is capable of recognizing an object by layering multiple steps in an intermediate layer between an input layer and an output layer.

11. The table game management system according to claim 1, wherein the control device is configured to record and monitor a history of wagered chip information for each playing position based on the determined position, type and number of chips.

12. The table game management system according to claim 11, wherein the history of wagered chip information is a history of the total amount of chips wagered at each playing position or a history of the number of chips of each type.

13. The table game management system according to claim 11, wherein the control device is configured to be capable of identifying a player at each playing position by an identity number.

14. The table game management system according to claim 13, wherein

the control device is configured to identify a player by extracting an image of the player's face and identifying the identity number.

15. The table game management system according to any one of claims 11 to 14, wherein the control device is configured to monitor the recorded history of the wagered chip information, compare it with statistical data, extract peculiar situations, and output warnings.

16. The table game management system according to any one of claims 11 to 14, wherein the control device is configured to be capable of monitoring the recorded history of the wagered chip information, extracting peculiar situations based on predetermined conditions, and outputting warnings.

17. The table game management system according to any one of claims 11 to 14, wherein

the betting area includes a player area, a banker area, a tie area, a player pair area, and a banker pair area, and

the control device is configured to be capable of determining the position, type and number of chips wagered in each of the player area, banker area, tie area, player pair area and banker pair area.

18. The table game management system according to claim 17, wherein

the table game management system further comprises a win/loss result determination device configured to determine the win/loss result of the baccarat game at the game table, and

the control device is configured to record and monitor the chip amounts and win/loss history for each play position obtained based on the determined position, type and number of chips and the win/loss result determined by the win/loss result determining device.

19. A management system for table games according to claim 17, wherein the control device is configured to monitor the recorded chip amounts and win/loss histories and to identify players who have won more than a predetermined amount and to output a warning.

20. The table game management system according to claim 17, wherein the control device is configured to be capable of determining the position, type, and number of chips wagered in adjacent betting areas.