reasons such as a lack of training or simple input error. As a result, the deck library from one deck type may be used for comparison with images from another deck type. Using the wrong deck library may result in errors in card identification.

SUMMARY

[0008a] According to an aspect, there is provided a method for tuning a card handling device, the method comprising:

capturing a plurality of images from a deck of cards with an imaging device of a card handling device as the cards pass through the card handling device during a calibration mode;

storing the plurality of images of the cards in non-transitory memory of the card handling device;

analyzing, using instructions executed by a processor of the card handling device, each image of the plurality of images for card identification information related to at least one of a rank area including a rank symbol of the card in the respective image, or a suit area including a suit symbol of the card in the respective image; and

[0009] automatically generating a calibration file during the calibration mode, with the processor, and storing the calibration file in the non-transitory memory, wherein the calibration file includes parameters associated with the card identification information based on the analyzing for processing cards during a subsequent card recognition mode.In an embodiment, a method of automatically generating a calibration file for a card handling device is disclosed. The method comprises capturing a raw image from at least a portion of a card passing through a card handling device, and using a processor, automatically generating a calibration file stored in memory of a main control system of the card handling device. Automatically generating the calibration file comprises identifying at least one parameter associated with a rank area around a rank of the at least a portion of the card, identifying at least one parameter associated with a suit area around a suit of the at least a portion of the card, and storing the at least one parameter associated with the rank area and the at least one parameter associated with the suit area in the calibration file.

[0010] In another embodiment, a method of automatically generating one or more deck libraries for one or more decks of cards is disclosed, The method comprises using a processor to automatically generate a first calibration file without user input in identifying at least one parameter associated with a rank area and at least one parameter associated with a suit area for a first deck type of cards, the calibration file including the parameters associated

with the rank area and the suit area, storing the first calibration file in a first deck library for the first deck type, using the processor to automatically generate a plurality of master images for the cards of the first deck type using the parameters from the calibration file, and storing the plurality of master images for the cards of the first deck type in the first deck library.

[0011] In another embodiment, a card processing apparatus is disclosed. The card processing apparatus comprises a memory device, an imaging device operably coupled with the memory device such that raw images from the imaging device are stored in the memory device, and a main control system coupled with the imaging device. The main control system is configured to run an operating system having a file directory system configured to store a plurality of deck libraries for a plurality of different deck types. The main control system is configured to receive the raw images from the memory device, automatically generate a calibration file having parameters related to a rank area and a suit area for a deck type.

CLAIMS

What is claimed is:

1. A method for tuning a card handling device, the method comprising:

capturing a plurality of images from a deck of cards with an imaging device of a card handling device as the cards pass through the card handling device during a calibration mode;

storing the plurality of images of the cards in non-transitory memory of the card handling device;

analyzing, using instructions executed by a processor of the card handling device, each image of the plurality of images for card identification information related to at least one of a rank area including a rank symbol of the card in the respective image, or a suit area including a suit symbol of the card in the respective image; and

automatically generating a calibration file during the calibration mode, with the processor, and storing the calibration file in the non-transitory memory, wherein the calibration file includes parameters associated with the card identification information based on the analyzing for processing cards during a subsequent card recognition mode.

2. The method of claim 1, wherein analyzing the plurality of images includes the processor locating blobs having a centroid and a location and identifying the card identification information located within the blobs.

3. The method of claim 2, wherein analyzing the plurality of images further comprises the processor ignoring blobs that have a size below a certain threshold and blobs that are located outside of a desired region of the plurality of images.

4. The method of claim 2, wherein identifying the card identification information includes the processor specifically searching through the plurality of images for a ten rank and using the ten rank to determine the parameters in the calibration file during the calibration mode.

5. The method of claim 4, wherein identifying the card identification information includes using the blob analysis to specifically search for a relatively large blob in proximity of the ten rank to obtain the measurements of the suit area.

6. The method of claim 1, further comprising automatically generating, with the processor, a plurality of master images from the plurality of images based on the parameters in the calibration file during the calibration mode, and storing the plurality of master images in the non-transitory memory.

7. The method of claim 6, further comprising automatically associating, with the processor, the plurality of master images with an appropriate rank and suit during the calibration mode.

8. The method of claim 6, further comprising comparing, with the processor, master images of the plurality of master images with each other to determine secondary relationships during the calibration mode.

9. The method of claim 8, wherein comparing master images of the plurality of master images with each other is performed as part of a secondary verification after associating the plurality of images with an appropriate rank and suit is performed from a pre-sorted deck.

10. The method of claim 1, wherein the calibration file includes a parameter defining a region of interest of a smaller size than a field of view of the imaging device.

11. A method of automatically generating a calibration file during a calibration mode of a card handling device, the method comprising:

capturing a plurality of raw images of at least a rank and suit symbol of cards from a deck of cards using a imaging device of a card handling device as the cards pass through the card handling device during a calibration mode;

storing the plurality of raw images of the at least a rank and suit symbol of the cards in non-transitory memory of the card handling device;

identifying, using instructions executed by a processor of the card handling device, a size of each rank and suit symbol of each stored raw image of the plurality;

storing a region of interest and symbol size information in a calibration file for the plurality of raw images during the calibration mode for subsequent use by the card handling device during the calibration mode;

storing the calibration file in the non-transitory memory of the card handling device;

converting the plurality of raw images into a plurality of master rank files and a plurality of master suit files during the calibration mode; and

storing the plurality of master rank files and the plurality of master suit files corresponding to a specific card type in the non-transitory memory of the card handling device during the calibration mode.

12. The method of claim 11, wherein identifying a size of each rank and suit symbol includes employing a blob analysis.

13. The method of claim 12, wherein employing the blob analysis includes the processor first identifying a rank to obtain measurements of the size of the rank and then identifying a suit to obtain measurements of the size of the suit to include with the calibration file during the calibration mode.

14. The method of claim 11, wherein storing the calibration file in the non-transitory memory of the card handling device includes storing the calibration file in a subdirectory of a file system, the subdirectory corresponding to a particular deck type for the deck of cards used to generate the calibration file.

15. A method of identifying a card rank and suit for calibrating a card handling device, the method comprising:

automatically creating a calibration file during a calibration mode of the card handling device by:

capturing, with an imaging device of the card handling device, a plurality of raw images of at least a rank and suit symbol of cards from a deck of cards as the cards pass through the card handling device;

storing the plurality of raw images in non-transitory memory of the card handling device;

identifying, with a processor of the card handling device executing instructions, a size of each rank and suit symbol of each stored raw image of the plurality;

storing a region of interest and rank and suit symbol size information in the calibration file for the plurality of raw images in the memory; and

storing the calibration file in the non-transitory memory of the card handling device; and

automatically generating a plurality of master rank files and a plurality of master suit files during the calibration mode by:

converting, with the processor, the plurality of raw images into a plurality of master rank files and a plurality of master suit files; and

storing the plurality of master rank files and the plurality of master suit files corresponding to a specific card type in the non-transitory memory of the card handling device.

16. The method of claim 15, further comprising:

identifying at least one card during a card recognition mode of the card handling device by:

capturing, with the imaging device, at least one unknown image as a card passes through a card handling device;

comparing, with the processor, at least a portion of the at least one unknown image to one of the plurality of master rank files and the plurality of master suit files; and

determining, with the processor, a match of a card identity based on a score from the comparing.

17. The method of claim 15, further comprising automatically associating the master rank files and the master suit files with their corresponding rank and suit during the calibration mode with the processor.

18. The method of claim 17, wherein automatically associating the master rank files and the master suit files with their corresponding rank and suit is performed by the processor according to an order in which the cards from the deck of cards are read in by the imaging device during the calibration mode.

19. The method of claim 17, wherein automatically associating the master rank files and the master suit files with their corresponding rank and suit is performed by the processor without requiring a predetermined order for the deck of cards during the calibration mode.

20. The method of claim 15, further comprising the processor converting the plurality of raw images from a grayscale image to a black and white image based on a threshold level that dynamically changes over time responsive to a change in lighting conditions.