

CLAIMS

1. A face recognition system for identifying a person as the person is moving through a designated area, the system comprising:
 - a camera aimed at the designated area; and
 - at least one processor operable to perform:
 - face tracking of the person as the person moves through the designated area based on receiving a plurality of consecutive images from the camera; and
 - image selecting by selecting at least one candidate image for matching from the plurality of consecutive images being tracked based on an image quality metric, time elapsed, and an image quality count.
2. The system of claim 1, wherein the processor is further operable to perform image selecting using a trained classifier.
3. The system of claim 1, further comprising a face matching engine, and wherein the processor is further operable to send the at least one candidate image to the face matching engine, and wherein the image quality count is adjusted with each candidate image sent to the face matching engine.
4. The system of claim 3, wherein the processor is operable to continue face tracking and image selecting for the person until the image quality count reaches a maximum count value.
5. The system of claim 4, wherein the maximum count value is less than 5.
6. The system of claim 1, further comprising a guidance feature to corral the person walking through the designated region.
7. The system of claim 6, wherein the guidance feature is a handrail.
8. The system of claim 6, wherein the guidance feature is presented by a display or a virtual projector.

9. The system of claim 1, further comprising a display, and the processor and display are operable to show on the display live images of the face of the person during face tracking.
10. The system of claim 9, wherein the processor is operable to superimpose graphics on the live images enclosing the face during face tracking.
11. The system of claim 9, wherein the processor is operable to perform a transformation on the live images during the face tracking to encourage the person to look at the display thereby obtaining a higher quality image.
12. The system of claim 11, wherein the transformation is selected from the group consisting of blurring (blurred around subject's face); cropping (face cropped image); configure face to line image; configure face cartoon image; unsharp masking; noise suppression; illumination adjustment; high dynamic range; rotation (roll) correction; emoji-type face representation; and animal-type face representation.
13. The system of claim 9, further comprising a housing enclosing the processor, camera and display.
14. The system of claim 9, further comprising display ring, and wherein the display ring is operable to change visually based on the images of the person walking through the designated area.
15. The system of claim 1, wherein the processor is further operable to monitor the time elapsed for face tracking of the person, and terminate face tracking for the person after the time elapsed reaches a maximum time elapsed.
16. The system of claim 15, wherein the maximum time elapsed is equal to or greater than 2 seconds.
17. The system of claim 1, wherein the image quality metric is selected from the group consisting of face size (F_s), Yaw Pitch Roll (YPR), and Laplacian Variance (LV).

18. The system of claim 1, wherein the processor is operable to determine instructions for person moving based on the plurality of consecutive images.
19. The system of claim 18, wherein the processor is operable to determine when the person has exited the designated area.
20. The system of claim 19, wherein the processor determines the person has exited the designated area when a face size (F_{size}) of the person is greater than a maximum face size (F_{max}) and the person is tracked outside the field of view of the camera.
21. The system of claim 20, further comprising a display, and indicating on the display for a next person to enter the designated area.
22. The system of claim 18, wherein the instructions direct said person to enter a second area for further identification.
23. The system of claim 3, further comprising a remote server, and wherein the face matching engine is located on the remote server.
24. The system of claim 23, wherein the face matching engine interrogates the at least one candidate image of the person to confirm the identity of the person.
25. The system of claim 24, wherein the processor is operable to monitor an enrollment state of the system corresponding to a total number of persons whose identify has been confirmed by the face matching engine.
26. The system of claim 1, wherein the processor is further operable to perform image selecting based on a cue arising from the person walking.
27. The system of claim 24, wherein the cue is visual-based.
28. The system of claim 25, wherein the cue is selected from the group consisting of a badge, article of clothing, band, flag, sign, and gesture.

29. The system of claim 1, further comprising a visual privacy warning feature to direct the person into the designated area for face capture or to a face capture exclusion area.
30. The system of claim 4, further comprising wherein the maximum count value is less than 3.
31. A face recognition system for identifying a person as the person moves through a designated area, the system comprising:
- a face detection engine for detecting a face of the person when the person enters the designated area and based on a first sequence of images generated by a camera as the person enters the designated area;
 - a tracking engine for tracking the face of the person as the person moves through the designated area and based on a second sequence of images generated by the camera as the person traverses the designated area; and
 - a quality select engine for selecting a maximum quality image for each person traversing the designated area.
32. The system of claim 31, further comprising a face matching engine for matching the maximum quality image with a validated image of the person.
33. The system of claim 32, further comprising a display module for displaying tracking of the person in real time.
34. The system of claim 33, further comprising a guidance feature to corral the person towards the camera as the person traverses the designated area.
35. The system of claim 33, further comprising a housing enclosing the camera, detecting engine, quality select engine, tracking engine, and display module.
36. A face recognition method for identifying individuals based on a maximum quality image of the face of the individual as each individual moves through a designated area, the method comprising:
- (a) streaming images from at least one camera for each individual entering the designated area;

(b) face detecting by searching the streamed images for a face until a face of an individual is detected;

(c) face tracking by:

(i) assigning a tracking ID and a quality select count to the individual;

(ii) tracking the face of the individual to obtain at least one candidate image of the face of the individual as the individual moves through the designated area;

(iii) timing the individual during tracking for an elapsed time;

(iv) storing as the maximum quality image the at least one candidate image for face matching if an image quality metric is within a threshold quality range and higher than that of a previously-stored quality image; and

(v) adjusting the quality select count for the individual based on whether the at least one candidate image was stored as the maximum quality image; and

(d) maximizing image quality by repeating the face tracking step for each individual if the elapsed time is within a maximum time and the quality select count is within a threshold count range.

37. The method of claim 36, wherein the step of storing is carried out remotely from the designated area.

38. The method of claim 36, further comprising, subsequent to the step of maximizing image quality, face matching the maximum quality image with a validated image of the face of the individual.

39. The method of claim 36, wherein the step of maximizing is based on the quality image count being less than or equal to 5, and optionally less than or equal to 3.

40. The method of claim 36, comprising displaying a live stream of images of the individual being tracked during the tracking step.

41. The method of claim 40, comprising superimposing graphics on the live stream of images of the individual being tracked to encourage the individual to look at the

camera.

42. The method of claim 41, comprising terminating the tracking step for the individual when the elapsed time is equal to or greater than 2 seconds.
43. The method of claim 42, further comprising displaying an instruction to enter the designated area until tracking is commenced for a next individual.
44. The method of claim 36, wherein at least three (3) candidate images are generated during the step of tracking.
45. The method of claim 36, wherein the quality metric being selected from the group consisting of face size (F_s), Yaw Pitch Roll (YPR), and Laplacian Variance (LV).
46. A face recognition method for identifying individuals based on a maximum quality image of the face of the individual as each individual moves through a designated area, the method comprising:
 - (a) streaming images from at least one camera for each individual entering the designated area;
 - (b) face detecting by searching the streamed images for a face until a face of an individual is detected;
 - (c) assigning a tracking ID and a quality select count to the individual;
 - (d) commencing a face tracking timer for the individual;
 - (e) tracking in real time the face of the individual to obtain a current candidate image of the face of the individual as the individual moves through the designated area;
 - (f) delegating the current candidate image as the maximum quality image for face matching if an image quality metric of the current candidate image is within a threshold quality range and, if the maximum quality image had been previously delegated, the current candidate image has a higher quality rating than the previously delegated maximum quality image;
 - (g) maintaining a quality select count for the individual corresponding to a total number of current candidate images delegated; and
 - (h) continuously updating the maximum quality image for the individual by

repeating steps (e) – (g) so long as the quality select count is less than a threshold count and an elapsed tracking time measured by the face tracking timer is less than a maximum time.

47. The method of claim 46, wherein the step of delegating is carried out by saving the delegated candidate image in a storage located remote to the designated area.
48. The method of claim 46, further comprising, subsequent to the step of updating, face matching the delegated candidate image with a validated image of the face of the individual.