CLAIMS

1. A driving management method, comprising:

controlling a camera assembly provided on a vehicle to collect a video stream of a vehicle driver;

obtaining a feature matching result of a face part of at least one image in the video stream and at least one pre-stored face image in a data set, wherein the data set stores a pre-stored face image of at least one registered driver, and wherein the data set is stored in a cloud server, and the data set is downloaded to the vehicle, responsive to that the vehicle and the cloud server are in a communication connection state, for the vehicle to perform feature matching without a network connection; and

responsive to that the feature matching result represents that the feature matching is successful, controlling the vehicle to execute an operation instruction received by the vehicle.

2. The method according to claim 1, further comprising:

responsive to that the vehicle and the cloud server are in the communication connection state, sending a data set download request to the cloud server; and

receiving and storing the data set sent by the cloud server.

3. The method according to claim 1, further comprising:

responsive to that the feature matching result represents that the feature matching is successful, obtaining identity information of the vehicle driver according to the pre-stored face image that is succeeded in feature matching; and sending the image and the identity information to the cloud server; or

responsive to that the feature matching result represents that the feature matching is successful, obtaining identity information of the vehicle driver according to the pre-stored face image that is succeeded in feature matching; intercepting the face part in the image; and sending the intercepted face part and the identity information to the cloud server.

4. The method according to claim 1, further comprising: obtaining a living body detection result of the collected image;

the controlling the vehicle to execute an operation instruction received by the vehicle

according to the feature matching result comprises:

controlling the vehicle to execute an operation instruction received by the vehicle according to the feature matching result and the living body detection result.

5. The method according to claim 4, wherein the pre-stored face image in the data set is also correspondingly provided with a driving permission;

the method further comprises: responsive to that the feature matching result represents that the feature matching is successful, obtaining the driving permission corresponding to the pre-stored face image that is succeeded in feature matching;

the controlling the vehicle to execute an operation instruction received by the vehicle comprises: controlling the vehicle to execute an operation instruction received by the vehicle within the permission scope.

6. The method according to claim 1, further comprising:

performing driver state detection based on the video stream; and

performing at least one of: prompting early-warning on an abnormal driving state or performing intelligent driving control according to the result of the driver state detection,

wherein the driver state detection comprises at least one of: driver fatigue state detection, driver distraction state detection, driver's predetermined distraction action detection, or driver gesture detection.

7. The method according to claim 6, wherein the performing driver fatigue state detection based on the video stream comprises:

detecting at least a part of a face region of at least one image in the video stream to obtain state information of the at least a part of the face region, the state information of the at least a part of the face region comprising at least one of: eye open/closed state information or mouth open/closed state information;

obtaining a parameter value of an index for representing a driver fatigue state according to the state information of the at least a part of the face region within a period of time; and

determining the result of the driver fatigue state detection according to the parameter value of the index for representing the driver fatigue state;

wherein the index for representing the driver fatigue state comprises at least one of: an eye closure degree or a yawning degree;

wherein the parameter value of the eye closure degree comprises at least one of: the number of eye closures, eye closure frequency, eye closure duration, eye closure amplitude, the number of eye semi-closures, or eye semi-closure frequency;

the parameter value of the yawning degree comprises at least one of: a yawning state, the number of yawns, yawn duration, or yawning frequency.

8. The method according to claim 6, wherein the performing driver distraction state detection based on the video stream comprises:

performing at least one of face orientation or gaze direction detection on the driver image in the video stream to obtain at least one of face orientation information or gaze direction information;

determining a parameter value of an index for representing a driver distraction state according to at least one of the face orientation information or the gaze direction information within a period of time, the index for representing the driver distraction state comprises at least one of: a face orientation deviation degree or a gaze deviation degree; and

determining the result of the driver distraction state detection according to the parameter value of the index for representing the driver distraction state;

wherein the parameter value of the face orientation deviation degree comprises at least one of: the number of head turns, head turn duration, or head turn frequency;

the parameter value of the gaze deviation degree comprises at least one of: a gaze direction deviation angle, gaze direction deviation duration, or gaze direction deviation frequency.

9. The method according to claim 8, wherein the performing at least one of face orientation or gaze direction detection on the driver image in the video stream comprises:

detecting face key points of the driver image in the video stream; and

performing at least one of face orientation or gaze direction detection according to the face key points.

10. The method according to claim 9, wherein the performing face orientation detection according to the face key points to obtain face orientation information comprises:

obtaining feature information of head posture according to the face key points; and

determining the face orientation information according to the feature information of the head posture.

11. The method according to claim 6, wherein the predetermined distraction action comprises at least one of: a smoking action, a drinking action, an eating action, a calling action, or an entertainment action.

12. The method according to claim 11, wherein the performing driver's predetermined distraction action detection based on the video stream comprises:

performing target object detection corresponding to the predetermined distraction action on at least one image in the video stream to obtain a detection frame for a target object; and

determining whether the predetermined distraction action occurs according to the detection frame for the target object.

13. The method according to claim 12, further comprising:

responsive to that the predetermined distraction action occurs, obtaining a parameter value of an index for representing the driver's distraction degree according to a determination result indicating whether the predetermined distraction action occurs within a period of time; and

determining the result of the driver's predetermined distraction action detection according to the parameter value of the index for representing the driver's distraction degree;

wherein the parameter value of the index for representing the driver's distraction degree comprises at least one of: the number of occurrences of the predetermined distraction action, duration of the predetermined distraction action, or frequency of the predetermined distraction action.

14. The method according to claim 11, further comprising:

responsive to that the result of the driver's predetermined distraction action detection is that a predetermined distraction action is detected, prompting the detected distraction action.

15. The method according to claim 6, further comprising:

executing a control operation corresponding to the result of the driver state detection;

wherein the executing a control operation corresponding to the result of the driver state detection comprises at least one of:

responsive to that the determined result of the driver state detection satisfies a predetermined prompt/warning condition, outputting prompt/warning information corresponding to the predetermined prompt/warning condition;

responsive to that the determined result of the driver state detection satisfies a predetermined information sending condition, sending predetermined information to a predetermined contact or establishing a communication connection to the predetermined contact; or

responsive to that the determined result of the driver state detection satisfies a predetermined driving mode switching condition, switching the driving mode to an automatic driving mode.

16. The method according to claim 6, further comprising:

sending at least a part of the result of the driver state detection to the cloud server;

wherein the at least a part of the result comprises abnormal driving state information determined according to the driver state detection.

17. The method according to claim 16, further comprising:

storing images or video clips in the video stream corresponding to the abnormal driving state information; or

sending the images or video clips in the video stream corresponding to the abnormal driving state information to the cloud server.

18. The method according to claim 1, further comprising:

responsive to that the vehicle and a mobile device are in a communication connection state, sending a data set download request to the mobile device; and

receiving and storing the data set sent by the mobile device;

wherein the data set is obtained from the cloud server and sent to the vehicle by the mobile device upon reception of the data set download request.

19. The method according to claim 1, further comprising:

responsive to that the feature matching result represents that the feature matching is unsuccessful, refusing to execute the received operation instruction.

20. The method according to claim 19, further comprising:

sending registration prompt information;

receiving a driver registration request according to the registration prompt information, the driver registration request comprising registered face images of the driver; and

establishing a data set according to the registered face images.

21. The method according to claim 1, wherein the obtaining a feature matching result of a face part of at least one image in the video stream and at least one pre-stored face image in a data set comprises:

responsive to that the vehicle and the cloud server are in a communication connection state, uploading the face part of at least one image in the video stream to the cloud server, and receiving the feature matching result sent by the cloud server.

22. A non-transitory computer storage medium for storing a computer readable instruction, wherein when the instruction is executed, the driving management method according to claim 1 is performed.

23. A driving management method, comprising:

receiving a to-be-identified face image sent by a vehicle;

obtaining a feature matching result of the face image and at least one pre-stored face image in a data set, wherein the data set stores a pre-stored face image of at least one registered driver, and wherein the data set is stored in a cloud server, and the data set is downloaded to the vehicle, responsive to that the vehicle and the cloud server are in a communication connection state, for the vehicle to perform feature matching without a network connection; and

responsive to that the feature matching result represents that the feature matching is successful, sending an instruction of allowing controlling the vehicle to the vehicle.

24. The method according to claim 23, further comprising:

receiving a data set download request sent by the vehicle, the data set storing a pre-stored face image of at least one registered driver; and

sending the data set to the vehicle.

25. The method according to claim 23, further comprising:

receiving a driver registration request sent by the vehicle or mobile device, the driver registration request comprising a registered face image of the driver; and

establishing a data set according to the registered face image.

26. The method according to 23, wherein the obtaining a feature matching result of the face image and at least one pre-stored face image in a data set comprises:

performing feature matching on the face image and at least one pre-stored face image in the data set to obtain the feature matching result; or

obtaining the feature matching result of the face image and at least one pre-stored face image in the data set from the vehicle.

27. The method according to claim 23, further comprising:

receiving at least a part of the result of driver state detection sent by the vehicle, performing at least one of prompting early-warning on an abnormal driving state or sending an instruction of intelligent driving control to the vehicle;

wherein the at least a part of the result comprises abnormal driving state information determined according to the driver state detection.

28. The method according to claim 27, further comprising: executing a control operation corresponding to the result of the driver state detection;

wherein the executing a control operation corresponding to the result of the driver state detection comprises:

responsive to that the determined result of the driver state detection satisfies a predetermined prompt/warning condition, outputting prompt/warning information corresponding to the predetermined prompt/ warning condition;

responsive to that the determined result of the driver state detection satisfies a predetermined information sending condition, sending predetermined information to a predetermined contact or establishing a communication connection to the predetermined contact;

responsive to that the determined result of the driver state detection satisfies a predetermined driving mode switching condition, switching the driving mode to an automatic driving mode.

29. The method according to claim 27, further comprising:

receiving images or video clips corresponding to the abnormal driving state information.

30. The method according to claim 29, further comprising:

performing at least one of the following operations based on the abnormal driving state information:

data statistics, vehicle management, or driver management;

wherein the performing data statistics based on the abnormal driving state information comprises:

collecting statistics about the received images or video clips corresponding to the abnormal driving state information based on the abnormal driving state information so that the images or video clips are classified according to different abnormal driving states to determine the statistical situation of each of the abnormal driving states;

wherein the performing vehicle management based on the abnormal driving state information comprises:

collecting statistics about the received images or video clips corresponding to the abnormal driving state information based on the abnormal driving state information so that the images or video clips are classified according to different vehicles to determine the abnormal driving statistical situation of each of the vehicles;

wherein the performing driver management based on the abnormal driving state information comprises:

processing the received images or video clips corresponding to the abnormal driving state information based on the abnormal driving state information so that the images or video clips are classified according to different drivers to determine the abnormal driving statistical situation of each of the drivers.

31. An electronic device, comprising: a memory, configured to store an executable instruction;

and

a processor, configured to communicate with the memory to execute the executable instruction to perform operations, the operations comprising:

controlling a camera assembly provided on a vehicle to collect a video stream of a vehicle driver;

obtaining a feature matching result of a face part of at least one image in the video stream and at least one pre-stored face image in a data set, wherein the data set stores a pre-stored face image of at least one registered driver, and wherein the data set is stored in a cloud server, and the data set is downloaded to the vehicle, responsive to that the vehicle and the cloud server are in a communication connection state, for the vehicle to perform feature matching without a network connection; and

responsive to that the feature matching result represents that the feature matching is successful, controlling the vehicle to execute an operation instruction received by the vehicle.