are not able to detect drivers' in-cabin movements such as signaling, blind spot checking or putting on seat belt. For insurance providers, information of these driving practices can be valuable to price the premiums of different drivers.

[0005] Thus, what is needed is a device and method that can evaluate driving risk by integrating data from GPS, accelerometer, camera video of vehicle's surrounding environment and in-cabin camera video. With a combined analysis and calculation of the data received from a vehicle, a score can be generated for the driving and the score can be used for driving practice evaluation and accident prevention purposes.

SUMMARY

[0006] According to a first aspect, there is provided a computing device for evaluating driving risk. The computing device includes an input circuit configured to receive data from a vehicle, the data comprising at least one of GPS data, acceleration data or image data. The computing device further includes a processor, and the processor is configured to train a situation classification model based on the data received from the vehicle using machine learning methods to classify various driving situations. The processor is further configured to identify a plurality of risks based on the data received from the vehicle and one or more of the various driving situations classified by the situation classification model, determine a plurality of weightages wherein a respective weightage is assigned for each of the

plurality of risks, and generate a score based on the plurality of weightages for the plurality of risks.

[0007] According to a second aspect, there is provided a method for evaluating driving risk. The method includes: receiving data from a vehicle, the data comprising at least one of GPS data, acceleration data and image data; training a situation classification model based on the data received from the vehicle using machine learning methods to classify various driving situations; thereafter identifying a plurality of risks based on the data received from the vehicle and one or more of the various driving situations classified by the situation classification model; determining a plurality of weightages, wherein a respective weightage is assigned for each of the plurality of risks; and generating a score based on the plurality of weightages for the plurality of risks.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The accompanying figures, where like reference numerals refer to identical or functionally similar elements throughout the separate views and which together with the detailed description below are incorporated in and form part of the specification, serve to illustrate various embodiments and to explain various principles and advantages in accordance with a present embodiment.

[0009] FIG. 1 depicts an illustration of a computing device for evaluating driving risk in accordance with a present embodiment.

[0010] FIG. 2 depicts an illustration of a system for evaluating driving risk of a vehicle in accordance with the present embodiment.

[0011] FIG. 3 depicts a block diagram of a situation classification model in accordance with the present embodiment.

[0012] FIG. 4 depicts a block diagram of a manoeuver classification model in accordance with the present embodiment.

CLAIMS

1. A computing device for evaluating driving risk, comprising:

an input circuit configured to receive data from a vehicle, the data comprising at least one of GPS data, acceleration data or image data; and

a processor configured to:

train a situation classification model based on the data received from the vehicle using machine learning methods to classify various driving situations,

wherein the processor is further configured to:

identify a plurality of risks based on the data received from the vehicle and one or more of the various driving situations classified by the situation classification model;

determine a plurality of weightages, wherein a respective weightage is assigned for each of the plurality of risks; and

generate a score based on the plurality of weightages for the plurality of risks.

2. The computing device of claim 1, wherein the image data comprises at least one of images of road condition, images of traffic condition, images of weather condition, images of lighting condition or images of other vehicles.

3. The computing device of claim 1, wherein the image data comprises at least one of images of a driver's postures inside the vehicle or images of the driver's movements inside the vehicle.

4. The computing device of claim 3, wherein the processor is further configured to identify the driver of the vehicle based on the image data using facial recognition.

5. The computing device of claim 1, wherein the processor is further configured to identify the driver of the vehicle using the driver's biometric data.

6. The computing device of claim 1, wherein the processor is further configured to identify the driver of the vehicle using the driver's identity document or data.

7. The computing device of claim 1, wherein the plurality of risks comprises at least one of not keeping a safe distance, not following traffic lights or traffic signs, not slowing down at road junctions, not signaling, not doing safety checks or reckless driving.

8. The computing device of claim 1, wherein identifying the plurality of risks based on the data received from the vehicle is based on training on previous data received from vehicles using machine learning methods.

9. The computing device of claim 8, wherein machine learning methods comprises deep learning, random forest, support vector machines, linear regression, logistic regression, nearest neighbor and decision tree.

10. The computing device of claim 1, wherein the score is used for at least one of assessing the driver's behaviors, providing analysis data to insurance providers or predicting an accident of a semi-autonomous or autonomous vehicle.

11. The computing device of claim 1, wherein the processor is configured to generate the score based on a sum, wherein the sum is based on the respective weightage assigned for the each of the pluralities of the risks.

12. The computing device of claim 11, wherein the sum is based on a number of occurrences for the each of the pluralities of the risks and the respective weightage assigned for the each of the pluralities of the risks.

13. The computing device of claim 12, wherein the respective weightage assigned for the each of the plurality of risks increases at a predetermined

rate, wherein the predetermined rate is based on the number of occurrences for the respective risk in a predetermined period of time.

14. A method for evaluating driving risk, comprising:

receiving data from a vehicle, the data comprising at least one of GPS data, acceleration data and image data;

training a situation classification model based on the data received from the vehicle using machine learning methods to classify various driving situations;

thereafter identifying a plurality of risks based on the data received from the vehicle and one or more of the various driving situations classified by the situation classification model;

determining a plurality of weightages, wherein a respective weightage is assigned for each of the plurality of risks; and

generating a score based on the plurality of weightages for the plurality of risks.

15. The method of claim 14, wherein the image data comprises at least one of images of road condition, images of traffic condition, images of weather condition, images of lighting condition or images of other vehicles.

16. The method of claim 14, wherein the image data comprises at least one of images of a driver's postures inside the vehicle or images of the driver's movements inside the vehicle.

17. The method of claim 16, wherein the method further comprises identifying the driver of the vehicle based on the image data using facial recognition.

18. The method of claim 14, wherein the method further comprises identifying the driver of the vehicle using the driver's biometric data.

19. The method of claim 14, wherein the method further comprises identifying the driver of the vehicle using the driver's identity document or data.

20. The method of claim 14, wherein the plurality of risks comprises at least one of not keeping a safe distance, not following traffic lights or traffic signs, not slowing down at road junctions, not signaling, not doing safety checks or reckless driving.

21. The method of claim 14, wherein identifying the plurality of risks based on the data received from the vehicle is based on training on previous data received from vehicles using machine learning methods.

22. The method of claim 21, wherein machine learning methods comprises deep learning, random forest, support vector machines, linear regression, logistic regression, nearest neighbor and decision tree.

23. The method of claim 14, wherein the score is used for at least one of assessing the driver's behaviors, providing analysis data to insurance providers or predicting an accident of a semi-autonomous or autonomous vehicle.

24. The method of claim 14, wherein the method comprises generating the score based on a sum, wherein the sum is based on the respective weightage assigned for the each of the pluralities of the risks.

25. The method of claim 24, wherein the sum is based on a number of occurrences for the each of the pluralities of the risks and the respective weightage assigned for the each of the pluralities of the risks.

26. The method of claim 25, wherein the respective weightage assigned for the each of the plurality of risks increases at a predetermined rate, wherein the predetermined rate is based on the number of occurrences for the respective risk in a predetermined period of time.