System and method to monitor trip and detect unsafe events

Technical Field

The present invention relates generally to a system and method to monitor trip and detect unsafe events.

Background

Ride hailing services involve putting passengers and drivers who do not know each other on trips in close physical proximity. Passengers and drivers are concerned about their safety during the trip, and ride hailing providers wish to ensure their service is safe for their users.

Further, accidents or even criminal activity may happen during such trips, and sometimes result in fatality if help is not rendered in a timely manner. With possibly thousands of such trips occurring at any one time, it is a challenge to ensure safety of every single trip.

A need therefore exists to provide a system and method to monitor trip and detect unsafe events that seek to address the above-mentioned problems.

Summary

Disclosed are arrangements which seek to address one or more of the above problems by providing a system and method to monitor trip and detect unsafe events. The disclosed arrangements can also be used to monitor a trip based on processing data relating to each element of the trip and trigger an appropriate response upon detection of an unsafe of unusual event.

According to a first aspect, the present disclosure refers to a method for monitoring movement of a vehicle during a ride based on a mobile device associated with the vehicle, comprising: detecting an unusual movement of the vehicle during the monitoring, the unusual movement comprising at least one of a change in speed, route or arrival time of the vehicle; determining an overall risk level based on the unusual movement; triggering a response based on the overall risk level, the response including a request to confirm a status of an occupant of the vehicle; and triggering a followup response based on the status of the occupant; wherein

determining the overall risk level further comprises: processing, by one or more risk models, data associated with the ride, the vehicle, and occupants in the vehicle during the ride, wherein the processing of the data by each of the one or more risk models is based on a specific risk, the specific risk comprising at least one of a risk of sexual crime, risk associated with a driver of the vehicle, risk associated with a passenger of the vehicle, risk of occurrence of a crime, risk of a driving accident and risk of an abnormal progress of the ride; assigning a priority to each of the one or more risk levels based on the specific risk associated with each of the one or more risk models, and triggering the response if a risk level of a highest priority exceeds a threshold value, the response being at least one of making a call to an occupant of the vehicle, sending a message to an occupant of the vehicle, activating audio recording of the mobile device, communicating with a next-of-kin of an occupant of the vehicle, requesting assistance from a public service or an incident response team, and continued monitoring of the ride, based on the overall risk level.

According to a second aspect, the present disclosure refers to a system for monitoring movement of a vehicle during a ride based on a mobile device associated with the vehicle, comprising: at least one processor; and at least one memory including computer program code; the at least one memory and the computer program code configured to, with the at least one processor, cause the system at least to: detect an unusual movement of the vehicle during the monitoring, the unusual movement comprising at least one of a change in speed, route or arrival time of the vehicle; determine an overall risk level based on the unusual movement; trigger a response based on the overall risk level, the response including a request to confirm a status of an occupant of the vehicle; and trigger a followup response based on the status of the occupant; wherein determining the overall risk level further comprises: processing, by one or more risk models, data associated with the ride, the vehicle, and occupants in the vehicle during the ride, wherein the processing of the data by each of the one or more risk models is based on a specific risk, the specific risk comprising at least one of a risk of sexual crime, risk associated with a driver of the vehicle, risk associated with a passenger of the vehicle, risk of occurrence of a crime, risk of a driving accident and risk of an abnormal progress of the ride; determining a risk level for each specific risk based on the processed data; assigning a priority to each of the one or more risk levels based on the specific risk associated with each of the one or more risk models, and triggering the response if a risk level of a highest priority exceeds a threshold value, the response being at least one of making a call to an occupant of the vehicle, sending a message to an occupant of the vehicle, activating audio recording of the

mobile device, communicating with a next-of-kin of an occupant of the vehicle, requesting assistance from a public service or an incident response team, and continued monitoring of the ride, based on the overall risk level.

Brief Description of the Drawings

Some aspects of at least one embodiment of the present invention will now be described with reference to the drawings and appendices, in which:

Fig. 1 illustrates a system for monitoring a trip and detecting unsafe events according to various embodiments;

Fig. 2 illustrates a schematic diagram of a ride monitoring server according to various embodiments;

Fig. 3 shows an overview of a process for monitoring a trip and detecting unsafe events according to various embodiments;

Fig. 4 shows an example illustration of how a status of an occupant in a vehicle may be obtained according to various embodiments;

Fig. 5 is a flow diagram of a monitoring movement of a vehicle during a ride based on a mobile device associated with the vehicle according to various embodiments;

Figs. 6A and 6B form a schematic block diagram of a general purpose computer system upon which the travel co-ordination server of Fig. 1 can be practiced;

Figs. 6C is a schematic block diagram of a general purpose computer system upon which the ride monitoring server of Fig. 2 can be practiced;

CLAIMS

1. A method for monitoring movement of a vehicle during a ride based on a mobile device associated with the vehicle, comprising:

detecting an unusual movement of the vehicle during the monitoring, the unusual movement comprising at least one of a change in speed, route or arrival time of the vehicle;

determining an overall risk level based on the unusual movement;

triggering a response based on the overall risk level, the response including a request to confirm a status of an occupant of the vehicle; and

triggering a followup response based on the status of the occupant;

wherein determining the overall risk level further comprises:

processing, by one or more risk models, data associated with the ride, the vehicle, and occupants in the vehicle during the ride, wherein the processing of the data by each of the one or more risk models is based on a specific risk, the specific risk comprising at least one of a risk of sexual crime, risk associated with a driver of the vehicle, risk associated with a passenger of the vehicle, risk of occurrence of a crime, risk of a driving accident and risk of an abnormal progress of the ride;

determining a risk level for each specific risk based on the processed data;

assigning a priority to each of the one or more risk levels based on the specific risk associated with each of the one or more risk models, and triggering the response if a risk level of a highest priority exceeds a threshold value, the response being at least one of making a call to an occupant of the vehicle, sending a message to an occupant of the vehicle, activating audio recording of the mobile device, communicating with a next-of-kin of an occupant of the vehicle, requesting assistance from a public service or an incident response team, and continued monitoring of the ride, based on the overall risk level.

2. The method according to claim 1, wherein monitoring the movement of the vehicle further comprises monitoring at least one of a GPS, accelerometer or gyroscope sensor of the mobile device.

3. The method according to claim 1, wherein determining the risk level for each specific risk further comprises training the one or more models based on the status to output a revised risk level for each specific risk of the detected unusual movement.

4. The method according to claim 1, wherein the processing is further based on one or more feature vectors, each feature vector representing at least one of a contextual information and historical information relating to the ride, wherein

contextual information comprises a duration of the unusual movement, a location at which the unusual movement occurred, start and stop time of the unusual movement, congestion level on road segment when the unusual movement occurred, booking information of the ride, behaviour of occupants of the vehicle, and past events that occurred on the ride; and

historical information comprises historical data about occupants of the vehicle and information about similar past bookings, stops and past unusual movement relating to a location at which the unusual movement occurred.

5. The method according to claim 1, wherein determining the overall risk level further comprises:

processing, by a decision model, the risk levels determined by the one or more risk models, business goals, existing resources and possible tradeoffs; and

determining the overall risk level based on the processing.

6. The method according to claim 1, wherein triggering the response comprises at least one of making a call to an occupant of the vehicle, sending a message to an occupant of the vehicle, activating audio recording of the mobile device, communicating with a next-of-kin of an occupant of the vehicle, requesting assistance from a public service or an incident response team, and continued monitoring of the ride, based on the overall risk level.

7. The method according to claim 1, wherein triggering the followup response comprises at least one of making a call to an occupant of the vehicle, communicating with a next-of-kin of an occupant of the vehicle, requesting assistance from a public service or an incident response team, and continued monitoring of the ride, based on the status of the occupant.

8. A system for monitoring movement of a vehicle during a ride based on a mobile device associated with the vehicle, comprising:

at least one processor; and

at least one memory including computer program code;

the at least one memory and the computer program code configured to, with the at least one processor, cause the system at least to:

detect an unusual movement of the vehicle during the monitoring, the unusual movement comprising at least one of a change in speed, route or arrival time of the vehicle;

determine an overall risk level based on the unusual movement;

trigger a response based on the overall risk level, the response including a request to confirm a status of an occupant of the vehicle; and

trigger a followup response based on the status of the occupant;

wherein determining the overall risk level further comprises:

processing, by one or more risk models, data associated with the ride, the vehicle, and occupants in the vehicle during the ride, wherein the processing of the data by each of the one or more risk models is based on a specific risk, the specific risk comprising at least one of a risk of sexual crime, risk associated with a driver of the vehicle, risk associated with a passenger of the vehicle, risk of occurrence of a crime, risk of a driving accident and risk of an abnormal progress of the ride;

determining a risk level for each specific risk based on the processed data;

assigning a priority to each of the one or more risk levels based on the specific risk associated with each of the one or more risk models, and triggering the response if a risk level of a highest priority exceeds a threshold value, the response being at least one of making a call to an occupant of the vehicle, sending a message to an occupant of the vehicle, activating audio recording of the mobile device, communicating with a next-of-kin of an occupant of the vehicle, requesting assistance from a public service or an incident response team, and continued monitoring of the ride, based on the overall risk level.

9. The system according to claim 8, further configured to:

monitor at least one of a GPS, accelerometer or gyroscope sensor of the mobile device.

10. The system according to claim 8, further configured to:

train the one or more models based on the status to output a revised risk level for each specific risk of the detected unusual movement.

11. The system according to claim 8, further configured to:

Process the data based on one or more feature vectors, each feature vector representing at least one of a contextual information and historical information relating to the ride, wherein

contextual information comprises a duration of the unusual movement, a location at which the unusual movement occurred, start and stop time of the unusual movement, congestion level on road segment when the unusual movement occurred, booking information of the ride, behaviour of occupants of the vehicle, and past events that occurred on the ride; and

historical information comprises historical data about occupants of the vehicle and information about similar past bookings, stops and past unusual movement relating to a location at which the unusual movement occurred.

12. The system according to claim 8, further configured to:

process, by a decision model, the risk levels determined by the one or more risk models based on business goals, existing resources and possible tradeoffs; and

determine the overall risk level based on the processing.

13. The system according to claim 8, further configured to:

trigger the response comprising at least one of making a call to an occupant of the vehicle, sending a message to an occupant of the vehicle, activating audio recording of the mobile device, communicating with a next-of-kin of an occupant of the vehicle, requesting assistance from a public service or an incident response team, and continued monitoring of the ride, based on the overall risk level.

14. The system according to claim 8, further configured to:

trigger the followup response comprising at least one of making a call to an occupant of the vehicle, communicating with a next-of-kin of an occupant of the vehicle, requesting assistance from a public service or an incident response team, and continued monitoring of the ride, based on the status of the occupant.