RECKLESS DRIVING AND SPEED ALERTING SYSTEM FOR DRIVER AND OTHERS ON ROAD FOR DRIVING SAFETY

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ABSTRACT: This paper proposes an idea to alert rough and drunk driver when he is driving rough or recklessly. The application is based on a cell phone. The cell phone with sensors has to install software in it. The Android phone has accelerometer and orientation sensors already built in phones. The application calculates the sensor reading, if driver is not driving proper, then an audible alert will be heard by the driver and again at second time and at third alert, SMS will be sent to the person they mentioned in the help contact numbers, asking for help, it also sends GPS coordinates to locate the exact position of driver. It also gives alert when set limit of speed exceeds. The system does the job of alerting the driver as well as the other persons driving on road by placing LED and sound speaker inside and outside of the car. This is because, other people driving on road will also get alert and they will be careful of this rough driver.

Keywords: Reckless driving behavior, Speed alert application, Sensors.

I. INTRODUCTION

Today's it is highly risky to drive a vehicle. because, various kinds of vehicles are available that provides convenience in human daily life and due to the developments of new technologies it makes the vehicle running fast. It also brings in some problems such as the happenings of accidents due to driver's reckless /careless behavior. The reckless driving is dangerous to the drivers themselves and also to the public driving their vehicle on the same road. A main cause of road accidents is rough driving or driving after alcohol consumption. Very commonly used phones are android based cell phones. This paper, proposes a system which will very alert the driver who is driving recklessly and it also alert the other persons driving on that road. An audible alert can be given to the careless or a rough driver. It measures the speed and orientation of the vehicle. Those parameters can be collected by using sensor. It will calculate longitudinal (horizontal) and lateral (vertical) acceleration values. It will match the result with a predefined pattern to identify careless driver. And the alert sound will be given to the driver. It also gives alert when set limit of speed exceeds. The application does the job of alerting the driver as well as the other persons driving on road. It suggests placing a LED and sound speaker inside the car and outside of the car. The speaker and LED which is inside will alert the driver and speaker and LED which is outside will alert the other people driving on the same road, so people will be aware of careless driving.

II. LITERATURE SURVEY

A unit, TELEMATIC box, was developed to monitor a vehicle's location [2], velocity and driver behavior and transmitting relevant data to a centralized web-server. Data such as acceleration, speed and tilt angle of the vehicle was measured and used to characterize driver behavior.

Drawback to this technology

1. It used microcontroller, in which you have to purchase a separate hardware unit ie TLEMATIC box.
2. It used to calculate only longitudinal acceleration. It was not concerned with lateral acceleration.
3. The location of vehicle was calculated manually via GPS tracker.

Monitoring driver behavior using an electronic unit with two sensors [3], namely a GPS and accelerometer, and theoretical models, which include both acceleration and speed data, to detect and report erratic driving of a minibus taxis. This paper presents a way of monitoring driver behavior using an electronic unit with two sensors, namely a GPS and accelerometer. Acceleration data was captured on the prototype's SD-card, and post-processed with MATLAB. The Paper was focused on road accidents occurring due to poor indication of sign boards, drowsy state and drunken state of drivers in both two wheelers and four wheelers [4]. The accidents due to the drowsy state of the driver is prevented using eye blink sensor which detects the drowsy state and alarms the driver using buzzer and a LCD message. The aim was to prevent the accidents by providing receiver unit in vehicles along with transmitter unit at necessary places such as school zones, diversion zones, railway crossings and other accident prone zones to indicate about the respective places well in advance before reaching the spot by means of LCD message and as well as by a recorded voice. Driver monitoring is achieved via an eye-gaze tracking system [5] and vehicle instrumentation. Driver eye-gaze tracking and critical road scene feature detection are combined to determine what the driver is seeing. The CeDAR active vision platform containing the stereo road scene cameras and face LAB passive stereo cameras observing the driver. CeDAR: Cable Drive Active vision Robot in vehicle. Four cameras are arranged in two stereo pairs. Cameras are fitted with polarizing filters and far-field cameras use glare hoods. Saab, automobile manufacturer has designed an experimental product AlcoKey, which used the breath sample of drivers. It collects the breath sample before they start the vehicle. Then the AlcoKey's radio transmitter sends a signal to the vehicle's electronic control unit. Now the control unit will decide wither the vehicle to be started or not based on the level of alcohol present in the breath

sample. These researches worked based on the interactions between human and vehicle to determine drunk driving. It also required that the vehicle need to be tightly coupled with the auxiliary add-ons, so their compatibility have been compromised most of the time [8]. Architecture for driving information system using GPS receiver and specific sensors is implemented. They have recorded the acceleration and GPS data and used pattern matching to detect and classify driving styles. The work shows that the acceleration reflects the measures of driving pattern. However, it do not only aim on the acceleration signature, but also take help of GPS data. The devices required in their system are specific and not conveniently compatible [9].

III. PROBLEM IDENTIFICATION

This application considers three categories of behaviors and problems as follows.

1. The lane position maintenance problems: for a reckless driver it is difficult to be in lane. He drives in back and forth pattern, to go out of lane, drive in long curved line, and driving intentionally over steered.
2. The speed control problems: such as accelerating or decelerating suddenly, too jerky brakes, and stopping inappropriately.
3. The judgment and vigilance problems: such as driving on the other side of the road, driving without headlights at night, driving with tires on lane marker. This driving problem provides relatively strong evidence of reckless driving; the actions related to problems of lane position maintenance and speed control are categories, so they can be used as main evidences for reckless driving detection. The probability of reckless driving goes higher while the number of observed cues increases.

A. LATERAL ACCELERATION

The main problem in lane positioning maintenance is abnormal or irregular curvy movements which causes drives in weaving pattern, to go out of lane, driving intentionally over steered, and travel in long curved line. This results in change on lateral acceleration. The lateral movement is caused by rotating a steering wheel in opposite direction one after another.

B. LONGITUDINAL ACCELERATION

A reckless driver or a drunk driver is not able to keep proper speed and finds difficulty to maintain lane position, and so he sometimes experiences difficulty in driving. Sudden acceleration (increase in speed) or deceleration (decrease in speed) concludes the driver is reckless. They cause change in longitudinal acceleration. We say that the longitudinal acceleration is in the horizontal direction of a car that is toward the head of the car. Hence, increase in speed of vehicle leads to an increase of longitudinal acceleration. And deceleration will cause decrease of longitudinal acceleration.

IV. DESIGN OF PROPOSED SYSTEM

The design of system includes six proposed modules for rough and drunk driver.

A. IMPLEMENTATION AND SYSTEM OVERVIEW

In this section, the design and implementation of rough driving detection system is discussed. The rough driving detection system is made up of six modules.

(1) Calculating orientation module,
(2) Real-time Supervising module,
(3) Pattern matching module,
(4) Alert module,
(5) GPS Module,
(6) Speed alert module.

B. WORKING OF SYSTEM

Fig 1. Shows the architecture of proposed system.

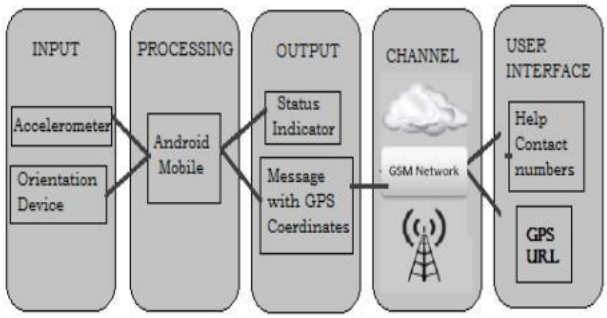

Fig. 1. System Architecture of a proposed system.

To evaluate the rough driving detection prototype with real driving tests, the data is collected from the orientation device in mobile in two kinds of abnormal driving behaviors in real driving. The data include lateral and longitudinal accelerations of the vehicle that is movement in these two directions. It also collected the data of regular driving in different environments. The work flow of rough driving detection system is also illustrated in Fig. 2. After the application starts, an orientation module performs its function, and procedure is conducted when the application detects that the phone is located in a car. Then the main application works in a background. The module supervises the driving behaviors in real time and collects acceleration parameters. The collected parameters include longitudinal and lateral acceleration. The data is fed to the pattern matching modules. If the pattern is matched, it means a reckless driving is detected; one signal is transmitted to trigger an alert. The phone gives alert to driver or automatically contact the police or concern person for help.
It also sends GPS Coordinates of location of driver as shown in Fig 6. If the condition fails, control returns to the module immediately.

C. SPEED ALERT MODULE

The device which can give GPS coordinates is GPS available in cell phone. The time interval can be defined. To calculate the average speed during driving by car, it takes the distance between two points and then divided it by the given time interval. This is an analog speedometer that gives audible and visible alerts when a set speed limit is exceeded. It automatically triggers a speed limit change when crossing the set limit again. You can set maximum and minimum speed limits

Fig 2. Speed Alert Module.

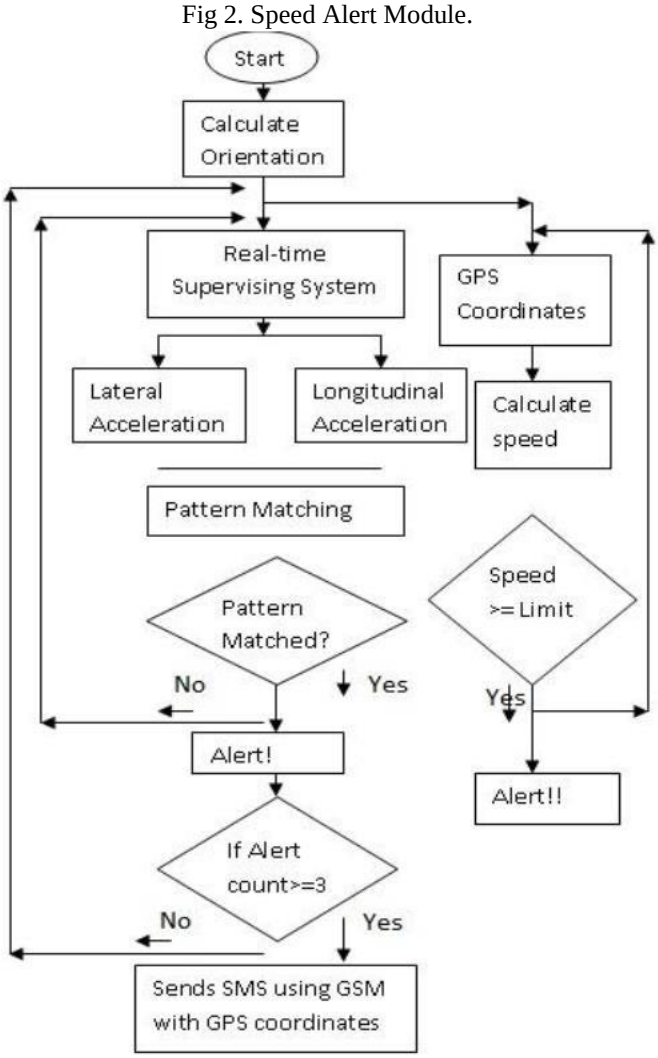

Fig. 3. Working of the reckless driving detectiona system.

D. Software Implementation:

The Android G I phone provides an accelerometer sensor and an orientation sensor. In the following part, described the implementation details of the prototype. This implemented the prototype in Java, with Eclipse and Android 1.6 SDK. It consists of 7 class files, which include 4 Activities, I View, I Service and I Resource. They can be divided into five major components: user interface, system configuration, monitoring daemon, data processing and alert notification. After the system is started, it finishes the configuration automatically. The monitoring daemon keeps running in background as a Service in Android, collecting and recording the readings of sensors. These readings are processed and used to detect rough driving. When rough driving is detected, the alert notification component works to alarm and remind the driver of dangerous driving or call the police for help. It compiled and built the system project, create and sign the .apk file and install it onto G I phone by ADB tool. Ultimately, we may create the .apk file in release mode, sign it with our release private key and publish it on Android Market, making it available to Android mobile device users for download.

V. RESULT ANALYSIS

When practical is taken, live readings are shown in the Fig 4. At first weaving movement it gave first alert, when again moving in a weaving pattern it again gave alert. When we took third movement in a weaving fashion it gave alert and SMS using GSM.

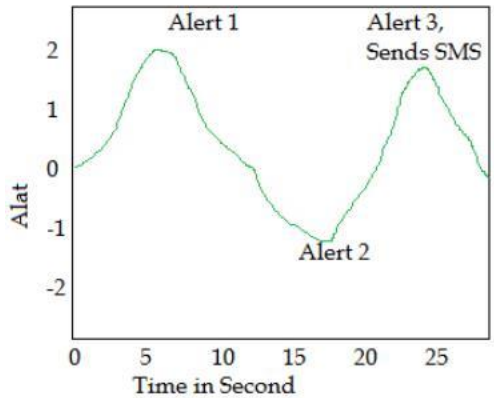

Fig. 4 Alat in case of weaving in moving vehicle.

The snapshot of SMS, sent to the concern person through GSM service asking for help is shown in the Fig 5.

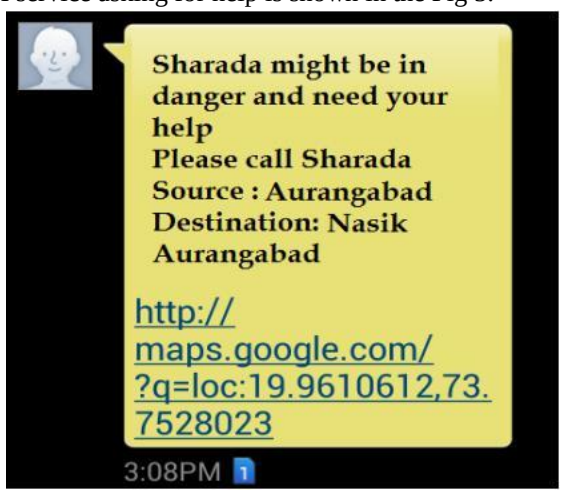

Fig. 5 The SMS sent to help contact numbers of a concern person.

The snapshot of current location of driver when mapped the coordinates with google map is shown in the Fig 6.

Fig. 6. The current location of driver.

The comparison of base paper technology and proposed technology is shown in table below.

Base Paper Technology	**Proposed Technology**
It uses a microcontroller fixed in TELEMATIC box, costing extra.	It Uses sensors in any android phone. These sensors are in built in it.
Concerned with speed only.	Concerns with speed and rough driving too.
Needs to track driver's position manually through GPS tracker.	It sends SMS with location of driver through GSM to help contact numbers.
It did not alert others who driving on road.	~~It alerts the other people~~ driving on road. It gives audible and visible speed alerts when set speed exceeds and in case of driver's rough driving.

He~~nce, proposed technology~~ is better than base paper technology cost wise and performance wise. It assures safety for driver who is driving rashly and other people who are driving on the road; it alerts them so that they can be aware of this reckless and rough driver and so accidents can be avoided.

VI. CONCLUSION

In this paper, proposed technology is very efficient android cell phone based rough and drunk driver alerting system. The cell phone, which is located in the moving vehicle, collects and analyses the information from its orientation sensor and accelerometer to identify any irregular or dangerous driving behaviors typically related to driving under alcohol influence.

VII. FUTURE SCOPE

1. This project works on android based smart phone. In future this would be extended to other OS like Apple's iOS, Nokia's Symbian, RIM's BlackBerry OS.
2. Can be modified to locate turns before they actually appears on road so that accidents can be avoided on turning.

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