Analyzing Drivers behavior for Rash driving & Overspeeding using Smartphone: A Survey

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Abstract: Considering the increasing number of vehicle accidents due to overspeeding and Rash driving over the globe, We hear by carried out Survey of different problem in case of accidents and work on the solution which helps the parents in case of accidents. In today's life, everyone is in hurry to reach their destination as fast as possible. Various sensors are used to monitor drivers behavior, In literature survey, we studies various papers to observe Drivers pattern. This paper also provides some research directions which various researches can explore. A program installed on the mobile automatically calculates accelerations supported detector readings, and compares them with threshold set in the application. Once any proof of rash driving is determined, the mobile will automatically alert the driver or sends a message to given number in application for help well before accident actually happens

***IndexTerms*–Three axis accelerometer, Gyroscope, GPS.**

I. INTRODUCTION

It is very difficult to define the multidimensional feature that researchers found is being sleepy.It is one of the Factor that taken in consideration in traffic accidents. It is very difficult to solve this problem, when the design of earlier accident prevention systems was foundineffective for alerting the driver.The three-axis accelerometer readingfrom a built-in accelerometer, the speed of the vehicle can be measure by the sensors.[1] Therefore, a real-time fatigue detection system is essential in order to eliminate or reduce the risk of a driver having an accident. [2]Due to rash driving it harms Driver as well as fellow passengers, fellow drivers, pedestriansand their family. Therefore, it is of high importance to reflections driving to the person himself as well as concernedauthorities for relevant action and improvement. [3]The objective of this paper is to provide a low cost, feasible andcontinuous detection of solution to minimize rash driving habits. For rash driving detection, most previous methods havedeployed additionally dedicated sensors like accelerometer sensor inside smartphone, smartphone based mobile applications orroadside sensors. The technologies include either direct detection through mobile inbuilt sensors, or exportingdriving data to a remote server with furtherapplication of various analytical techniques on the basis ofcertain theoretical thresholds of violation.

We use the algorithm which collect and monitor the requiredinformation. By detecting it generates an alert message. The paper built with the details of data processing of the accident detection module in a specific manner. Additionally, the contribution is presented through a flow chart of the proposed system todetect an accident correctly and in a timely manner. The aim of the paper is to avoid road accidents due to unsafe driving of the vehicles. In the existing system, the road crashes are controlled by pointing a readings taken from accelerometer sensor. When the rider crosses the road at a speed which is quite dangerous.The disadvantage of existing system is many man powers is needed to carry a radar gun and to check the speed.

Smartphone Sensors

Smartphones today equipped with the lots of sensors, which provide apps with huge information about the world around the phone.

3.1Accelerometer and gyroscope

The orientation of the phone can be detected by the accelerometer. The gyroscope, or gyro in short, it adds an additional dimension to the information catchby the accelerometer by considering rotation or tilt. Linear acceleration can be measures by accelerometer, while a gyroscope side by side measures the angular rotational velocity. Both sensors measure rate of change. The directional movement of a device would also be measure by the sensor called as accelerometer, but will not be able to resolve its lateral orientation or tilt during that movement gyroscope is use to insert an information in it. An accelerometer is providing both noisy and clean output, so it depends on certain conditions. But when we combine the 3-axis accelerometer with a 3-axis gyroscope, we get a response in same time. Accelerometers are also used to provide steps' information for a third party 'health' application.

A Gyroscope is consider to make in work with the accelerometer, it used to hold the stability in navigation system. Example: Navigator, stabilizers, etc. Similarly, a gyroscope sensor is which is present in your smartphone to grasp angular velocity and acceleration. It is used in all those mobile games, we are able to play using this sensors in our phones, tablets, etc, is due to a Gyroscope Sense. Similarly, it is required in a smartphone to be able to watch multidimensional , games or photos. The motion of photo or the video change, when we move our phone due to the presence of Gyroscope.

3.2 GPS

GPS stands for **G**lobal **P**ositioning **S**ystem. It's a technology invented by the U.S. government and overseen by the country's Air Force. Generally it is free for everyone to use this technology.GPS is use to track the location,there are various

application of GPS .We use GPS to track the Drivers current location and send it to the respected parents in case of any of the situation occur.GPS also provide a facility of mapping, in case of searching particular address.This technology can be use by billions of people today in their everyday life.The system provides their applications to military, civil, and commercial users around the world.

3.3 Driver behavior:

Behavior of driver is detected an important cause for accidents so in order to assess reason and differences in accident happening, Traffic monitored team differentiate 3 angle of driver behavior: reasoned or planned behavior, impulsive or emotional behavior, and habitual behavior.

3.4 APK Extractor

It will extracts **APK** that are installed on your **android device** and copies them to your SD card. Fast and eastouse extractsalmost all application,including system applications. No ROOT access required.

Literature Survey

The following is the list of the most commonly researched task in Rash driving and Overspeeding. Various researchers has establishes in past that tried to monitor driver behaviour using two dedicated sensors placed inside car, roadside or inside the Smartphone.

In paper [3], Fazeen et al. it proposed a system using smartphone which is an innovative aspect,it also integrated inside an automobile to calculate driver style.Android-based smartphone app can be design which uses a concept related to 3-axis, it record and analyze various driver behaviours and external road conditions that could potentially be dangerous to the health of the driver. They have used x-axis and y-axis accelerometer data to measure the driver's control on the vehicle as they accelerate, and apply the brakes.

In paper [4], Chigurupa et al. developed an android app which uses data from sensor known as Gyroscope, GPS sensor and video can be recorded with the help of camera to give rating to the driver. The reviews can be used to show the driver and improve performance. The range of acceleration or deceleration values is use to consider the phenomenon of safe driving. Whenever the accelerometer values exceed more than a specified limit it would be considered as an event.

In paper [5], P. Singh et al. developed an application which is totally android based. This application collects data from accelerometers, GPS and microphone is use to record the sound, and then data is merged and analyzed to detect rash driving patterns. The various patterns such as observing brake style, direction-change left,right, sudden breaking and improper acceleration were analyzed.

In paper[6], In this paper, author suggested fine grained identification of driving patterns to improve driving safety. The have suggested certain number of types for abnormal driving behavior, for example sudden-U turn is fast turning in U-shape. Advanced features are collected from certain types of driving behavior patterns on acceleration and orientation. Many of which are extracted feature stored to Model Database which can realize abnormal driving patterns.

In paper[7],The author compared two of the most common methods used to find shortest path between two points on the earth surface – Haversine Algorithm, and Vincenty Algorithm. Haversine Algorithm is used for spherical shapes while Vincenty Algorithm is used for elliptical shapes. Using these formulae gives approximate results about the real distances. Haversine is two times faster than Vincenty, as such, it satisfies the response time evaluation criteria. So author concludes that Haversine is more appropriate for use.

In paper[8], In this paper, author developed a method that collects data using sensor present in Smartphone and observe driving events and road anomalies. This paper suggest the patterns of driving events, such as left turn, right turn,unsafe braking and sudden forced acceleration, and road conditions, such as pothole, bump and rough patch, detected in the data set. This study helps in collecting driving behaviour and road anomalies to ensure driver safety and maintenance of roads.

I. RESEARCH METHODOLOGY

The Real time monitoring can be perform by the user/Driver itself, user also responsible for reporting of behaviour. The first step is to install "Fall Detector" app on your android device, then User will login to an app present in smartphone equipped with accelerometer sensor. The values are set according to take situations in consideration before start driving, When driver starts driving the bike, the app will remain open on the users phone and readings from accelerometer sensor will be taken periodically and it try to match a pattern, If rash driving pattern is occur, user will be provided with an alert message but if it found continuously or if user repeats rash driving, his GPS coordinates will be sent to the server/parents. We propose System using mobile phones as the platform for rash driving detection. To the best of our knowledge, we are the first to introduce mobile phones in the area of combinedly detect rash, dash, over speeding. We design the algorithm for detecting rash driving in real time using mobile phones. We analyze the unsafe driving related patterns and extract its fundamental based on accelerations of vehicle which are determined by accelerometer. There are several advantages of using phone based app, maintanence cost is negligible or system provides efficient and reliable service and power efficiency.

We design the detection algorithm based on accelerations, and apply it to the mobile phones equipped with 3-Axis accelerometer and orientation sensor. An accelerometer is responsible to collect the acceleration readings in directions of x-, y-, and z-axis,

which represented by Ax Ay and Az. generally, we assume that the directions of X-axis, y-axis, and z-axis are decided by the orientation of the phone that is gyroscope sensors. As illustrated in Fig. 1, positive direction can be defined by x-axis which is generally for right side of the device, positive direction toward the top of the device can be represented by y-axis and the front of the device suggest z-axis. In mobile phone, orientation can be determined by orientation sensors, i.e. yaw, pitch, roll values that are denoted as Bx, By and Bz, respectively. The yaw means rotation around the z-axis, while pitch and roll represent the rotation around x-axis and y-axis. They are also shown in Fig. 2. The values specifies in the following figure can be extracted from the orientation sensor.

Fig1: pervasive Rash Driving Detection System

Algorithm For Accelerometer:

1. Initialize
2. Get x coordinate
3. Get y coordinate
4. Get z coordinate
5. Extract Features of the environment.
6. Predict Motion states according to the features (x, y, z axis readings)
7. If rash driving found then inform police station.
8. Else, continue.
9. Stop

3.1Conclusion

The system made with the sensors is the heart of an our project which leads to find the symptoms of rash driving and at the same time it will gives a notification by considering their acceleration readings.We can use the system from any part because it is completely software based, the thing which you need only is your phone, your phone is very handy and no additional setup is require which makes the project costly and static. In future work we will add the same with overspeeding detection system.

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