Smart Phone Based Rash Driving Identification And Detection

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Abstract- *By the transportation survey majority of the human life is in endanger or causes injury due to road accident is because of Rash driving rather than drunk & drive, using mobile phones when driving. Smart phone can be used to identify the Rash Driving drivers from the people who can ride the vehicle to form '8' shaped pattern. This proposal aims to determine the driving pattern with the help of smart phone. The data is collected using the Accelerometer sensor, Magnetic sensor, Position sensor and GPS from smart phone using MATLAB Mobile. Extracted feature is useful for identification of the driver's driving skill via phone from diverse sensors. The style of driving is monitored at every instance with the help of GPS and ThingSpeak which is open source IoT. Using the smart phone sensor, rash driving can be identified, alert or warning signal can be given to driver and details will be delivered to the traffic police using GPS via cloud.*

Keywords- Accelerometer, MATLAB Mobile, ThingSpeak, Sensor devices.

I. INTRODUCTION

Road accidents are caused due to distraction of the driver. The distraction while driving is because of lack of sleep[2], using gadgets during driving, lack of proper driving skill, speed driving, not following the traffic rules, drunk and drive etc., Terminal devices were installed on the road side to monitor the rash driving[6]. Rash driving can be classified by wrong side driving, frequently changing lane and fast acceleration.Detecting rash driving in huge traffic is very difficult with the current implementation.

In-built smart phone sensors can be used to monitor the driver's driving style. The driving style is captured as signals using the able smart phone sensors. The sensors like accelerometer sensor, magnetic sensor and position sensor can be used to identify the acceleration, location, speed of the vehicle.

II. RELATED WORK

Many concepts were implemented for monitoring rash driving like installing camera in road side and on the vehicle to monitor the driving skill of the driver.

In the first category the camera is able to capture the vehicle only to certain meters depending upon the capacity of the camera lens. Monitoring the driver with the help of road side camera is not possible to get the continuous data or the driving behaviour of the driver. Live data was not captured in the related model.

Driver Monitoring System has been developed to monitor the abnormal driving signs of the driver and give alter [5].

III. MATERIALS &METHODOLOGY

The proposed project can be implemented by the following requirements. Computer with 4 GB RAM and 64 bit Windows 7 operating system, MATLAB R2017b, Android Smartphone, Vehicle, Wi-Fi connectivity.

MATLAB R2017b is a high level programming language which is widely used in all disciplines. This version of MATLAB has an additional tool for gathering the data from any sensor embedded devices.

Android smart phone has many in-built which may be used for reckless and rash driving. Sensors such as Accelerometer sensor, Position sensor, Magnetic sensor, etc., are used for monitoring the speed, location and driving skill.

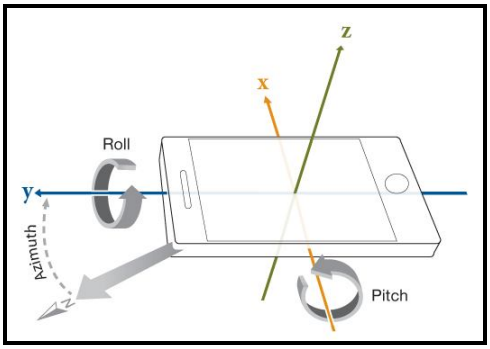

Fig 1: Accelerometer sensor axes

The MATLABMobile is installed in the smart phone is used to record the acceleration of the vehicle. MATLAB app connected to the Matlab in the system via Wi-Fi using connector on for gathering the sensor data. ThingSpeak is linked to the MATLAB for live data visualization. Live data stream is received form the MATLAB since it is an IoT service for cloud storage. User login is must for accessing this ThingSpeak cloud; this is possible only with a valid MathWorks account. Depending on the version of the MATLAB the access to the tools and add-on vary.

The inbuilt sensors of the android smart phone are sufficient to monitor the behaviour of the driver and the data can be used for analysis. System with MATLAB R2017b and higher version, MATLAB Mobile in the smart device is required for the proposed project.

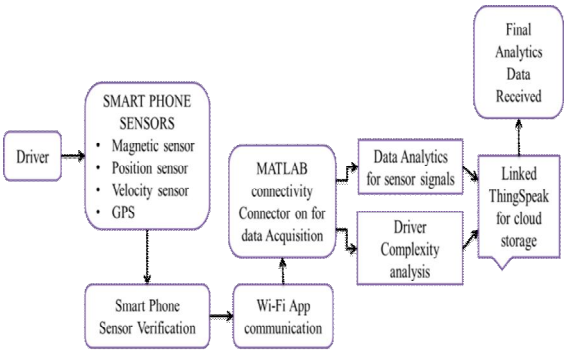

Fig 2: System Architecture

MATLAB Mobile which is installed in the smart phone is used for sensing the acceleration, speed, position in the form of data stream. The data stream is send to the system from the smart phone while the driver is driving. This is sent to the cloud storage for data analysis and instant visualization of the data stream. Common Wi-Fi connectivity is used for linking the android smartphone and the cloud storage through IoT. ThingSpeak is the IoT Cloud storage service that is used to communicate via any third-party service like Twitter. Below is the activity diagram of the proposed project for detecting rash driving on road.

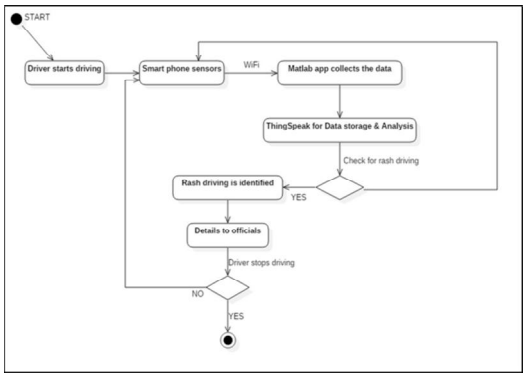

Fig 3: Activity diagram

IV. RESULTS AND DISCUSSION

Many drivers were allowed to driver their vehicle with the android smart phone with this project implementation. The smartphone sensor data was collected in the computer and the same was sent to the cloud using ThingSpeak service.

The data stream is stored and analyzed. The data visualization of the data stream that was gathered in real is also done usin this model. Fig 4 shows the abnormal driving behaviour of the driver while driving the car with the proposed system.

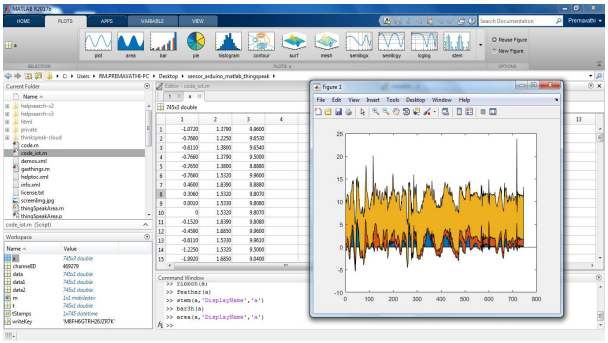

Fig 4: Visualization of the accelerometer data

ThingSpeak make the data analysis and visualization easier for the drivers and the officials in the monitoring center. The live data stream from the smartphone to send to the ThinkSpeak cloud storage. The data is visualized at every insatant by the monitoring center. The figure below is the data visualization of the data from the driver's android smartphone.

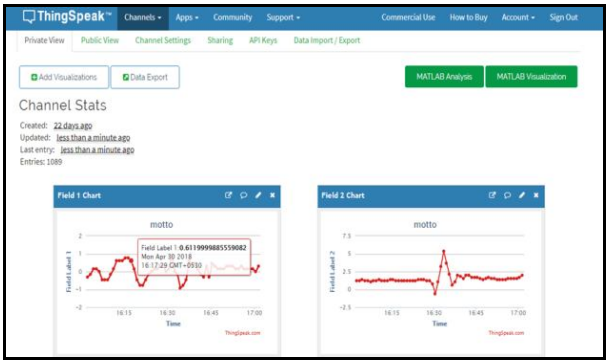

Fig 5: Data visualization in ThingSpeak

V. CONCLUSION

The proposed project was used to demonstrate a new way to identify and detect rash driving by the car driver. This technology can be implemented to communicate with the driver for alerting him/her about their driving skill. The model will generate a set of error log that can be used to decide the driving skill of the car driver. The project also implemented new parameter for driving the car from the output data. Further the data is processed using new techniques which made the system comparatively good for monitoring the driving skill and the standard of driving. The process gave an accurate data for determining the rash driving. This system can be implementing and reduced the cost of fixing the camera on the road side for detecting rash driving. Just installing MATLAB Mobile and Wi-Fi will do the work. Live monitoring is made by linking to the ThingSpeak cloud service. This project can be used by the transport department and any cabs companies to track of the performance of the driver and also the way by which vehicle was handled by the driver. This project can also be used to have a record while issuing license renewal to the car driver. This in turn makes the driver to driver properly on road to have their license and in turn it avoids accident. If the driver has a very bad error log then he/she will not be able to renew their license. They may be forced to get new driving license after improving the driving skill.

In the future, we will extend our work to propagate the temporal information of the driver for the system to make more accurate decisions. We will also improve the face tracking algorithm to make the face detection and face part detection become more stable and time coherent. We will also try to identify the reckless driving in two wheelers. This application can be given to the public to monitor their ward who rides/drives the vehicle.

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