IOT Based Vehicle Smart Speed Monitoring System

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Abstract - *Acquiring instant vehicle speed is desirable and a corner stone to many important vehicular applications. This paper utilizes smart phone sensors to estimate the vehicle speed, especially when GPS is unavailable or inaccurate in urban environments. In particular, we estimate the vehicle speed by integrating the accelerometer's readings over time and find the acceleration errors can lead to large deviations between the estimated speed and the real one. Recognizing this observation, we propose an accurate vehicle speed estimation system, which senses natural driving conditions in urban environments including making turns, stopping, and passing through uneven road surfaces, to deriver reference points and further eliminates the speed estimation deviations caused by acceleration errors. Extensive experiments demonstrate that the system is accurate and robust in real driving environments.*

***Key Words*: IOT, Smart vehicle over speeding sensor, accident prevention system, vehicle speed estimation system.**

1. INTRODUCTION

Smartphone sensors are utilized to estimate the vehicle speed, especially when GPS is unavailable or inaccurate in urban environments. In particular, the vehicle speed is estimated by integrating the accelerometer's readings over time and finding the acceleration errors which can lead to large deviations between the estimated speed and the real one. The Smartphone sensors can be utilized to perform various required tasks. The Smartphone sensors such as accelerometer and gyroscope can be effectively utilized to estimate the vehicle speed. These Smartphone sensors sense natural driving conditions to derive the vehicle speed without requiring any additional hardware. The natural driving conditions such as sensing turns, sensing stops and sensing uneven road surfaces can be sensed through Smartphone sensors. Internet was being used by earlier mechanisms. By using internet the solution is not lightweight and accurate. Without using internet and by using built-in sensors high accuracy speed estimation can be obtained.

1.1 PROPOSED SYSTEM

In this system we consider a sensing approach, which uses Smartphone sensors to sense natural driving conditions, to derive the vehicle speed without requiring any additional hardware.

The basic idea is to obtain the vehicle's speed estimation by integrating the phone's accelerometer readings along the vehicle's moving direction over time. While the idea of integrating the acceleration values over time seems simple, a number of challenges arise in practice.

1.2 ADVANTAGES OF PROPOSED SYSTEM:

a. Our system identifies unique reference points from the natural driving conditions to infer the vehicle's speed at each reference point grounded on different features presented by these reference points. Such reference points include making turns, stopping (at a traffic light or stop sign or due to road traffic) and passing through uneven road surfaces (e.g., speed bumps or potholes).
b. Based on the speed inferred from the reference points, we measure the acceleration error between each two adjacent reference points and eliminates such errors to achieve high-accuracy speed estimation.
c. The main advantage of our system is that it senses the unique features in natural driving conditions through simple smart phone sensors to facilitate vehicle speed estimation.
d. Furthermore, our system is easy to implement and computational feasible on standard Smartphone platforms.

2. SYSTEM ARCHITECHTURE

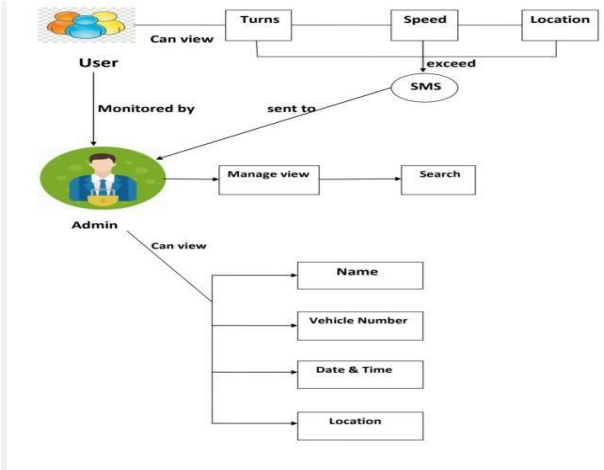

Fig-1: System architecture

The two smart phone sensors used to estimate vehicle speed are accelerometer and gyroscope. The vehicle's

acceleration can be obtained from the accelerometer sensor in the smart phone when a phone is aligned with the vehicle. The vehicle speed can then be calculated from the integral of the acceleration data over time. The system identifies three kinds of references points, making turns, stopping, and passing through uneven road surfaces, by sensing natural driving conditions based on smart phone sensors and then uses the information of the reference points to measure the acceleration error and further eliminates accumulative error. Whenever speed exceeds a SMS is sent to admin. The admin can manage view and search the required data in the database. All the details of the vehicles whose speed has been exceeded will be stored in the database monitored by admin.

3. CONCLUSIONS

The system address the issue faced in the real road conditions in order to predict the speed of the vehicle in support to the universally present applications. The sensor mounted on the smart phones is required to sense in the natural conditions which is achieved by our proposed system. To predict the speed of the vehicle the system identifies three key elements that might affect the high speeding vehicle. These key elements are the turns which might reduce the speed of the vehicle, the halting of the vehicle due to various reasons like traffic signal, traffic jam, road blockage and thirdly the status of the road like bumpy or uneven surface. These considerations eliminate the faults that are caused due to the sensing of the phone's accelerometer predictions on the speed of the vehicle. The key contribution of this work is incorporating the actual driving environment and accurately prediction the speed of the vehicle.

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