Road Vehicle Monitoring System Based On IoT

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Abstract : A smart vehicle speed monitoring system proposed using speed sensor .Considering the road safety a new technique is described to identify the speeding vehicle and charge them fine for breaking the rules or intimating the consulted authority to take action. The necessity to check this has been very essential and different methods have been used for. Hence, we are proposing a system in which speed monitoring of every vehicle can be done and reported directly to higher authorities. It may develop into possibility by executing the following technologies. This project targets to propose a system, which detects vehicle which are being driven above the given maximum speed limit that the respective roads or highway limits specific speed limit and immediately report to concerned authorities. This describe a system which can track the location and vehicle of different test vehicles from a exact place for research and development purposes and to store data of testing parameters of those vehicles. Further analysis and records system design will be generalized for monitoring different parameters like location, vehicle speed .proposed system uses to carry out particular vehicle velocity estimation by detecting common driving conditions utilizing cellular Smartphone sensors and accelerometer readings module for data transfer application.

***Keywords*– IoT, Smart vehicle over speeding sensor, vehicle to vehicle interaction.**

I. INTRODUCTION

Acquiring instant vehicle speed is desirable and a corner stone to many important vehicular applications. 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. Further analysis shows that the changes of acceleration errors are very small over time which can be corrected at some points, called reference points, where the true vehicle speed can be estimated. Recognizing this observation, an accurate vehicle speed estimation system, SenSpeed, can be developed which senses natural driving conditions in urban environments including making turns, stopping, and passing through uneven road surfaces, to derive reference points and further eliminates the speed estimation deviations caused by acceleration errors.

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.

II. EXISTINGSYSTEM

The existing studies utilizing Derivative Dynamic Time Wrapping (DDTW) algorithm introduces large overhead on collecting offline trace and prevents large-scale deployment. Also, the speed estimation accuracy of DDTW suffers from the coarse- grained signal information.

In the existing work, there are two vehicle speed estimation mechanisms deployed on highways or main roads. One is employing the loop detectors, and the other is using traffic cameras. These solutions all rely on pre deployed infrastructures that incur installation cost. The traffic camera could be installed in urban environments, but it suffers low accuracy, bad weather conditions and high maintenance cost.

2.1.DISADVANTAGES OF EXISTING SYSTEM:

a. GPS embedded in Smartphone's often suffers from the urban canyon environment, which could result in low availability and accuracy. In addition, the low update rate of GPS is not able to keep up with the frequent change of the vehicle speed in urban driving environments
b. Moreover, continuously using GPS drains the phone battery quickly. Thus, it is hard to obtain accurate vehicle speed relying on GPS for applications requiring real-time or high- accuracy speed estimations.
c. The accelerometer readings are noisy and affected by various driving environments.
d. The speed estimation is not real-time and accurate.
e. The solution is not lightweight and computational not feasible on smart phones.

III. PROPOSEDSYSTEM

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.We propose to perform accurate vehicle speed estimation by sensing natural driving conditions using smart phone sensors.
2.We study the impact of the acceleration error on the speed estimation results obtained from the integral of the phone's

accelerometer readings.

3.We develop a vehicle speed estimation system, which utilizes the information obtained from the reference points to measure and eliminate the acceleration error and achieves high accuracy speed destination

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3.1. ADVANTAGES OF PROPOSED SYSTEM:

1.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).

2.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 destination.

3.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.

4.Furthermore, our system is easy to implement and computational feasible on standard smart phone platforms.

3.2. MODULES:

1. **User:** In this module, the user can view the x, y and z coordinates, and moving directions along with the current location.
2. **Obtain the vehicle speed:** In this module, we present the design of our proposed system, , which estimates vehicle speed accurately through sensing driving conditions in urban environments. Our system does not depend on any pre-deployed infrastructure and additional hardware.
3. **Sensing Turns:** A vehicle usually undergoes plenty of turns in urban environments. The vehicle speed can be inferred according to a principle of the circular movement when a vehicle makes a turn. When a vehicle makes a turn, it experiences a centripetal force, which is related to its speed, angular speed and turning radius. Thus, by utilizing the accelerometer and the gyroscope, we can derive the tangential speed of a vehicle.
4. **Sensing Stops:** A vehicle stops frequently in urban environments because of stop signs, red traffic lights or heavy traffic. When a vehicle stops, the vehicle speed is determined to be zero. The vehicle speed decreases to zero when a vehicle stops, so we can obtain the exact speed at a stop reference point.
5. **Sensing Uneven Road Surfaces:** The accelerometer's readings from smart phones can be utilized to infer the vehicle speed, when a car is passing over uneven road surfaces. Speed bumps, potholes, and uneven road surfaces are common in urban environments. When a car is passing over uneven road surfaces, the accelerometer's readings from smart phones can also be utilized to infer the vehicle speed.
6. **Sending data Alert SMS module:** In this module, based on the variation of directions an alert messages is sent to the Owner (The number which is saved in app default, which can be changed) with a data say car number or any etc. The module, is triggered when it crosses the threshold limit of the Reference points. The mobile should have sufficient balance to send the SMS.
7. **Admin:** In this module, admin receives sms alerts when the user makes drifts, over speed, stops and go in uneven roads. The admin will also obtain users name, phone number, vehicle number, along with current location with current date and time.

IV. SYSTEM REQUIREMENTS

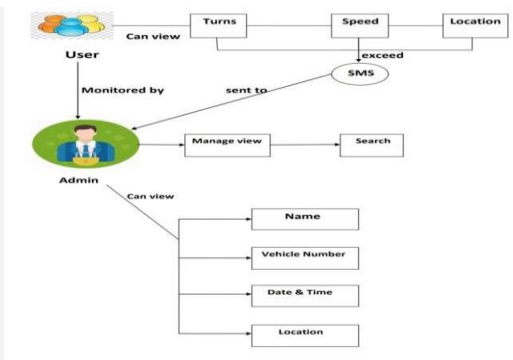
HARDWAREREQUIREMENTS:

- System: Pentium Dual Core.
- Hard Disk : 120 GB,
- Monitor:15''LED
- Input Devices : Keyboard, Mouse
  - Ram: 1GB.

SOFTWAREREQUIREMENTS:

- Operating system: Windows7.
- Coding Language :Android, JAVA
- Toolkit: Android 2.3ABOVE
- IDE: Eclipse

V.SYSTEMARCHITECTURE



Acquiring instant vehicle speed is desirable and a corner stone to many important vehicular applications. Smartphone sensors are utilized to estimate the vehicle speed. 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.

UML DIAGRAMS:

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group. The goal is for UML to become a common language for creating models of object oriented computer software. The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling. The UML uses mostly graphical notations to express the design of software projects.

VI. TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

VII. CONCLUSION

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.

VII. FUTUREENHANCEMENTS

Smart phone sensor is to sense natural driving conditions to achieve high speed accuracy. Detect of high speed if the user exceeds the limit. The application of mobile sensing the total distance traveled and generating the message. The system is deployed for testing in an area. The application will start automatically when the system runs. i.e. providing feasibility to user. Providing on-line database for registering user. And in upcoming the application will detect the obstacles in the street, make record of it and perform action.

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