

# Sensor Based Traffic Prediction and Accident Detection using GPS and GSM Technology

Geetanjali Shintre<sup>[1]</sup>, Gowrima E.<sup>[2]</sup>, Prabhudev R.<sup>[3]</sup>, Shilpa M.S.<sup>[4]</sup>

Mrs.Bhat Geetalaxmi Jayram(Associate Professor)<sup>[5]</sup>

Department of Information Science and Engineering

The National Institute of Engineering, Mysore, Karnataka, India

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## Abstract:

We are developing an application which predicts the traffic and detect accident using sensors. Every person using a smartphone has the GPS facility inbuilt which is in turn connected to the vehicle by which a person can find his location. In this application we can predict traffic by looking at the traffic of GPS at a particular place. The systems should be able to identify each vehicle and track its behavior, and to recognize situations or events that are likely to result from a chain of such behavior.

This paper proposes to utilize the capability of a GPS receiver to monitor speed of a vehicle and detect accident based on monitored speed and send accident location to an Alert Service Centre. Using sensors we detect accidents. The smoke, crash and pressure sensors are to be fit in the vehicle and whenever it senses the system will send the accident location acquired from the GPS along with the time by utilizing the GSM network. This will help to reach the rescue service in time and save the valuable human life. The broader area network of this project is wireless networks.

**Keywords—Accident Detection, Sensor Based Accident Detection, Sensor Based Traffic Prediction, Traffic Prediction.**

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## I. INTRODUCTION

“Sensor Based Traffic Prediction and Accident Detection using GPS and GSM Technology” is an android application which is to be installed over a smartphone and the application is very handy since now-a-days almost everybody owns their own smartphone.

Traffic prediction refers to avoiding the traffic from any remote location or keeping yourself updated about any traffic jams on the route passing through. Using the GPS initially, location of the particular vehicle is found which checks for any traffic jam on the way. Since every vehicle’s location is detected by the GPS, with the help of GSM technology the application will inform to user to take another route and hence can save their precious time.

Accident detection is another module of this project. The sensors like smoke, crash, pressure are to be set up in the vehicle. These sensors senses any sought of indication for the accident and when any of the sensors are high the signals are sent to the controller. If so happens, then there will be a message displayed by the application which will accept one input to the question asked to the driver if he’s “OK”. If the input is given “Yes” since the accident is minor, we know that the driver has no much harm. A timer will be set to give this input. Suppose there is a major accident, the user won’t be able to give any input, the timer triggers; automatically the input will be then taken as “NO” by default and immediately a

message is sent through GSM to the respected police control room, hospitals and the fire brigade.

## II. EXISTING SYSTEM

Electronic Stability Control Electronic stability control (ESC) systems act on the braking or power systems of a vehicle to assist the driver in maintaining control of the vehicle in a critical situation(caused, for example, by poor roadconditions or excessive speed during cornering). ESC usually acts by sensing wheel slip in individual wheels and reducing power or applying braking to one or more wheels to regain stability. ESC can reduce accidents by more than 20 percent in normal conditions and more than 30 percent in wet or icy conditions. It has been available on some cars for around 10 years, and costs have been reducing due to improved technology and increased volumes. A driver’s state of vigilance can also be characterized by indirect vehicle behaviours like lateral position, steering wheel movements, and time to line crossing. There is an important Spanish system called TCD (Tech Co Driver) based on steering wheel and lateral position sensors.

Advanced Emergency Braking Systems (AEBS): Some vehicles are already fitted with systems which employ sensors to monitor the proximity of the vehicle in front and detect situations where the relative speed and distance between the two vehicles suggest that a collision is imminent. In such a situation, emergency braking can be automatically applied and

the effects of the collision are either mitigated or avoided altogether. The capability of such systems could be expanded in the future to cover other types of accident (for example, pedestrian accidents or even head-on collisions). There are significant casualty savings to be obtained by equipping vehicle with these systems. The level of casualties saved depends on the type of vehicle and the level of capability of the system. Current systems do not always avoid collisions, but they ensure that the collision takes place at a slower speed thus mitigating injuries. Future systems should be able to avoid collisions altogether, including may collisions with pedestrians.

### III. PROPOSED SYSTEM

We predict the traffic by counting the number of GPS locations at one particular place. If the number exceeds the limit then we assume there is traffic jam. In this section, a coarse comparison of some of the reviewed systems is presented from the discussed viewpoints. Also, we explain the critical problems in the current systems.

Every vehicle has its own GPS which indicates its location, if there is large number of GPS static or taking small movements at a particular place we consider it to be traffic jam. When there is traffic jam, the message is sent through our application to the users who are close the traffic jam location. Hence in this way the user will save time by avoiding the traffic jam and can take another route.

However the sensors help in detecting the accidents. The sensors give the accurate signals.

1. Robust and precise symptom extraction. These challenges are:

- a. Developing illumination invariant algorithms for detection and tracking of sensors
- b. Fast processing to achieve real-time systems

This is an android application which uses GPS and GSM technology, mainly.

### IV. DESIGN CONSIDERATION:

In this topic it is discusses about the purpose of design, design features, block diagram of system & its description.

#### A. PURPOSE OF DESIGN:

The available systems designed for remote accessing about industrial security wirelessly from far away distance using GSM technology.

#### B. DESIGN FEATURES:

The system makes use of GSM technology for the transmission of code pattern to control the devices.

The system is microcontroller based.

The system should be accessible even from long distances.

System uses IR SENSORS.

#### C. BLOCK DIAGRAM

To practically implement the above features, the arrangement of various devices in our system is as shown in the figure 1:

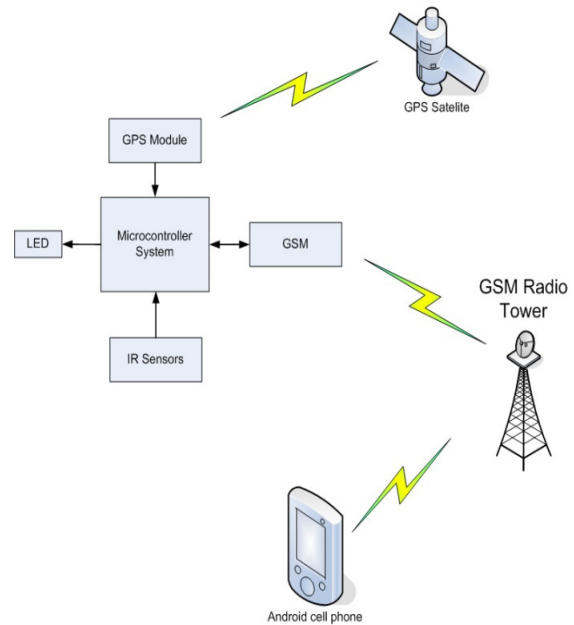


Fig 1: Block Diagram showing the components.

#### D. BLOCK DIAGRAM DESCRIPTION:

The block diagram 1 includes Microcontroller, GSM Module, IR Sensor, Control Button and Siren.

IR Sensors are attached to VEHICLE to sense the body SHADOW. The inputs from these sensors are provided to Microcontroller where they will be processed. Microcontroller communicates two types of messages with the monitoring system via GSM Communication.

Two types of messages are:

- a) Regular update: Continuous update about the location of the theft vehicle.
- b) Abnormal update: Abnormal sensor values with the alert messages.

The block diagram 1 includes a GSM enabled device (Mobile OR tablets). This is the monitoring system. The outputs from the IR Sensor system are received on HyperTerminal port of Monitoring system. Here the received data can be saved.

## V. DATAFLOW DIAGRAM

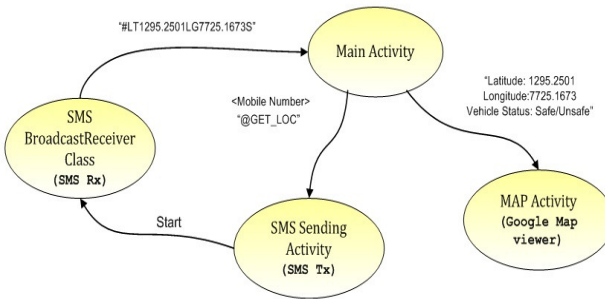


Fig 2: Flow of data around the application

## VI. SOFTWARE DEVELOPMENT RESULT

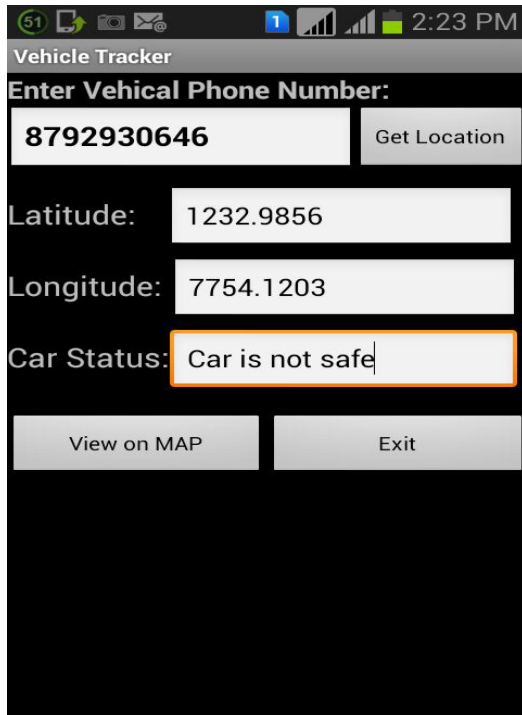


Fig 3: Design of the application

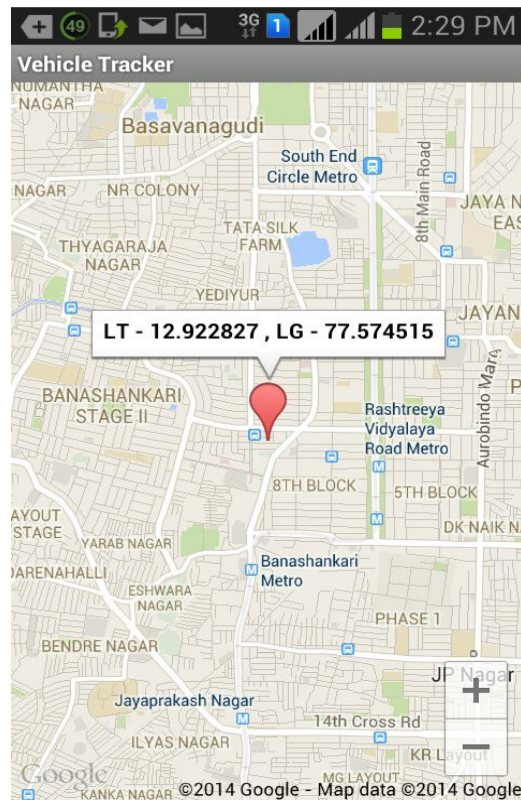


Fig 4: Navigation of the vehicle

## VII. CONCLUSION

In this paper the idea is for controlling the traffic and detecting the accidents. With this system the police control and the hospitals are immediately informed. Hence the precious life can be saved.

The other shortest path is indicated in case of traffic jam on one particular location. As well as the time consumption is reduced.

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