Vehicle Theft Detection System Over IoT

Ms.N. Navaneetha[1], S. Srujana[2], G. Avinash[2], M. Nagesh[2]

[1Asst.]*Professor, Computer Science and Engineering, CMR Engineering College, Medchal, T.S, India,*

[2]*B. Tech, Computer Science and Engineering, CMR Engineering College, Medchal, T.S, India*

ABSTRACT:

Arduino Based Vehicle Accident Alert System using GPS, GSM and Accelerometer. Accelerometer detects the sudden change in the axes of vehicle and GSM module send the alert message on your Mobile Phone with the location of the accident. The advancing technology has made our day to day lives easier. Since every coin has two sides similarly technology has its benefits as well as its disadvantages. The rise in technology has increased the rate of road accidents which causes huge loss of life. The poor emergency facilities available in our country just add to this problem. Our project is going to provide a solution to this problem. If we reduce the time between when an accident happens and when a medical ambulance is dispatched to the area, we can save human lives by reducing mortality rates. GPS has become an integral part of a vehicle system nowadays. The accelerometer senses a sudden shift in the vehicle's axles. It will be tested by Arduino. The Arduino sends the warning message via the GSM module to the police control room or a rescue team, including the location. So, after receiving the information, the police can automatically track the location via the GPS module. Then, the appropriate action will be taken after verifying the venue.

Keywords:GSM, GPS, Switch, Buzzer.

1. INTRODUCTION:

The high demand of automobiles has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country. An automatic alarm device for vehicle accidents is introduced in this paper. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid centre within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. A Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team. When the

accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the GSM module and the location of the accident is detected with the help of the GPS module. The accident can be detected precisely with the help of both Vibration sensor and vibration sensor. The Angle of the rolls over of the car can also be known by the message through the MQ3 sensor. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way. The usage of auto mobiles has improved linearly over the past decade, which increased in the risk of human life. This is because due to the insufficient emergency facilities.

The primary goal of the accident warning system is to save people in crashes. This device helps the owner to observe and find out vehicle activity and its past vehicle movements, the latest such as GPS are highly useful now-a-days. Over the past decade, the use of auto mobiles has improved linearly, which increased the risk of human life. This is because the emergency services are inadequate. We use an alert system in this paper that helps to strengthen the emergency system of the crash system, [1]. This device senses the occurrence of the accident and the coordinated accident is reported to the emergency team. In the event of no causality, a switching mechanism is used to shut off. Using the Accelerometer Sensor, an accident is observed. The angle where the car rolled off is shown by a message [2][3]. This application aims to provide the weak emergency facilities with a suitable alternative. This accident warning system identifies the accident and the location of the accident and sends GPS coordinates to the Smart Phone, device, etc. listed in it, [4].

PROBLEM IDENTIFICATION

An accident happens at night or in areas where no individuals are heard in that particular setting and victims are not saved at the right time [5]. Many of them are losing their lives because of this. This device solves the above problem by submitting data directly after an accident to the emergency team [6].

2. LITERATURE SURVEY

After analyzing the requirements of the task to be performed, the next step is to analyze the problem and understanding its context [7]. The first activity in the phase is studying the existing system and other is to understand the requirements and domain of the new system. Both the activities are equally important, but the first activity serves as a basis of giving the functional specifications and then successful design of the proposed system[8]. Understanding the properties and requirements of a new system is more

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difficult and requires creative thinking and understanding of existing running system is also difficult, improper understanding of present system can lead diversion from solution. The proposed system design involved the following research paper analysis [9].

 [**1**] **"Wireless black box using MEMS accelerometer and GPS tracking for accidental monitoring of vehicles" by Watthanawisuth,** N., IEEE conference in Jan, 2012: This survey presents an overview of wireless black box using MEMS accelerometer and GPS tracking system is developed for accidental monitoring [10]. The system consists of cooperative components of an accelerometer, microcontroller unit, GPS device and GSM module. In the event of accident, this wireless device will send mobile phone short massage indicating the position of vehicle by GPS system to family member, emergency medical service (EMS) and nearest hospital [11]. The threshold algorithm and speed of motorcycle are used to determine fall or accident in real-time. The system is compact and easy to install under rider seat. The system has been tested in real world applications using bicycles. The test results show that it can detect linear fall, non-linear fall and normal ride with high accuracy.

[**2**] **"Development of vehicle tracking system using GPS and GSM modem" by Hoang Dat Pham, IEEE conference in Dec, 2013** The ability to track vehicles is useful in many applications including security of personal vehicles, public transportation systems, fleet management and others. Furthermore, the number of vehicles on the road globally is also expected to increase rapidly [12]. Therefore, the development of vehicle tracking system using the Global Positioning System (GPS) and Global System for Mobile Communications (GSM) modem is undertaken with the aim of enabling users to locate their vehicles with ease and in a convenient manner. The system will provide users with the capability to track vehicle remotely through the mobile network. This paper presents the development of the vehicle tracking system's hardware prototype. Specifically, the system will utilize GPS to obtain a vehicle's coordinate and transmit it using GSM modem to the user's phone through the mobile network [13]. The main hardware components of the system are u-blox NEO-6Q GPS receiver module, u-blox LEON-G100 GSM module and Arduino Uno microcontroller. The developed vehicle tracking system demonstrates the feasibility of near real-time tracking of vehicles and improved customizability, global operability and cost when compared to existing solutions.

[3] "Traffic-incident detection-algorithm based on nonparametric regression" by Shuming Tang, IEEE conference in March, 2005 This paper proposes an improved nonparametric regression (INPR) algorithm for forecasting traffic flows and its application in automatic detection of traffic incidents. The INPRA is constructed based on the searching method of nearest neighbors for a traffic-state vector and its main advantage lies in forecasting through possible trends of traffic flows, instead of just current traffic states, as commonly used in previous forecasting algorithms [14]. Various simulation results have indicated the viability and effectiveness of the proposed new algorithm. Several performance tests have been conducted using actual traffic data sets and results demonstrate that INPRs average absolute forecast errors, average relative forecast errors, and average computing times are the smallest comparing with other forecasting algorithms [15].

[4] "Automatic Accident Detection: Assistance Through Communication Technologies and Vehicles" by Fogue, M., IEEE conference in August, 2012 In this article, e-NOTIFY system is presented, which allows fast detection of traffic accidents, improving the assistance to injured passengers by reducing the response time of emergency services through the efficient communication of relevant information about the accident using a combination of V2V and V2I communications [16]. The proposed system requires installing OBUs in the vehicles, in charge of detecting accidents and notifying them to an external CU, which will estimate the severity of the accident and inform the appropriate emergency services about the incident. This architecture replaces the current mechanisms for notification of accidents based on witnesses, who may provide incomplete or incorrect information after a long time [17]. The development of a low-cost prototype shows that it is feasible to massively incorporate this system in existing vehicles.

3. METHODOLOGY

Existing system:

In existing system consists of two units namely, Crash Detector Embedded Unit and Android Control Unit. Crash Detector Embedded Unit is responsible for detecting the accident condition using three-axis accelerometer sensor, position encoder, bumper sensor and one false alarm switch. Bluetooth module (HC-05) is used to send the accident notification to the victim's android phone where an android app will get the GPS location of accident spot and compare it with all the nearby hospital's location in order to

calculate the shortest path and send the notification to the nearest hospital's ICU as mentioned earlier in the form of SMS.

Proposed System:

One of the basic reasons for road accidents is speed. Road accidents are rising suddenly today and are one of the key causes of human deaths. Human life is more important than anything else, and timely assistance is more important than lending a helping hand. If emergency service could get accident reports and reach it in time, more lives could have been saved. In saving human lives, the time between the accident and when the ambulance reaches the site of the accident plays an important role. If we reduce the time between when an accident happens and when a medical ambulance is dispatched to the area, we can save human lives by reducing mortality rates. GPS has become an integral part of a vehicle system nowadays. The accelerometer senses a sudden shift in the vehicle's axles. It will be tested by Arduino. The Arduino sends the warning message via the GSM module to the police control room or a rescue team, including the location. So, after receiving the information, the police can automatically track the location via the GPS module. Then, the appropriate action will be taken after verifying the venue.

OPERATION:

The Prototype of this Accident Detection and information passing technique uses the following steps:

1. The Complete Setup is depicted in the form of block diagram.

2. Piezoelectric sensor detects the first occurrence of the accident and it is intimated to the MCU.

3. The Latitude and Longitude are detected using GPS and it is sent as message to the rescue team through GSM.

4. The message receiver number is pre stored in the EEPROM.

5. A OFF Switch is also provided at times of need to avoid false message.

OPERATION OF THE PROJECT:

Now a day's large amount of accidents is happening in highways due to increase in traffic and also due to rash driving of the drivers. And in many situations the family members or the ambulance and police authorities cannot able to get information regarding to that accident in an appropriate time. This

result in delaying the help which is more important to that person who suffer from that accident. Our project automatic accident vehicle detection and messaging system using GSM modem is designed to overcome such problem and to prove help for the person who met with accident and save their life too by passing message to rescue team in right time. In this project we are using accident detection unit which fitted the vibration sensor in the vehicle. For example, In case of accident, occurs if the car is hit to some other vehicle or an object it create some vibration in that case then the vibration sensor will detect the vibrating signal and it pass the message to the arduino. Arduino is used as a Central Processing Unit (CPU) of our project. When the arduino receives a signal from vibration sensor it immediately pass the message to GSM modem then the GSM modem then the GSM modem will starts its process. In this project we used reset button it will be used by the driver if the accident is very normal for example if the driver hit the wall in some situation like parking then the driver will press the reset button this will inform the arduino to that system will not send SMS. But if the driver is not in a situation to press the switch or if the accident is really a major accident then the driver will not press the reset button and then the system will send SMS. Here, we use GSM modem to send SMS to the family members and the rescue team. Buzzer is also used to indicate as an accident has been occurred which will create a beep sound. Thus the life of a person who met with an accident has been identified and save their life too.

Results Explanation:

The system detects accident from vehicle and send message through GSM module. The message is received by another GSM module. Google Map Module It displays Google map show u exact location of accident and it details. It gets detail SMS from accident location. Hence there is small variation in the coordinates, initial value of latitude and longitude are same but fractional value changes with small difference.
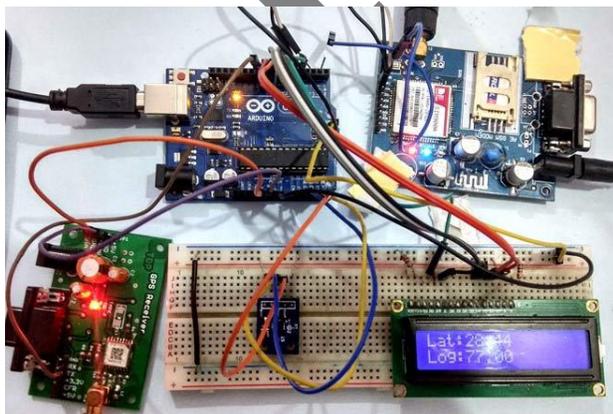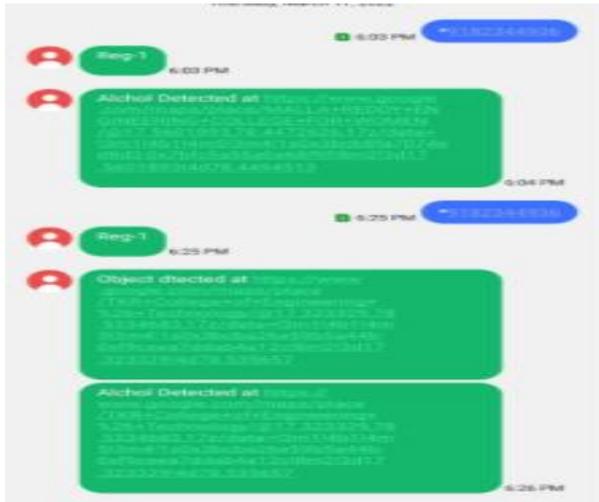
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Fig. Hardware kit image

Fig.2. Output results with location

CONCLUSION

Our idea is used to detect accident and automate emergency assistance services. As a result, system is sending SMS to the nearest Emergency assistance service provider from accident location. The high demand of automobiles has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country. An automatic alarm device for vehicle accidents. This design is a system which can detect accidents in significantly less time and sends the basic information. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. A Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team. When the accident occurs the alert message is sent automatically to the rescue team and to the police station and the message is sent through the GSM module.

Future Scope:

We are finding the shortest path based on the distance of nearby hospitals but there may be chance that the traffic will be more in that path. So we need to come up with some algorithm which gets the nearby hospitals with minimal distance and traffic. We may add some modules which will also let the system know about the traffic details and then find out which node will take less time to reach from the

accident spot. Another thing which we may add is 'first aid kit' for emergency medical treatment at the scene itself. We can also add some modules which will measure the injuries level or some additional information like blood group, heart beats, current glucose level which may be send to the hospitals in advance before the victims reaches the hospitals hence improvise the performance of the proposed system.

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