

# ACCIDENT DETECTION USING VIBRATION SENSOR AND GPS MODEL

Bhanupriya K P<sup>1</sup>, Bharathi A<sup>2</sup>, Megha L<sup>3</sup>,  
Poornima S<sup>4</sup>, Rakshitha R<sup>5</sup>

<sup>1,2,3,4</sup>Students, <sup>5</sup>Assistant professor, Department of Computer Science and Engineering  
Vidya Vikas Institute of Engineering and Technology, Mysuru, Karnataka, India.

**Abstract:** We are losing significant amount of people because of road mishap around the world. To get rid of this, an automated system can be used. which can edify the opportunities of immediate treatment to protect injured person. Some task in this way is already accomplished by researchers and in this paper, such act was studied. Else, a system is proposed from the review which can espy the event of mishap with the help of sensors and indicate the nearby hospital to fossick immediate aid. Injured person's relatives will be notified with the help of this system. This type of system can be of major use when the collisions happen at a remote place. As several references ensure that 90% of road traffic mishap happen at low speed of the vehicle. Proposed system system work will be done in two segments:

first is recognition of accidents with the help of sensors like speed, vibration and collision.

Second is notify the nearest hospital, relatives via message for seeking help with the help of injured person's location by using GSM and GPS.

**Keyword:** Vibration sensor, GPS, GSM, IoT, Accident Detection

## I. INTRODUCTION

The internet of things (IOT) is a network of recognised the implanted computing devices linked with current internet infrastructure. Commonly, the internet of things (IOT) furnish ameliorated connection to the devices, systems and services that protrude beyond machine to machine (M2M) and encompasses a broad series of protocols, domains and applications. The combination of these implanted devices (containing smart objects) is utilised in practically early aspect of automation, allowing sophisticated applications such as the smart grid to developed. Objects in the internet of things related to broad series of devices, containing heart monitoring implants, bio-chip transponders at animal's farm, electric mussels at coastal waters, autos built-in with sensors, land function instrument that help firefighters. Control devices and washers/dryers that utilise Wi-Fi for remote monitoring.

In this paper we are presenting our research on automatic accident detection techniques by using IoT sensors. The accident may happened in some lonely areas or remotated areas

At that time person may be severely injured not able seek help immediately from others at that time we can find out about accident by using sensors. Sensors are installed to vehicle before the accidents and these sensors detects the accidents with the measure of vibration and collision effects. In these days, everyone is having smart phone and they are easily available. Users carry their mobiles everywhere and any time. Smart phones are used to sending notifications to ambulance and relatives of the victims when the accident occurs. To tracking locations GPS is used by using GSM we can send alert notification to the rescue team.

## II. LITERATURE SURVEY

In this section we are providing brief information of previous work done, that are related to our project. In previous works they used different types of sensors and algorithms to find an accident, those methods are discussed here. By using those papers we are trying to find new and better techniques to implement our project.

2.1 IoT Based Automatic Accident Detection Using Vanet Manuja M et al.

In this project they are using Tilt sensor to detecting angel tilt in vehicle, Fire sensor is used to detect fire, MEMS sensor and Temperature sensor. If the accident occurs then that it will be detected by using Fire sensor, Tilt sensor and MEMS sensor then they provide input the controller and it sends alert messages to the rescue team and nearest hospital by using the RF (Radio Frequency) module. GPS and GSM modules are used to find location of the vehicle and that also send to the recue team. If the vehicle is in normal condition then they do not send any alert messages. Temperature sensor is used for continuous monitoring of temperature if the temperature exceeds the threshold level then also it sends alert messages automatically.

Advantages of this system is user friendly, wireless monitoring, fast recovery and quick process.

2.2 Accident Detection Using Neural Network Sreyan Ghosh et al.

In this system they are using Raspberry Pi Model B+, GSM module, Pi camera it is used for detecting image and video frames, Keras is an opensource library developed in python in order to experiment extensively in neural networks, OpenCV is image processing library. Here CCTV cameras

are used to detect accident. CCTV cameras are the input for CNN model. Raspberry Pi is intercepted to CCTV camera and Pi camera is used detect to the image frame and objects in videos. Here the videos frames are divided into accident frame and no accident frame. CNN model id used to detect the accident. Each video segment is run through the CNN model if the frame crosses the threshold limit then that video frame is divided into accidental frame otherwise called as non-accidental frame. If the frame is divided into accidental frame then the GSM is automatically send an alert message to the phone number. This system gives more accuracy compared others but this system is cost effective and suitable for severe accidents. It didn't detect the moderate or small accidents.

2.3 Accident Detection Using Raspberry Pi  
Shwetha Bergonda et al.

In this project they are mainly using Raspberry Pi. They are used LED, this LED switched on when the system is switched on. Power supply is also required to LED switch on. Vibration sensor is used to detect the accident and then send notification to the raspberry pi. The GPS is used for receiving the location of the vehicle. If the accident occurs then GPS gives the exact position of the vehicle, this information will be delivered through the WhatsApp message to a mobile phone number. This message will be received by using circuit's internet connection. The values of longitude and latitude will be provided in this message, by using these variables approximated the vehicle location. The raspberry pi receives data by vibration sensor and it responds by sending WhatsApp message to the recipient's phone. LED is interfaced in any ports of the raspberry pi, it is used to display speed and GPS model status. Internet is interfaced in raspberry pi via transmit and receive pin. Disadvantage of this system is it requires internet connection for whole process. hence it is a cost effective method.

2.4 IoT Based Accident Detection Using Naïve Bayes Algorithm  
Ratheeshkumar A M et al.

In this system they are using Ultrasonic sensor for sound measuring, Heartbeat sensor for measuring driver blood pressure and heartbeat, Speedometer for calculating vehicle speed, Arduino UNO board used as a microcontroller and Alcohol sensor is used for measuring alcohol level. In this system, all the sensors will be wired inside the vehicle. The sensors value will be uploaded in a cloud server. A threshold value will be assigned for every sensor. In case of any abnormal means, the warning will be sent to the user interface end. Then, automatically the horn will turn on and the vehicle will slow down towards left corner. Secure Service Virtualization in Internet of Things by Dynamic Service Non-Dependency Verification is to be ensured by the hardware.

III. HARDWARE REQUIRMENTS

Vibration Sensor:

This sensor is used to detect accident. When the sensor reaches threshold vibration value then it sends signals to the microcontroller.

Collision Sensor:

This sensor is also called as Bump switch. Using this sensor we are finding out the accident and send signals to the esp32.

ESP32:

It is a chip microcontroller. Sensor send signals to this microcontroller then it sends information to the GSM module. It connects to both the GSM and GPS module.

LED:

This screen is used to display the current speed of the vehicle by using GPS model.

GPS:

Global Positioning System. It is used for tracking the location of the vehicle along with the latitude and longitude. It sends the location information to the ESP32 then it connects to the GSM.

GSM:

It is also called as global system for mobile communications. This system is used for sending alert message with the location of the vehicle to the recuse team along with the longitude and latitude value.

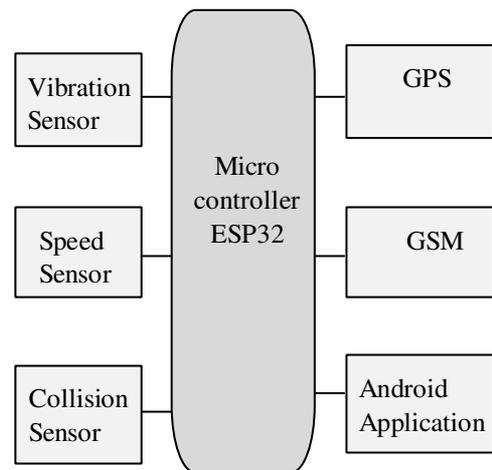


Figure 1. System Block Diagram

IV. PROPOSED SYSTEM

Based on the above related works, in this section we are proposing a new automatic accident detection method to provide fast and accurate information to the rescue team for the injured peoples in road accidents. This system having two steps. First step is automated accident detection step that is explained in 4.1 section and second step is alert notification sending step that is explained in 4.2 section.

4.1 Automated accident detection

In this section we are using three sensors for accident detection they are vibration sensor, collision sensor and speed sensor (led). Vibration sensor detects the accident. This sensor is set for default for amount of vibration if it

exceeds that range then it senses the accident. Collision sensor is used to sense the collision between the two solid bodies. when collision occurs then it changes the voltage and that helps to find the accident. Speed sensor or LED is used to display the current speed by using the GPS if the current exceeds the default speed then it notifies to the traffic police. These sensors notifies accident to the android application.



Figure 2. Accident Detection

#### 4.2 Alert Notification

In this section we are using GPS and GSM module for sending notification. Here ESP32 connects both the GSM and GPS module. When the accident sense by the sensor then they notifies to the android application then the GPS detects the location with longitude and latitude and it sends the alert messages to the recuse team by using GSM module. This GSM module detects the nearest hospital sends the location along with latitude and longitude. And it also sends information to the family members. Sometimes accidents are not that much serious that's why we are giving the button if the accident occurs minorly then the user can cancel the alert notification by pressing the button within 10 second otherwise the message will send to the relatives and hospitals. If the speed of the vehicle exceeds the limited speed then send notification to traffic police.



Figure 3. Sending alert Notification

#### V. CONCLUSION

Previous works and experiments helped a lot to develop a secure and effective automatic accident detection techniques compared to existing works.

Thus the proposed system works well with some situation three sensor detects the accident and send notification by using android application. By using this techniques we can save the people lives and also prevent accident by giving them an alert notification when speed exceeds the limited speed. By using this technique we can also reduce the accident death rates. Although in some situation this system may not work properly so further implementation has to be done in this topic.

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