

# IOT BASED ACCIDENT TRACKING AND REPORTING

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**Abstract**-Transportation has great importance in our daily life and in highly populated countries, everyday people lose their lives because of their accident and poor emergency. This project has made solution to this drawback, when a vehicle meets with an accident immediately a vibration sensor will detect the signal and sends it to Node MCU microcontroller. Microcontroller will send an alert message through the GSM modem including the location to the police station or hospitals. The authors made attempt to develop a car accident detection and communication system which will inform the relatives, nearest hospital and police along with the location of the accident.

**Keywords:** Accident detection, GPS, Alert message, Microcontroller, vibration sensor, Fast detection.

## I. INTRODUCTION

In day to day life there is high demand of vehicle, there is also increase in traffic and road accident. Life of people is under high risk. An automatic alert system for vehicle accident is introduced in this paper. The proposed of this system is to detect accident in less time and send the information to hospitals, first aid center within few seconds. The alert message is sent to the near location, which helps in saving the valuable lives. When an accident happens the message is sent through the GPS module and the location of the accident is detected. The accident can be detected precisely. With the help of vibration sensor; this application provides the optimum solution to poor emergency facilities provided to the road accidents in the easiest way

The IOT (internets of things) is a system of interrelated computing devices, mechanical and digital machines, objects, animals and peoples and the ability to transfer data over network without requiring human-to-human, human-to-computer interaction.'

## II. LITERATURE SURVEY

Kiran Sawant et al., created an accident alert system using GSM and GPS modem and Raspberry Pi. A piezoelectric sensor first senses the occurrence of an accident and gives its output to the microcontroller. The GPS detects the latitude and longitudinal position of a vehicle. The latitudes and longitude position of the vehicle is sent as message through the GSM. The static IP address of central emergency dispatch server is pre-saved in the EEPROM. Whenever an accident has occurred the position is detected and a message has been sent to the pre-saved static IP address [1]. Manasi Patil et al., described a better traffic management system using Raspberry pi and RFID technology. The vehicle has a raspberry pi controller fixed in it which is interfaced with sensors like gas sensor, temperature sensor and shock sensor. These sensors are fixed at a predetermined value before accident. When an accident occurs the value of one of the sensor changes and a message to a predefined number (of the ambulance) is sent through GSM. The GPS module which is also interfaced with the controller also sends the location of the vehicle. When the message is received by the ambulance, a clear route has to be provided to the ambulance. The ambulance has a controller ARM which is interfaced with the RFID tag sends electromagnetic waves. When an ambulance reaches the traffic signal the RFID reader which is placed on the joints detect the electromagnetic waves of the tag. If the traffic signal is red, then the readers goes through the database in fraction of seconds and turn the red light green. And automatically in such condition the RFID on opposite joints turn the opposite signal red. This provides a clear route to the ambulance. [2]. V.Sagar Reddy et al., developed an accelerometer based System for driver safety. The system has the advantage of tracking or identifying vehicles location just by sending a SMS or email to the authorized person. The system is designed by using Raspberry Pi (ARM11) for fast access to accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so they can take immediate action to save the lives and reduce the damages. Images captured by the camera on the vehicle are emailed to the concerned person (for example the owner of the vehicle) along with the type of accident and the time of the accident [3]. Sri Krishna Chaitanya Varma et al., proposed an Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems. AT89C52 microcontroller is used in the system. When the system is switched on, LED is ON indicating that power is supplied to the circuit.

When the IR sensors that are used sense any obstacle, they send interrupt to microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information is sent to a mobile number as a message. This message is received using GSM modem present in the circuit. The message gives the information of longitude and latitude values. Using these values the position of the vehicle can be estimated [4]. Apurva Mane et al., described the methods for vehicle collision detection and remote alarm device using Arduino. Key features of this design include real-time vehicle monitoring by sending its information regarding position (longitude, latitude), time,

angle to the monitoring station and to the user/owners mobile that should help them to get medical help if accident or the theft occurs. Also user/owner has an access to get real-time position of a vehicle in real time. Whenever accident occurs MEMS and vibration sensor detects and sends the signals to microcontroller, by using GPS locations where accident has occurred is found, then GSM sends message to authorized members.[5]Prof.Mrs.Bhagya Lakshmi V et al., proposed a FPGA Based Vehicle Tracking and Accident Warning system using GPS. FPGA is mainly used to track position of any vehicle and send automated message to pre-programmed number. The owner of vehicle, police to clear traffic, ambulance to save people can be informed by this device. FPGA controls and co-

### III. BLOCK DIAGRAM

The block diagram of the proposed system consists of the following components: Power Supply, Vibration sensor, Node MCU, 16\*2 LCD, and GPS Receiver.

The above components are integrated as per the block diagram given in Fig 1

A. Node MCU: Node MCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressio Systems, and hardware which is based on the ESP-12 module.

B. Connecting Wires: Connecting wires allows an electrical current to travel from one point on a circuit to another because electricity needs a medium through which it can move. Most of the connecting wires are made up of copper or aluminum.

C. Neo GPS: The Global Positioning System, originally NAVSTAR GPS, is a satellite-based radio navigation system owned by the United States government and operated by the United States Air Force.

D. Limit Switch: A **limit switch** is an electromechanical device that consists of an actuator mechanically linked to a set of contacts. When an object comes into contact with the actuator, the device operates the contacts to make or break an electrical connection.

E. LCD display: **LCD's** technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology.

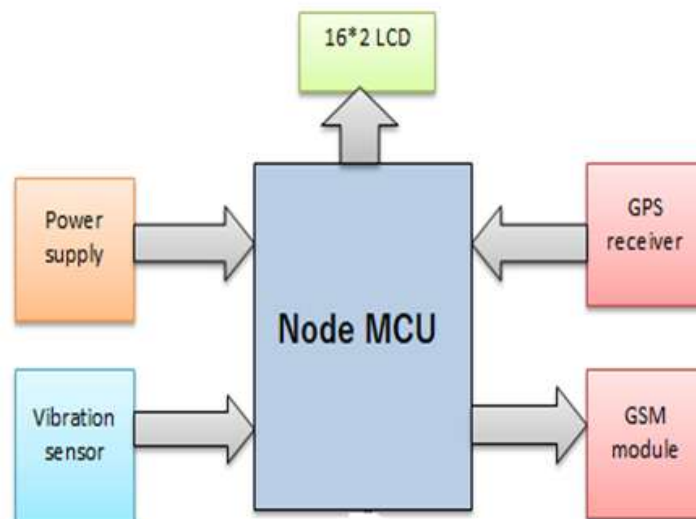


Fig. Block Diagram

### IV. Designing Procedure

1. The designing process will start as per the waterflow model in which it will start from requirement gathering about how the project could be implemented and what could be the new thing which could be added to the concept

2. After this modelling will be done in which we will create a simplified model of the system.

3. After that we will go through number of algorithms which could be used in the development of the system in an effective way.

4. Lastly, we will develop the final prototype of the system.

## V. Accident Detection Module

All other components like the ultrasonic sensor, accelerometer and GPS and GSM modules are connected via Atmega 162 microcontroller. The code for the working of this system is written in C. The LCD screen displays short messages to keep track of the working of the system. The alarm is triggered when an accident is detected. Accelerometer is used to detect crash or rollover of the vehicle and sends signals when an accident occurs to the microcontroller. The ultrasonic sensor detects whether or not the accident occurred due to an obstacle.

## VI. WORKING PRINCIPLE

This project implies a system which is a solution to this drawback, when a vehicle meets with an accident immediately a Vibration sensor will detect the signal, and sends it to the Arduino microcontroller. Microcontroller will send an alert message through the GSM modem /GPS including the location to the police station or a rescue team.



Arduino is used as main microcontroller, this system is made for accident alert, the whole system is to be implemented in the vehicle itself. So, when the accident happens, the vibration sense the shock and send it to an Arduino microcontroller, at the same time, with GPS the latitude and longitude of that particular location is obtained, And with that the exact location of the accident site is determined. And here, GSM modem SIM900 is interfaced with microcontroller. So that, when accident happens, the SMS will be sending automatically to the particular numbers which would be entered in the database. LCD will display the shock intensity and the validity of sending message. Also display the delay time to give the person chance to press the key if the accident is normal

## VII. ADVANTAGES

1. Reliable
2. Easy location Finding for Emergency vehicle
3. We can find the location of the vehicle easily.
4. Mobile number can be changed at any time.
5. More user friendly.
6. We can monitor the speed of the vehicle.
7. We can find the location of the vehicle.
8. Alert message to mobile phone for remote information.
9. Mobile number can be changed at any time.

## VI. LIMITATIONS:

1. Sending data is not secure.
2. GPS Accuracy.

## VII. APPLICATIONS:

1. Automotive and transport vehicles.
2. Publication.
3. Education sector.
4. Buses.
5. Automotive and transport vehicles.
6. Security, remote monitoring and transportation and logistics.
7. This system also can be interfaced with vehicle alerting system.

## VII. CONCLUSION:

Hence our system is an automated notification service that allows authorities to be immediately aware of any accidents that occur in their respective cities to allow them to take immediate action and prevent as much damage as possible, both human and economic. Hence the automatic alarm device for vehicle accidents has been implemented using AtMega162 microcontroller. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid center within a few seconds covering geographical coordinates, the time in which a vehicle accident has occurred. The switch provides the driver a chance to cut off emergency help systems in case the system triggers a false alarm or if the accident is not very severe and immediate help is not required. The additional Google maps interface also makes the viewing of the location easier.

## VIII. FUTURE SCOPE:

This system can interface with vehicle airbag system that prevents vehicle occupants from striking interior objects such as the steering wheel or window. This can also be developed by interconnecting a camera to the controller module that takes the photograph of the accident spot that makes easier.



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