



Review Paper on IoT Based Automatic Vehicle Accident Detection and Messaging System

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Abstract: Increasing use of vehicles in everyday life puts people's lives at risk due to the high probability of traffic accidents. This is probably due to a lack of real-time information gathering and communication. This paper describes an IoT-based vehicle automatic accident detection and rescue system that detects accidents and communicates information to rescue teams.

The methods include GSM/GPRS module which is used to establish communication between the web server and the vehicle's hardware devices, and the GPS module is used to track the location. Vibration sensors are used to detect accidents. The idea was developed around fetching real-time data from hardware devices using sensors, simultaneously storing data on a web server, and sending notifications to rescue teams via SMS, web applications, or Android mobile applications.

Keywords: Global Positioning System (GPS), Global System Module (GSM), Microcontroller Unit (MCU).

I. INTRODUCTION

India has a high population density in the world, as the population grows the demand for vehicles increases significantly, and situations that require concern are road accidents and the number of deaths from accidents. According to the 2019 Traffic Accident Report, a total of 449,002 accidents occurred.

Over a period of 2019, the country was linked to 151,113 deaths and 451,361 injuries. However, the main cause of the increase in mortality is due to delays in emergency services. Automotive is interested in IoT applications to provide advanced products that increase vehicle safety and ultimately maximize profits in response to customer needs. The healthcare industry is concerned about how IoT can improve the speed and accuracy of communications so as both industries required the need for IoT to improve the efficiency of their work this technology is the best solution for that. Other researchers have proposed different technologies at each stage, and each strategy has its strengths and weaknesses.

The process of this system comprises three main steps. These are the hardware devices that detect crashes, the GPS for the location, and the server to establish communication. Intelligent IoT sensors form a vast network for communication capture minute details of their surroundings and pass this important information. The basic idea of the real-time position of the vehicle through GPS is to focus on the vehicle system and to send information through the SMS module through the GSM module through the Internet. This method only recognizes when an object hits the vehicle. The alarm will be generated very instantly once the risk is identified and the location can be identified easily.

II. LITERATURE- REVIEW

The system diagram as shown below in figure 1 consists of different components such as accelerometer, IR sensor, microcontroller, LCD, Global Positioning System (GPS), Wi-Fi module, power supply, slot sensor, cloud storage. All the components are connected to a central processing unit, that is, a microcontroller where it is a central component and controls and coordinates the other components connected to it. The Wi-Fi module is used for wireless message transfer when a message is generated by the Global System Module (GSM) using the specific model module.

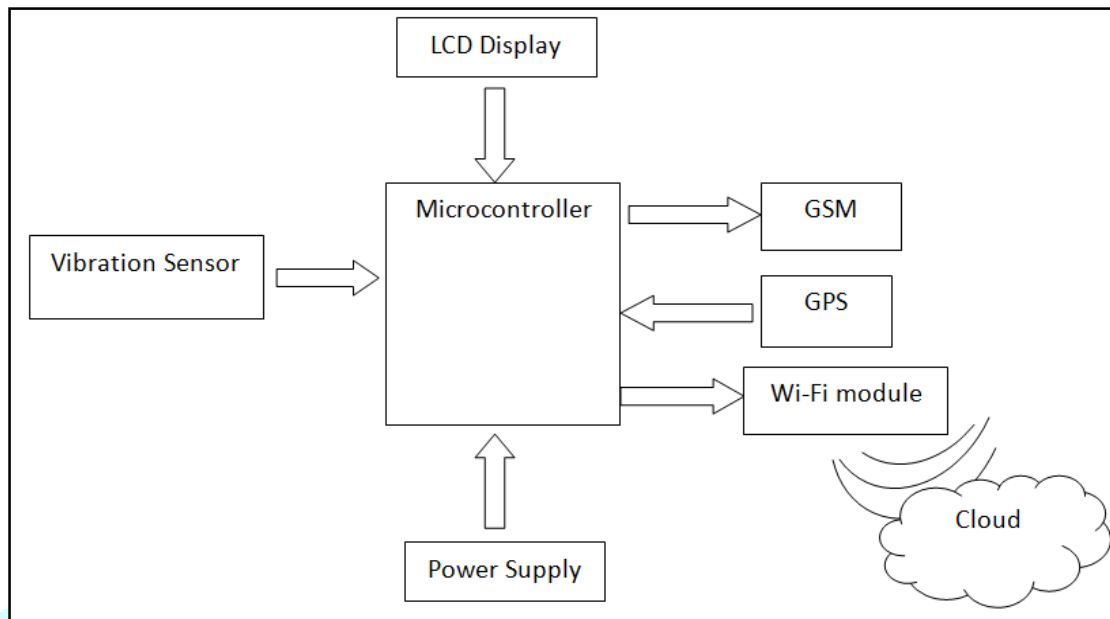


Fig1.Flowchart of GPS/GSM module

Accelerometer: An accelerometer is a gadget that measures changes in gravitational increasing speed in a gadget in which it could be introduced. Accelerometers are used to quantify the increase in speed, incline, and vibration in various gadgets.

Microcontroller: A microcontroller (or MCU for microcontrollers) is a small PC on a solitary coordinate circuit. In current phrasing, it's like, although less modern, an on-chip framework or SoC; an SoC can incorporate a microcontroller as one of its parts. A microcontroller contains at least one processor (processor centers) alongside memory and programmable information /performance peripherals. Program memory like ferroelectric RAMS, NOR is blaze or OTP ROM also regularly included on the chip, besides a small measure of RAM.

Global Positioning System (GPS): A GPS navigation device, receiver, or simply a GPS is a device capable of receiving information from GPS satellites and then calculating the geographical position of the device.

Wi-Fi Module: Wi-Fi is the term for a widely used wireless schmoozing skill that uses wireless rollers to deliver wireless broadband internet connection and internet associates.

Cloud Storage: Distributed storage is an information storage model in which advanced information is stored in coherent pools, these distributed storage providers are in charge of keeping the accessible and open information, and physical condition assured and running.

A GSM modem is a hardware device that uses GSM mobile phone technology to provide a data link to a remote network. From the point of view of the mobile phone network, they are essentially the same as an ordinary mobile phone, including the need for a SIM card to identify with the network.

Several methods have been studied in vehicle accident detection and messaging system in past years. This section describes some previously developed protocols. S. Kumar Reddy Mallidi, V.V. Vineela(2018) has proposed an intelligent vehicle monitoring system based on IoT. This system is used to detect accidents and vehicle theft. This method uses SVM through IoT technology. IoT devices placed in vehicles are designed using Raspberry Pi (RPi) which knows the sensors to immediately detect accidents and the camera to determine the severity of the accident.SVMS uses an image classification model based on machine learning. The SVMS has also become familiar with GPS to continuously track the location of vehicles.

Manuja M et.al (2019) The proposed system will solve these problems based on the VANET [Vehicle Ad-hoc Network] In this system, we transmit the alert message using the RF module and within the range of the RF module, the alert message is received by the moving vehicle and sent to the next moving vehicle and the process continues until the vehicle receives a message, which is in the network area. [1]

Vijaykumar P et.al (2019) developed a system that would detect if the person is watching the road or not. A camera is installed to detect the driver's facial expression, as well as a GSR sensor installed to send data to the Beaglebone card. In the event of an accident, the driver's phone Android app sends alert messages to the near contact, recorded in the app design, with the location of the crash site.

Sayed Mudabbira et.al (2019) proposed a system that handles accident warnings and detection. The Arduino Atmega 328 microcontroller is the heart of the system, which helps pass messages to the various devices in the system. In the event of an accident, the shock sensor is activated and the registration number information is transmitted via the GSM module. [2]

Praharsha Sarma et.al (2020) in this paper the Ultrasonic sensors are placed on the vehicle to detect an obstacle as well as vibration sensor with the accelerometer stored used to determine any unusual movement and the message via the GSM module is sent via the help of Arduino UNO.

CH. Gowri et. al (2020) proposed a system comprises of an accelerometer, ultrasonic sensor, vibration sensor, and support GPS and GSM Module for sending the message. The accelerometer detects a sudden change in the hubs of the car. The vibration sensor detects vibration in a heavy vehicle. Ultrasonic sensor depreciation contrary to movable about the speed of the carriages and GSM sends the alert message, to the accident site. Map of the place, in this case, derived from Google map link which was with the same width, the length of a GPS module. [3]

III. CONCLUSION

By examining all relevant documents and research articles, it can thus be concluded that a vehicle with the proposed system uses sensors and IOT to detect the severity of the accident and report it to the structural system so that rescue teams can rescue the victim as soon as they arrive at accident sites with all medical assistance. Therefore, this system can rescue victims early and significantly reduce mortality.

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