

GSM Enabled Automatic Vehicle Sensor Data to Detect Accidents

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Abstract

Usage of vehicles increases so hazards caused by vehicles are also increased. The causes for accidents are mainly due to fast driving, drunk and drive and even because of also carelessness. Accidents are the more unwanted thing to happen quite often main cause of accidents and crashes are due to human errors. The usage of vehicles cannot be reduced for any means, because of employment. The rate of accidents can be reduced in some ways Communication technology plays a major role in various fields. GSM is one of the important concepts in communication technology. One of the ways has been proposed to detect the accident in timely manner. In this proposed paper once the accident occur sensors placed in the vehicle have the ability to access the particular location and send the location to the stored contracts on the system, nearest hospital and ambulance services. This proposed system will work automatically without any human being intervention.

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1. Introduction

As employment increases in cities the use of vehicles has increased. Hence there is a risk of accidents so an optimum solution has been introduced in this paper. IOT is the concept used in this proposed system. IoT means the numbers of objects are interconnected and they have the skill to move the data through network without human beings. Every connected system have a unique identifier. Internet of Things (IoT) which consists of both software and hardware. The aim of using IOT for tracking and monitoring is because of huge advantage that provide when working with its components. An IOT system consists sensors which 'talk' to the cloud through some connections. As the software processes it, some actions are performed. Automatic alert system for vehicle accidents is introduced; the main objective is to control the accidents by sending a message to registered mobile using wireless communications technique. The rapid growth of technology has made our life easier. MEMS is the sensor which have the ability to sense, control and actuate on the micro scale MEMS device itself measure in the range of 20 micrometers to a

millimeter. MEM stands for Micro Electrical Systems. Vibrations occurs when the accidents happens As vibrations occurs the GPS which is connected though the sensors access the location and the GMS connected to the sensors transfers the collected information to all the contacts in the mobile to which the sensors is connected. Hence the accidents can be detected by the MEMS sensor which is used as the major module in this system. This research paper is divided into V parts. Section II describes about some automatic accident detection system. Section III deals with proposed block for proposed accident detection system. Section IV shows the result and discussion part. Section V discuss about the conclusion part.

2. Literature Review

[1] Supriya, et al., was designed a new accident identification system using IoT. The main purpose of this system was unusual happened things were sent messages to various peoples like vehicle holder, nearby rescuing services and to the nearest police station through the usage of internet facility. GSM/GPRS facilities are used to make the connection

between server and components in the automobiles. Detect the unusual condition by using vibration sensor. This system was implemented based on web services, sensors and cell phone usages.

[2] Manuja M et al., says that the common people are facing various issues due to traffic jam and automobile failure condition in urban area. To avoid the above problem the authors developed a new system called Vehicle Ad-hoc Network (VANET). Here every automobile associated with other vehicles. In existing work GSM concept was applied. But network coverage problem was occurring in GSM system. In this proposed system RF module was used to make a communication between one system to another system. Here four different sensors are used to the collect information from the environment.

[3] Fizzah Bhatti, et al., constructed a Transportation Systems using the concept of Internet of Things. It is used to increase the safety level of the people in smart cities. Automobiles numbers will be increased day by day. This the important cause of the road accidents. Automobiles are integrated with the sensors are to check the condition on real time, identify the accidents and send the real data to the concern people. In this proposed work smart android based application was developed to collect the various data such as speed of the vehicle, gravitational strength, voice and particular site. These above mentioned information was collected from the environment using various sensors and identify the unusual conditions on the road in smart cities. If any accidents are happened, immediately the real time message was sent to the hospital, relative and nearest police station.

[4] Swetha Bergonda et al., explained that transportation is very important for every common people in day to day activities.

Accident identification system using IoT was used to send the accident related data to the concern people immediately. GPS and WiFi concepts are used to identify the unusual condition immediately. In this system the message was send to the concern person WhatsApp cell number using Wi-Fi and internet. The system was sent longitude and latitude standards also send. Based upon all these values the accident zone will be identified easily.

[5] D.Karunkuzhali et al., was says that the people faced large amount of accidents and so many people loss their life also. Avoid this condition the authors developed a new project with Vibration sensor and Micro electro mechanical system (MEMS) sensor.

The above mentioned sensors are used to notice the accident, unusual condition and send the collected data to the server immediately. Arduino mega controller was used in this project to pass the alert message via GSM and GPS. The current location was identified by using GPS MODEM. This proposed system also used to identify the gas level and determine the heartbeat rate of the people inside the vehicle.

[6] Arun Francis G et al., discussed in his paper speed of the vehicle is one of the important reasons for road accidents.

During the accident time the accelerometer and ultrasonic sensor identify the signal and transfer the data to the controller. This system was used to identify the accidents immediately and send the alter information to the nearest control room with the particular location detail. The future work of this project was collecting the accident related messages through wireless webcam.

[7] Meha Soman et al., discussed in their work no emergency services in our country. Using this proposed system the accident situation easily identified and rescues the concern people and their family member. The MEMS sensor is used to identify the accidents through vibration. Ultrasonic sensors are used to calculate the distance.

[8] F.Alrifaie et al., designed a new system for vehicle tracking . In this proposed system was working based upon mobile phone towers. From the cell phone towers the latitude and longitude values are collected. Here the authors proposed system for vehicle tracking using Raspberry Pi connected with 3G/4G USB modem.

[9] Binod Kumar et al., constructed a system for accident detection. They used MEMS and ultra sonic sensor are used to identify the unusual condition. ARM 7 microcontrollers is used to the overall function of this proposed system. Using GSM modem locate the actual position, latitude and longitude value will be calculate.

[10] Boddapati Venkata sai Padmaja et al., implemented a vehicle monitoring and tracking systems by using Blynk platform.

This platform was act as an interface for data transport and visualization. This proposed system was used to check the eye blinking condition of the driver, usage of alcohol and vehicle temperature. The Ultrasonic sensor was fit in front portion of the vehicle. The two vehicles come closely, immediately send mail using Blynk application.

[11] B K Dar et al., discussed Vehicles embedded with state-of-the-art technologies, at the side of roads geared up with superior infrastructure, can play a crucial role inside the timely identity and notification of roadside incidents. However, such infrastructure and technologically wealthy motors are rarely available in less evolved countries.

[12] J anzola et al., discussed this article, a wi-fi autonomous system to estimate the automobile traffic, oriented to be used in the Internet of Things (IoT) packages is presented. In order to carry out the estimation of the rate and orientation of the transferring vehicles, the optical flow technique is used thru the approach of Gunnar Farneback, making use of segmentation by using morphology to avoid false facts captured in conditions in which the optical flow may not hit upon the movement. To procedure and display the statistics in actual time, the data is

sent to the cloud the usage of Flask framework, making it to be had for more than one users

[13] Zhou Wie et al., proposed device may be activated either manually or routinely whilst user walks. Under the manual mode consumer turns on the device before distracted strolling while beneath the automated mode, a "user behaviour profiling " module is used to recognize (distracted) on foot behaviours and an "item detection " module is activated. Using photograph processing and camera discipline of view (FOV), the distance and attitude among the person and detected gadgets are estimated and then applied to identify whether any ability injuries can happen. The " coincidence evaluation and prediction " module includes: temporal alarm that inputs the user's on foot velocity and distance with appreciate to the detected items and outputs temporal accident prediction; spatial alarm that inputs the consumer's on foot direction and angle with admire to the detected gadgets and outputs spatial accident prediction.

[14] Arsalan khan et al., proposed that the motive of this work is to reduce the reaction time of emergency services in conditions like traffic accidents or different emergencies consisting of fire, theft/robberies and medical emergencies. By utilizing onboard sensors of a cellphone to come across vehicular injuries and record itto the nearest emergency responder to be had and provide actual time location tracking for responders and emergency victims, will drastically increase the chances of survival for emergency victims, and also help keep emergency services time and resources.

3. Proposed System

The following figure 1 shows the block diagram of the proposed accident detection system using MEMS sensor and vibration sensor. It consists of the various components. The various components used in this system are Raspberry Pi, vibration sensor, MEMS sensor, GPS Modem etc. Vibration Sensor is used to measure the vibration status of the vehicle. The MEMS sensor is used to measure the unbiased mass and it creates a differentiation within the electric potential in the vehicle. Mems is type of sensor, it combined with chip and it reate the dimension of the location and collect the details from the surroundings. In this proposed system The GPS controls collect the location details of the vehicle and transfer the collected data to the server. The data and longitude and latitude value will be send to the family members, nearest hospital and ambulance service. The Raspberry Pi scontroller associated with GPS modem through internet. The LCD is used to display the current situation of GPS modem.



Figure 1: Block diagram of proposed system

The following figure 2 shows the proposed system hardware implementation.

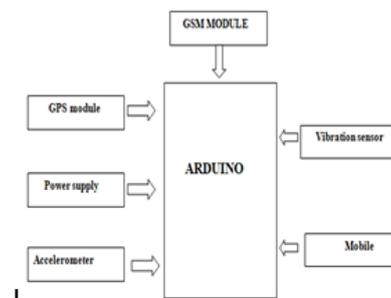


Figure 2: Expected Hardware implementation of proposed system.

4. Result and Discussion

We are going to make a smart accelerometer to determine and find the accident location place. Connections are given as per block diagram. MEMS sensor will sense vibrations whenever accident happens. So when vibrations are predicted an SMS will be sent along with the GPS value to the concerned person.

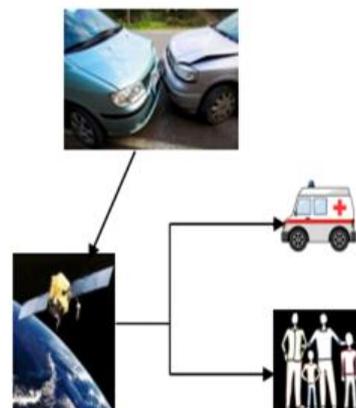


Figure 3: Hardware Setup

5. Conclusion

In this proposed accident detection system uses the computing concept GSM. Here mainly two sensors are used to collect the information regarding accident. The server continuously monitors the entire status system. If any unusual conditions will be occur immediately the message will be send the concern peoples, hospitals and emergency services. It also makes an alarm sound in case of emergency situation. This system is very useful in urban areas.

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