Accident Detection and Fast Health Care System using IoT

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Abstract - *In a today's life we see everywhere like newspaper, television news that the death of peoples due to accident. Road accidents and traffic congestion are the major problems in urban areas and also in rural areas. So we planned to implement the new system in which there is an automatic detection of accident through sensors. This system is fully automatic, thus it finds the accident spot, and helping to reach the hospital in time.*

***Key Words*: Accident Detection, GPS Module, Raspberry Pi, Accelerometer.**

1. INTRODUCTION

Due to the high demand of vehicles has also increased the traffic hazards and the road accidents. life of the people is under high risk. An automated alert system for vehicle accidents is introduced in this paper. The proposed system which can detect accidents in significantly less time and sends the basic information to the emergency hub of the nearest hospital within a few seconds covering the latitude and longitudes of the exact spot where the accident has occurred, So that the ambulance services can extract the person in need in minimum period of time.

1.1 Related work

The authors have explained that the vehicle tracking in embedded system.

Kiran Sawant, Imran Bhole, Prashant Kokane, Piraji doiphode, Prof. Yogesh Thorat,"[1] Explained about Accident Alert and Vehicle Tracking System.

benjamin coifman [2]Explained a real-time vision system for vehicle tracking and traffic surveillance.

r.ramani, s. Valarmathy, dr. N. Suthanthira vanitha, s. Selvaraju, m. Thiruppathi, r. Thangam [3] explained vehicle tracking And locking system. Their paper proposed a novel method of vehicle tracking and locking systems used to track the Stolen vehicle by using gps and gsm technology.

Kunal maurya, mandeep singh, neelu jain [4] explained the vehicle tracking system installed in a vehicle to enable The owner or a third party to track the vehicle's place. This design will frequently watch a moving vehicle and Report the status of the vehicle on demand.

V.Ramya, B. Palaniappan, K. Karthick [5] explained that the system which provides vehicle cabin safety. The system checks the level of the toxic gases such as CO, LPG and alcohol within the vehicle and provides alert information as alarm during the dangerous situations. The system sends SMS to the authorized person through the GSM. Detection of gases prevents further accidents.

Albert Alexe, R. Ezhilarasie [6] Explained system based on cloud computing infrastructure. In this system sensors will be used to monitor the fuel level, driver conditions, and speed of the vehicle. The data sent to cloud server –using GSM enabled device. All vehicles equipped with GPS antenna to locate the place. To avoid drunk and drive, the alcohol sensor installed to monitor the driver status.

Adnan I. Yaqzan, Issam W. Damaj, and Rached N. Zantout [7] explained the remote monitoring system based on SMS/alert

and GSM. System Includes two parts that are monitoring centre and the remote monitoring station. The monitoring centres consists of a computer and communication module of GSM. This paper shows that the system can watch and control the remote communication between the monitoring center and the remote monitoring station.

1.2 Proposed Algorithm

- Pseudo Algorithm:

  Initialization:

1. Lastlon=0, LastLat=0, LastAlt=0, DistTh=0

2. Get new GPS data:

{Lon, Lat, alt, Speed, hdhop, status}

3. AddNewPoint (GPS data)

4. Go to step 2.

- Display location on map:

1. initialize latitude ,longitude to zero

2. initialize marker to null

3.if location is retrieved from server i.e. location = found

4. then show location on Google map API , else

5. fetch location from server

As, soon as accident of the vehicle is occurred then the device sends message to given mobile

Device.

- Message for accident :

"Accident alert

Latitude: 2400.0090, N

Longitude: 12100.0000, E

Time: 12:00"

This system displays the location of vehicle on the LCD connected to it also just to make sure the working condition of the microcontroller.
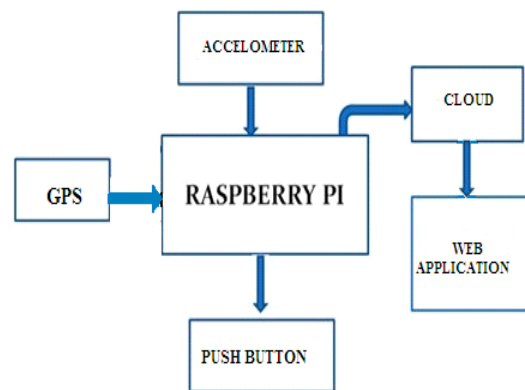
2. METHDOLOGY

FIG:-BLOCK DIAGRAM

The block diagram explains the working procedure of the system which can be designed for this project. An Raspberry Pi is used here for automation and controlling of the other supporting devices those are GPS, GSM, ultrasonic sensor, switch, buzzer etc.

Actually this project gives a practical model of a vehicle accident detection and rescue information system which can do routing, tracking of moving vehicle as well as detect accident in large area.. Actually this system consists of two section, the first one is tracking location which is done by GPS in it and as the car moves the location of the car change continuously, the GPS finds the location in terms of two co-ordinates that are longitude and latitude These two co-ordinates communicate with bulk messages modem which is shown in the block diagram. A sensor, GPS unit fitted in the vehicle detects the accident and sends the accident location to a main server unit which houses the database of all the nearby hospitals. An ambulance comes to the accident spot which carries the patient to the hospital and simultaneously monitors the vital parameters like temperature and pulse rate and conveys them to the concern hospital Along with this there would be control of traffic light signals in the path of the ambulance via RF communication to provide a clear path for the ambulance. This will reduce the time required by the ambulance to reach the hospital. Next comes the detection of accident through vibration sensor. To detect and send alert about the accident, a threshold is set to a highest

vibration value. If the vibration value is greater than the threshold value, then it will consider that accident occur and wait 60 second for a confirmation. This system is a prototype model of Accident Detection And Fast Health Care System Using IOT and GSM , GPS modem and Raspberry Pi working will be made in the following steps:

2.2 Hardware implementation and working

- Raspberry pi

FIG 2:-Raspberry pi zero

There are 40 GPIO pins on Raspberry pi model. It consists of 2 pins for each 5V Power and 3v3 Power. It has 8 Ground pins. And remaining pins are associated with various connection protocols such as SPI, I2C, UART and SD card Interfaces. For Example: InI2C protocol, GPIO's 3,5,27 and 28 are used. The Raspberry Pi is powered by the small micro-USB connector found on the lower left side of the circuit board. This connection is the same as found on the majority of smart phones and some tablet devices. Many chargers designed for smart phones will work with the Raspberry Pi, but not all. The Pi is more power-hungry than most micro-USB devices, and requires up to 700mA in order to operate. Some chargers can only supply up to 500mA, causing intermittent problems in the Pi's operation.

- **GPS Module**

Fig 3:- GPS module

This GSM Modem-RS232 is build with Dual Band GSM/GPRS engine- SIM900A, works on frequencies 900/ 1800 MHz. The Modem RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip(MAX232). The baud rate of RS232 is configurable from 9600-115200 through AT command. This GSM/GPRS Modem have internal TCP/IP stack to enable you to connect with internet via GPRS. It is used transferring SMS, Voice as well as DATA transfer application in M2M interface. Here onboard Regulated Power supply allows you to connect wide range unregulated power supply.

- **Accelometer Sensor**

Fig 4:- Accelorometer sensor

Accelerometers is made up of many different components, and can be purchased as a separate device. The Analog and digital displays are available, for almost all technology devices, these components are integrated into the main technology and accessed using the governing software or operating system. accelerometers have multiple axes, two to determine most two- dimensional movement with the option of a third for 3D positioning. All smartphones typically make use of three-axis models, whereas cars simply use only a two-axis to determine the moment of impact. The accuracy

of these devices is quite high as they're intended to measure even very minute shifts in acceleration.

- **Push Button**

FIG 5:-PUSH BUTTON

A push-button is a simple which is used for on and off mechanism, for controlling some aspect of a machine or a process. Buttons are made out of hard material, usually plastic or metal. The upper surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. The word 'pushing' a button include pressing, depressing.
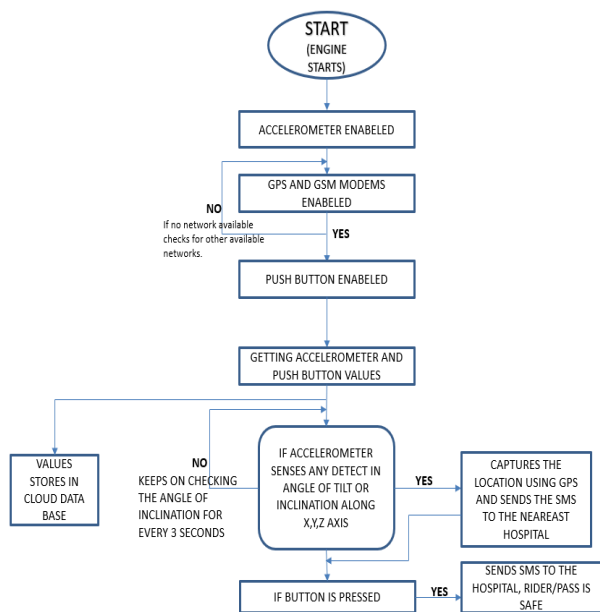
2.3 Flow chart

FIG 6:-FLOW CHART

1. Accelometer sensor will first sense the occurrence of an accident and give its output to the microcontroller.

2. The GPS detects the angel of inclination that is latitude and longitudinal position of a vehicle.

3. The latitudes and longitude region of the vehicle is sent as message through the GSM.

4. The static IP address of emergency dispatch server is pre-saved in the EEPROM.

5. Whenever an accident has occurred the position is detected and a message will be been sent to the pre-saved static IP address.
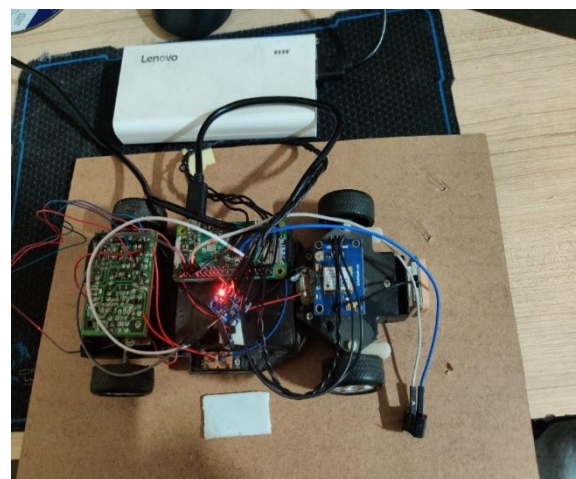
3. RESULT

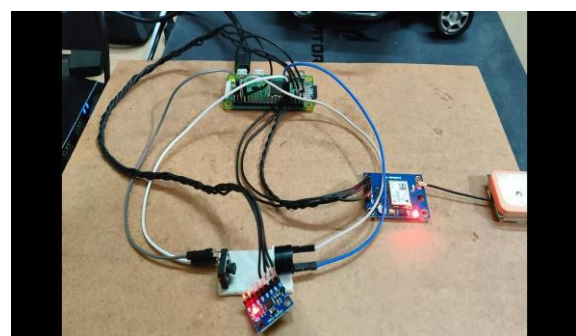**FIG 7: Accident Detection Prototype Placed On A Car**

Fig 8: Sensors Interfaced With Raspberry Pi Zero

The proposed design is a system which can detect accidents in significantly in less time and sends the basic information to first aid Centre. The alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. The cloud will act as a gateway between application and hardware. The sensors are interfaced with Raspberry pi 0(Raspberry pi 3) to detect the sensor information. In

between the sensors and a cloud, Raspberry pi act as a gateway. This system is fully automated, thus it finds the accident spot, and helping to reach the hospital in time.

4. CONCLUSION

The aim of this paper is to give an overview of vehicle tracking and vehicle accident detection system. This Vehicle accident detection system that can track geographical information automatically and sends an alert SMS regarding accident. Experimental work has been carried out carefully. The result shows that higher sensitivity and accuracy. This system is verified to be highly beneficial for the automotive industry.

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