

DESIGN OF AUTOMATIC ACCIDENT DETECTION IN VEHICULAR ENVIRONMENT USING IOT

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Abstract -Now-a-days lots of accident happens on highways due to increase in traffic and due to rash driving of the drivers. In many such situations the family members, ambulance and the police authority are not informed in time. This results in delay to help the person who is suffering, due to accident. The purpose of the system is to find the vehicle where it is and locate the vehicle by means of sending a message using a GPS which is placed inside the vehicle system. Most of the time we may not be able to find accident location because we don't know where accident will happen. Automatic Accident Detection System and Alerting System Based on IoT is designed to avoid such situation.

Key Words: Accident detection and alert, Internet of Things, Acceleration sensor, Global Positioning System, Global System for Mobile Communications.

1. INTRODUCTION

With 2.5V - 5.5V power the LV-Max Sonar provides very short to long-range detection and ranging, in an incredibly small package. Objects from 0-inches to 6-inches range as 6-inches. The antenna is connected to the module via LNA. The module has 51 channel acquisition engine, and 14 channel track engines, which can receive signals up to 65 GPS satellites. And Transferring them into the precise position. The Timing information that can be read over either by UART port or by RS232 serial port. Small size and high-end GPS functionality are operated at low power consumption. The LV-TTL-level and RS232 signal interfaces are provided on the interface connector, and supply voltage. The smart GPS antenna module can be used for OEM applications with the versatile adaptation. Additionally, the antenna can be tuned to the final system circumstances.

2. LITERATURE SURVEY

Many research persons carried out their studies on accident detection system. Aishwarya S.R made a research on IoT based vehicle accident prevention and tracking system for night drivers. This paper is based on Eye Blink Monitoring System (EBM) that alerts the subject during state of drowsiness. [1] Sadhana B made a research on Smart helmet intelligent safety for motorcyclist using raspberry pi and open CV. The idea is obtained after knowing that there is increased in number of fatal road accidents over the years. This project is designed to introduce safety system for the motorcyclist to wear the helmet properly. [2] Sarika R. Gujar has developed Advanced Embedded System of Vehicle Accident Detection and Tracking. The main objective of this system is to detect the accident location and call for the emergency services. Vehicle accident detection is possible with the help of sensor. GPS and GSM module helps the authority to trace the location of the vehicle. [3] Shailesh developed Wireless System for Vehicle Accident Detection and Reporting using Accelerometer and GPS. In this system, Accelerometer sensor is used to detect the crash and GPS gives the location of the vehicle. In case of accident, the system sends automated message to the number such as family member or emergency medical services via GSM.

3. BLOCK DIAGRAM

3.1 Accelerometer

An accelerometer is a electro mechanical device that is used to measure the specific force of an object, a force obtained due to the phenomenon of weight exerted by the object that is kept in the frame of reference of accelerometer. In the case of static acceleration, the device is mainly used to find the degrees at which an object is tilted with respect to the ground.

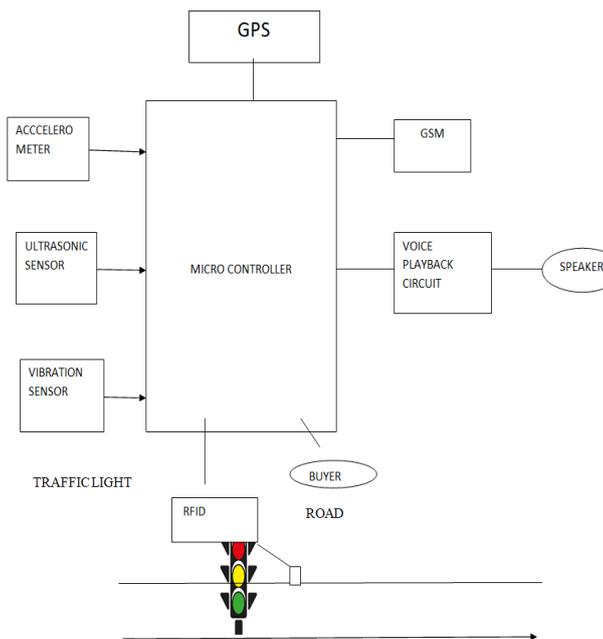


Fig 1: Block diagram of implemented system.

3.2 Ultra-sonic sensor

With 2.5V - 5.5V power the LV-Max Sonar provides very short to long-range detection and ranging, in an incredibly small package. The LV-MaxSonarEZ1™ detects objects from 0-inches to 254-inches (6.45-meters) and provides sonar range information from 6-inches out to 254-inches with 1-inch resolution. Objects from 0-inches to 6-inches range as 6-inches.

3.3 Vibration sensor

The vibration sensor is also called as piezoelectric sensor. These sensors are flexible device which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes with in acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge.

3.4 RFID

Radio-frequency identification (RFID) is that the use of a wireless non-contact system that uses radio-frequency electromagnetic fields to transfer data from a tag attached to an object, for the needs of automatic identification and tracking. Some tags require no battery and are powered and skim at short ranges via magnetic fields (electromagnetic induction). Others use an area power source and emit radio waves (electromagnetic radiation at radio frequencies). The tag contains electronically stored information which can be read from up to many meters away. Unlike a Universal Product Code, the tag doesn't get to be within line of

sight of the reader and should be embedded within the tracked object. RFID tags are used in many industries. An RFID tag attached to an automobile during production are often used to track its progress through the production line. Pharmaceuticals can be tracked through warehouses. Livestock and pets may have tags injected, allowing identification of the animal. Since RFID tags are often attached to clothing, possessions, or maybe implanted within people, the likelihood of reading personally-linked information without consent has raised privacy concerns.

4. HARDWARE IMPLEMENTATION

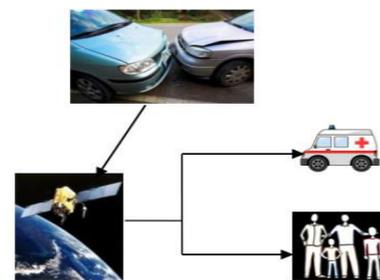


Fig 2: Hardware implementation of system.

4.1 WORKING PRINCIPLE

In this project we are using a Micro controller. When the system is switched on, LED will be ON indicating that the power is supplied to the circuit. When the vibration sensor senses any obstacle, they send interrupt to Micro controller.

The GPS receives the location of the vehicle that met with an accident and gives the information back. This information will be sent to a mobile number through SMS. This message will be received using internet present in the circuit. This message will give the information of longitude and latitude values. Using these values, the position of the vehicle can be estimated. The received data is given to the Micro controller. Corresponding gives an acknowledgement in the form of an SMS to the mobile phone. LED used in the circuit displays the reception of messages. The Micro controller interfaced to GPS modem via an internet, where the devices are activated using select lines internally built in the internet. Internet is interfaced to Micro controller via transmit and receive pin. LED is interfaced to any ports of Micro controller; it is used to display the current

status of the GPS modem, whether data is being read from GPS.

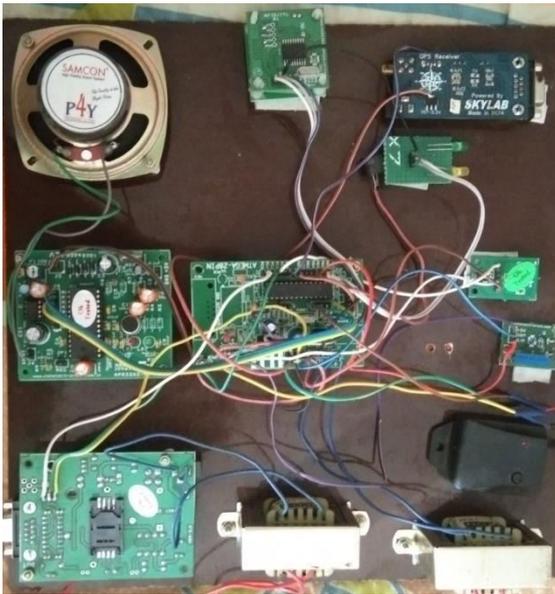


Fig 3: Working of the system.

Advantages

- We can monitor the speed of the vehicle.
- We can find the location of the vehicle.
- Alert message to mobile phone for remote information.
- Mobile number can be changed at any time.

Limitation

- Costlier.
- Sending data not secure.
- This system is not applicable for poor network connection places.

Applications

- Automotive and transport vehicles.
- Security, remote monitoring and transportation and logistics.
- This system also can be interfaced with vehicle alerting system.

5. CONCLUSION

The proposed system uses the IoT for vehicle accident detection and alarming the authorities regarding accidents, vehicle tracking using GPS Modem. In this project we have designed IoT based vehicle accident detection and tracking system using GPS Modem. Hence IoT can revolutionize the way the system interacts and respond for the variety of applications especially in case of traffic control.

6. FUTURE SCOPE

This system can be interfaced 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 the tracking easier.

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