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Accident alert system using IoT

Akash Kumar Gupta
akgupta452@gmail.com
Raghu Institute of Technology, Visakhapatnam, Andhra Pradesh

D. Sunilkumar
sunilkumardonka@gmail.com
Raghu Institute of Technology, Visakhapatnam, Andhra Pradesh

P. Prathima
prathimavarma8921@gmail.com
Raghu Institute of Technology, Visakhapatnam, Andhra Pradesh

V. Prashanth
prasanthvandani999@gmail.com
Raghu Institute of Technology, Visakhapatnam, Andhra Pradesh

Ch. Phani Sainadh
phanichaudhary99@gmail.com
Raghu Institute of Technology, Visakhapatnam, Andhra Pradesh

ABSTRACT

In order to identify vehicle accidents and send the accident location information to the vehicle owner, the nearest hospital and a police station through a web service, an IoT-based accident and rescue information system has been developed. The contact between the Web server and the hardware system is made via GSM / GPRS, with a GPS shield. Vibration sensors, keypad and buzzer are used to identify the incident. The project is built to collect data in real time using a web application, Android mobile app or SMS for the hardware computer. This project ensures the correct identification of the accident site in the nearest police station and hospitals and sends a notice.

Keywords— *IoT, Pressure Sensors, Node Mcu, Gps Module, L293d Motor Driver, Blynk App*

1. INRODUCTION

Now a days, developments in the automobile industry are rising exponentially, resulting in injuries and too many road hazards. Existence of people is at great risk. This is because emergencies in our country are missing. This condition prevails. Many people in our country lose their lives due to incidents. Owing to accidents or inadequate emergency team contact. We are overcoming this by providing an effective solution and reducing as much as possible the loss of life [2]. In our theory, device architecture lets us diagnose crashes in a very short time and passes the essential information to the first aid Centre. The geographical coordinates, time and angle of the occurrence of the vehicle are covered [3]. This distress message shall be transmitted within a short time to the rescue team and the cell phone number reported. This program saves a lot of precious lives in real time. The message is transmitted via GSM and the accident location [5]. The fundamental concept is to locate the vehicle device by collecting the vehicle's real time location via GPS, and transmitting data via GSM via SMS.

2. ACCIDENT DETECTION SYSTEMS

The rescue team cannot detect where the accident took place at present and therefore no details on it which contributes to the death of a individual. Also in dusky areas where there is no network for receiving signals, research is underway to track the car[4]. Within only a few days, so many state-of - the-art innovations are available to secure the car and track. During the past the incident information may be transmitted, but it is not possible to find the incident location. Air bags for health and safety travel are equipped for all vehicles. In 1968 the air bag program was introduced [4]. TPMS (Tire Pressure Monitoring System) is the framework for the pneumatic pressure control in vehicles with various operating conditions, such as lower pneumatic pressure, to improve traction, over rough terrain, to draw a high load from a tilt at slow speeds, to crush off soft dust. The pressure is between 15 and 45 PSI [5]. Various other accident deduction schemes were proposed.

The current device is used to monitor the angle and vibration sensors for the measurement of the shift in the vehicle with the pressure sensor [5]. In other system, the vehicle sensing system uses IOT, using a MCU, developed by Blynk application Algorithm. The other current system uses IOT. In this scenario, IOT tracks the vehicles with electric piezo sensors. The key goal is to distinguish between traffic accidents and no traffic accidents. The current device also provides the location of the accident with the aid of the GPS and GSM module. This concept of an AARS (Automatic Ambulance Rescue system) is all about the life of the patient. It is an automated emergency rescue device. The electrical signal to the microcontroller via signal conditioner is provided by previously proposed device where a vehicle has met with an accident, vibration sensor [4]. Place codes are identified by means of GPS and sent via GSM modem to the control center [3]. A report on the accident is received by the GSM modem in the control section and sent to your Computer. The nearest ambulance is identified and patient collection instructions. PC with the GSM modem that is

a slow process of transmitting a messaging and contact, contact is delayed in this device.

3. PROPOSED METHODOLOGY

We are introducing a new framework for automatic accident detection to resolve the current issue. Each vehicle contains an impact sensor and signals are sent to the micro controller when an accident occurs. The signal is transmitted via the IoT network from the microcontroller to the central device. The GPS module provides the co-ordinates of latitude and longitude of the victim vehicle sent via IoT network. The central unit sends the locations to the closest ambulance to pick the victim up. The central unit is located in the police station or the hospital, where the vehicle unit receives signals. The ambulance is given a warning alert near the accident site [5]. The ambulance also has a GPS recipient to map the accident site. This helps ambulances enter the site and save the victim in time. The following hardware components are used in this system.

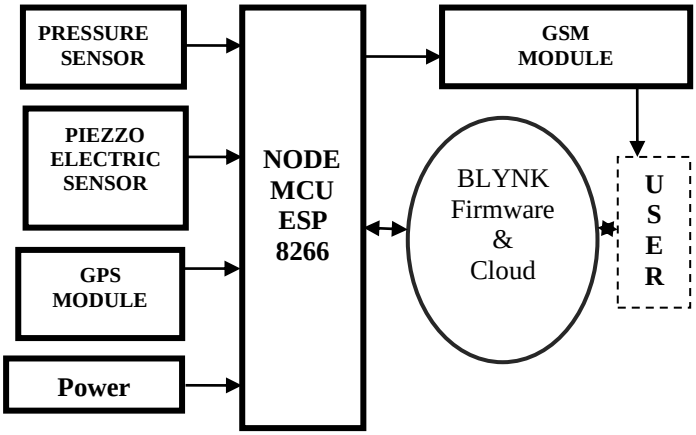


Fig. 1: Block diagram of Automatic Vehicle Accident Detection and Rescue System

4. HARDWARE AND COMPONENTS

4.1 Node MCU

Fig. 2: NodeMCU

Node MCU is an open-source firmware that includes open source system prototyping designs. The term' Node MCU' blends the node with the device ' MCU.' The term "Node MCU" applies exclusively to the software instead of the related development kits. Both the software and system prototypes are open source. The firmware is built on the Express if Non-OS SDK for ESP8266 and is based on the eLua project. It uses a large number of open source projects, like lua-cjson and SPIFFS. Due to resources constraints, users should select the correct modules for their projects and build a firmware tailor-made for 32-bit support.

4.2 GPS Module

GPS is an U.S. space-based global satellite navigation system. It provides worldwide users with efficient positioning, navigation and time-taking services in all weather conditions, day and night, anywhere on or near the planet. GPS consists of 3 parts: 24 to 32 Earth-circulating satellites, 4 Earth-based monitoring and control stations and user-owned GPS receivers [3]. GPS satellites relay space-based signals that provide a three-dimensional location (latitude, longitude and altitude) plus time on the GPS receivers.

Fig. 3: GPS AND GSM module

4.3 GSM Module

A handheld GSM hand set is used in this segment. GSM networks are the best-known systems for mobile telephones in the world. The fact that both signaling and voice networks are digital and are thus a fourth generation (4G) mobile telephone system varies from its predecessors. This also made it easy to connect to the network through data communication. GSM is the wireless network that links mobile telephones in the immediate vicinity by searching for cells. The GSM module provides short message service to pre- defined mobile numbers like users and emergency contacts like fire, police, and ambulance.

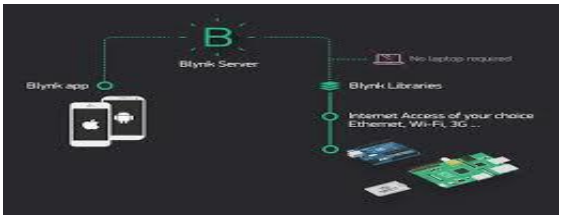
4.4 Pressure sensor

A pressure sensor is a device for pressure measurement of gases or liquids. Pressure is expressed as the force required to stop a fluid from expanding, and is usually stated in terms of force per unit area. A pressure sensor eventually acts as a transducer; it converts mechanical energy into electrical signal. For the purposes of this article, such a signal is electrical. Pressure sensors are used for control and monitoring in thousands of everyday applications. Pressure sensors can also be used to indirectly measure other variables such as fluid/gas flow, speed, water level, and altitude. Pressure sensors can alternatively be called pressure transducers, pressure transmitters, pressure senders, pressure indicators, piezometers and manometers, among other names.

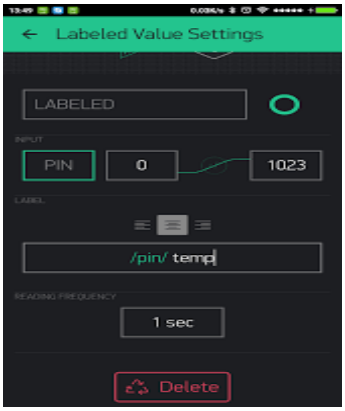
4.5 Blynk Firmware and Cloud

The Internet of Things is simply controlling or accessing various sensor data wireless. It can be easily achieved by various open source applications like Blynk. It can remotely monitor equipment, display sensor data, store data, access it and do many cool things. There are three key components on the platform:

(a) Blynk App: User to use different widgets to create awesome interfaces for your projects.
(b) Blynk Server: The smart phone and hardware communications are handled by Blynk Server. User can either use our Blynk Cloud or locally run your Blynk private server. It is open source, can handle thousands of devices easily and can be even started on a Raspberry Pi.
(c) Blynk Library: Allows contact with the server and process on all common hardware platforms.



(a)



(b)

Fig. 4: (a) BLYNK architecture (b) BLYNK user module

5. AUTOMATIC VEHICLE ACCIDENT DETECTION AND RESCUE SYSTEM

The proposed Automatic Vehicle Accident Detection and Rescue System is consisting of detection unit having components like pressure sensor to detect accident, and GPS module to detect the location. The location and pressure is continuously collected and transmitted to BLYNK server using built in Wi-Fi. If the values exceeded the typical values, the buzzer will be blown and SMS of occurrence of accident along with the location will be sent to user and emergency contacts.

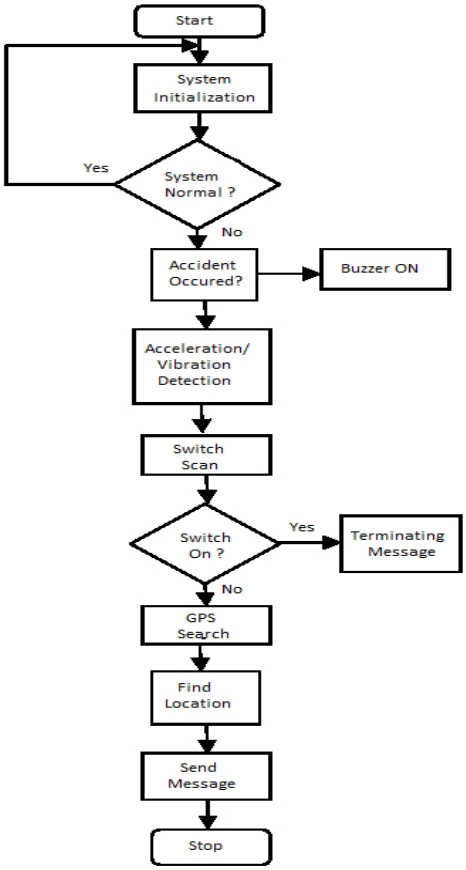


Fig. 5: Flow chart of Automatic Vehicle Accident Detection and Rescue System

6. RESULTS

The prototype of proposed Automatic Vehicle Accident Detection and Rescue System is shown in figure 6. If any accident occurs it will alarm the buzzer and SMS sent user with location. The output response is shown in figure 7,8. The Automatic Vehicle Accident Detection and Rescue System provide cost effective solutions for tracking, detecting accidents and alerting the users and rescue team.

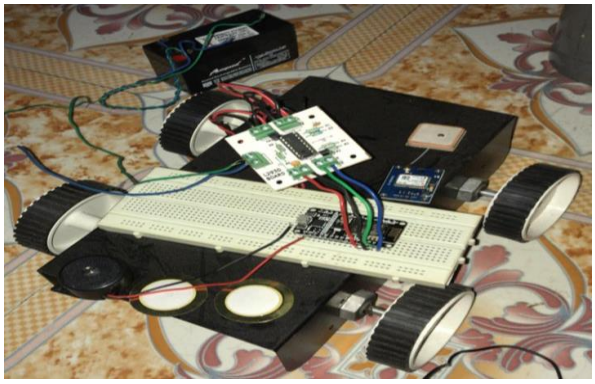


Fig. 6: Automatic Vehicle Accident Detection and Rescue System

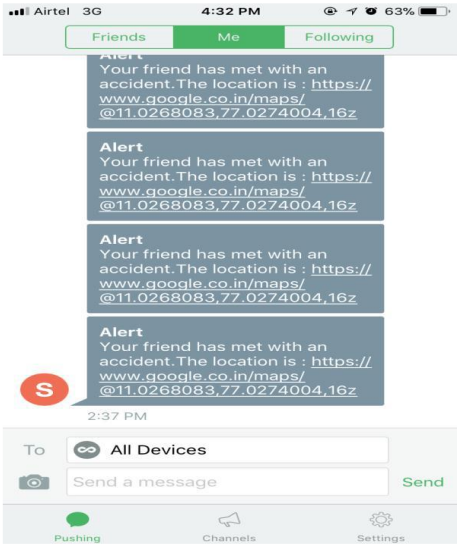


Fig. 7: SMS received to USER

7. CONCLUSION

The program suggested covers the warning and identification of incidents. The microcontroller node MCU is the core of the system that helps to transfer the message to various systems. When the accident happens, the Impact Sensor is triggered and information is transmitted through the GSM module to the registered number. The position can be transmitted using GPS through the geographical co-ordinates tracking system in the country. An impact sensor that is used as a main module in the device will detect the accident.

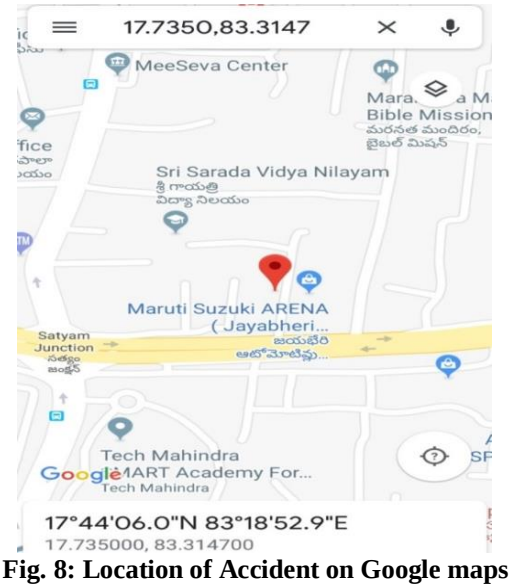


Fig. 8: Location of Accident on Google maps

Source: Google maps

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