ACCIDENT DETECTION AND ALERTING LOCATION

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Abstract - *The main aim of our project "Accident detection alerting location over gsm and gps using IOT" is to detect accidents and alerting the nearby police station, hospitals and to the relatives of the ones who are injured in the accident to take the necessary steps and provide emergency services required. The accident detection system is fitted into the vehicle which uses GSM, GPS and IOT technologies and displays the details in the LCD.*

***Key Words*: GSM, GPS, NODEMCU, IOT, ESP2866, SOC.**

1. INTRODUCTION *(Size 11 , cambria font)*

As in today world the population is growing as fast as the technology, hence the number of vehicles are also increased. We observe in day-to-day life the number of deaths due to accidents are increasing in an exponential manner. As the technology increased there must a automated accident detection system which reduces number of deaths caused and saves life.

Here in this project "ACCIDENT DETECTION ALERTING LOCATION" it detects the accident occurred and alerts nearby police and ambulance through a message which contains the location of the accident occurred. The accident detection system using wireless technologies is fitted into the automobile which contains nodemcu, gsm, gps and iot module. When the accident occurs a message including the location is displayed on the lcd and sent to the police, ambulance which are near to the location in order to provide the emergency assistance services.

2. COMPONENTS:

2.1 NODEMCU:

Nodemcu is an open source hardware and software development enrolment that is built around a very inexpensive SOC (ESP8266). Simply it is an opensource Lua based firmware developed for ESP2866 wifi chip. Nodemcu specifications are DC current:250Ma, RAM 32Kb ,DRAM 80 Kb and flash memory 200KB,3.3V regulator. It is bread board friendly.

Open source means Nodemcu hardware device is open for edit, modify, design or built new nodemcu development board. Nodemcu comes with analog and digital pins and also supports serial communication protocols like UART, SPI etc. Using such serial protocols we can connect with serial devices like LCD display , touch screens . It has CP2102 UART interface IC, it has integrated USB transceiver and it does not have any external resisters.

2.2 ESP2866:

ESP2866 is a Wi-Fi enable SOC module mostly used for IOT based applications. It is a 32-bit microcontroller and the model used is ESP-12E which is embedded with 10 silica L106 32-bit microcontroller. It has 2.4 GB Wi-Fi, general purpose IO pins, I2C serial communication, SPI serial communication protocol, UART and PWM. It has CPU clock speed of 80MHZ. It also has SRAM, RAM, SPL flash memory.

It is low-cost Wi-Fi sheet, has full TCP\IP stack and MCU and we can upload a full program.

2.3 MEMS:

MEMS means Micro Electro Mechanical Systems. It is an accelerometer. Accelerometer is used to measure speed. They are very useful in science and industry. It detects the vibration of the machine. It measures force in on direction. This helps us to find in which direction the machine got tilted.

2.4 GPS:

GPS is the Global Positioning System. It helps us to find the accurate location of the object. This works with the help of 24 satellites located in the earth's orbit. We can trace the location of any number of people anywhere in the world. In our project position, velocity and time of the user is determined.

2.5 GSM:

GSM is Global Systems for Mobile Communications. GSM is the second-generation cellular phone technology. The gsm module we used in our project is SIM-300. NodeMCU should be interfaced with gsm module. It maintains communication between the system and the allocated mobile number. If an accident is detected then the location of the user is send to the preferred.

2.6 LCD:

LCD is Liquid Crystal Display. It can display the numbers, alphabets and any other special characters. It shows the status of the output. It works on the light modulating properties of liquid crystals.

2.7 BUZZER:

We use magnetic buzzer in our project. It has two pins, one is connected to power supply and other to the ground . Inside it consists of piezo electric material. When the accident occurs NodeMCU gives information to the buzzer. As a result piezo electric materials present in it vibrates and produces sound.

3. Working:

Implementation steps:

1. Occurring of the Accident.
2. Accelerometer identifies the occurrence of the Accident.
3. As soon as the accident is detected the Buzzer starts buzzing.
4. Accelerometer sends the information of accident to Node MCU.
5. The location of Accident is identified by the GPS which is extracted and sent to Node MCU.
6. Location information of Accident occurrence is given to the server, GSM and android application.
7. The server starts running continuously.
8. As soon as the location co-ordinates are received, the distance between the hospital and the location of accident is calculated and stored in the database.
9. According to the set different lists are generated. We can manually set the range of hospitals.
10. SMS about the location is sent to the Hospitals and the relatives of the user.
11. The message is also displayed on the LCD display

4. Architecture design:

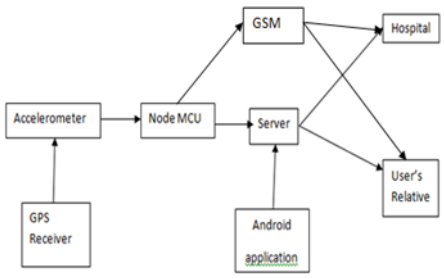

Fig1: Architecture design

Accident detection module:

The Accident detection module consists of Accelerometer, Buzzer, Node MCU, GSM and GPS Receiver that processes the accident location. The Accelerometer detects the change in the position of the coordinates and calculates the vibration and compares it with the threshold vibration value. Then the Accelerometer send the information to Node MCU. The Node MCU works in a way that whenever there are any changes other than threshold value it estimates that the accident has taken place and the Buzzer starts buzzing. The location of Accident detected is extracted from the GPS receiver and is sent to controller i.e., Node MCU. The location is detected with the help of longitude and latitude co-ordinates.

Android Application:

The android application is designed in such a way that whenever an accident takes place the user's relative's phone vibrates showing that accident has occurred. It also shows the map of the location in the android application.

GSM Module:

The Node MCU sends the information of accident occurrence and the location co-ordinates to GSM module. The GSM module send the text message to the hospital and the user's relative and alerts them about the occurrence of the accident.

Server:

The co-ordinates of the accident location is sent to the server. The server then calculates the distance between the hospital and the accident location. The server then sends the message to user's relatives and the hospital. The accident location co-ordinates are also sent to the android application by the server.

5. Software Requirements:

- Embedded C

6. Hardware Requirements:

- Node MCU
- MEMS Sensor
- GSM
- GPS
- RPS
- Buzzer
- Wi-Fi Module
- LCD

Circuit:

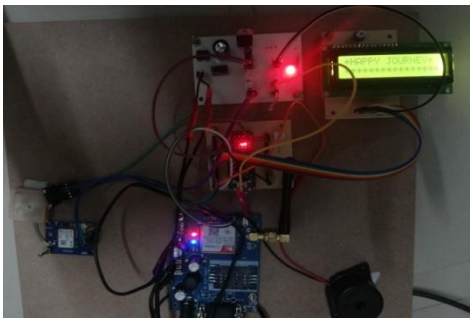

Fig2: Circuit board and connections

7. Prototype Testing:

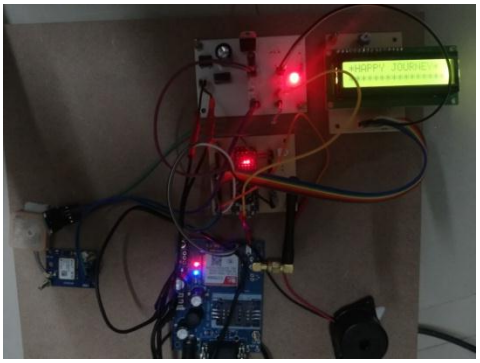

Fig3: LCD showing "Happy journey"

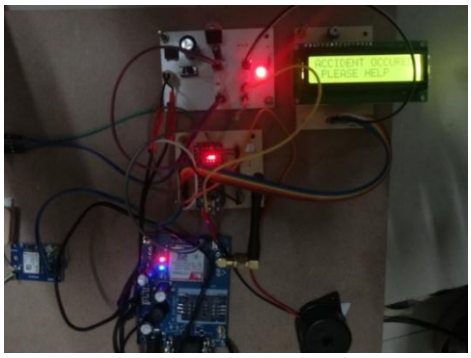

Fig4: LCD showing "Accident occurred Please help"

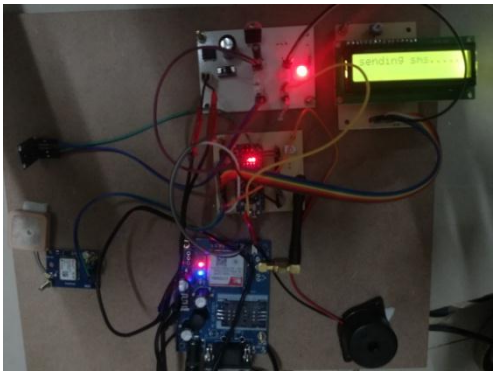

Fig5: LCD showing "Sending SMS"

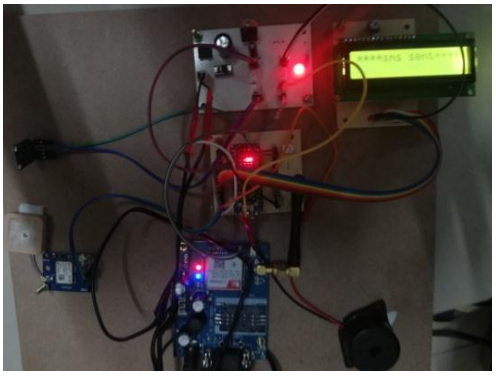

Fig6: LCD showing "SMS sent"

Result:

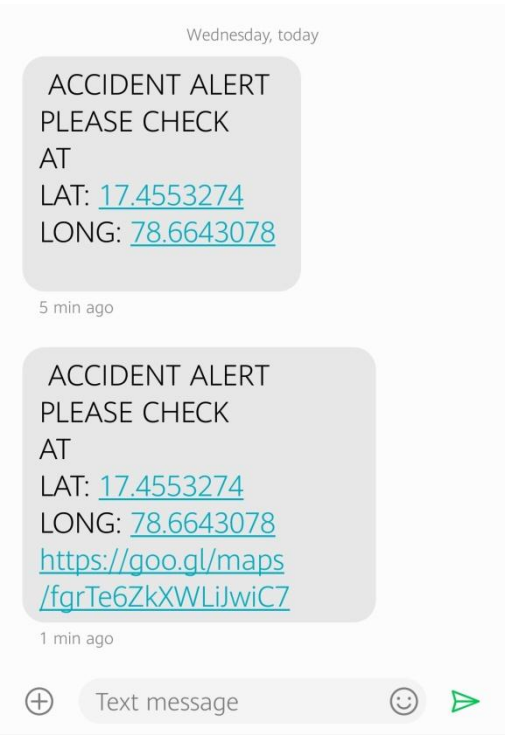

Fig7: Received message

8. CONCLUSIONS:

The main objective of this project is to send the message to the nearby hospital and relatives of the user and save their lives from the dangerous accidents.

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