iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** IV **Month of publication:** April 2020

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue IV Apr 2020- Available at www.ijraset.com

Arduino based Vehicle Accident Alert System using GPS, GSM and Accelerometer

Seema Shukla[1], Pooja Paswan[2], Dipika Singhaniya[3], Digvijay Nishad[4], K M. Neha[5], Shovana Khan Yusufzai[6]
[1, 2, 3, 4, 5]*(E&C Deptt., BIT, GIDA, Gorakhpur, India)*
[6]*(Asst.Prof, E&C Deptt., BIT, GIDA, Gorakhpur, India)*

Abstract: ***The aim of our project is to find the vehicle accident location by sending a message using a system which is placed inside the vehicle system. The purpose of this work is to find spot of vehicle where the accident is occur. Most of the times we don't know about where the accident is actually occurred or if accident happens then we cannot be able to present at the accident location so in this project we will find accident spot in order to rescue the injured person. First, we need to know that where the case of accident is actually happen and that is done through location tracking and then a SMS is send to your related one. GPS and GSM modules are used in this project which can be used for navigate the vehicle anywhere on the globe. In this project when an accident occur and vehicle tilt then, immediately accelerometer detect the change in axis of vehicle from these it collect some data and sends it to Arduino. The Arduino sends the alert message through the GSM to an authorized mobile number. Through GPS the authorized mobile number gets the exact location of where the accident has occurred and the location is seen with the help of Google map link.***

Keywords: GPS (Global Positioning System), GSM (Global Service for Mobile communication), Accelerometer, SMS (Short Message Service), Arduino.

I. INTRODUCTION

In this project we are making a device that sends the spot of the vehicle where the accident occurs. In the project we use GPS which can be used as a exact location identifier. Further we use GSM which sends the alert message to the vehicle owner's or to the owner's relatives and friends. When at the time of accident, the accelerometer detects the tilts (changes in axis of vehicle) and Arduino reads that variation in the axis of vehicle, we can send the alert message with the using of GSM. The Accident Alert System using Arduino is an initiative to implement a device in the vehicle specially in developing countries like India, where we normally seen the cases of accidents .Accident is increasing due to increase in number of vehicles and their use by some careless people, as a result every year the number of deaths due to accidents is increasing. The Accident Alert System using Arduino rescue or prevent the person from the uncertain death after accident because this system sends the message alert to the hospital or emergency number or nearly relative. The message alert will be appears with the Google map link which includes longitude and latitude that shows the direction of the vehicle.

II. WORKING PRINCIPLE

If any where there is an accident, the vehicle gets tilted and accelerometer changes its axis values. These axis values are monitored by Arduino and further Arduino is going to check if any variation occurs in any of the axis. If any variation in vehicle axis occurs, then Arduino reads the change in the coordinates by extracting $GPGGA String from GPS module data and sends SMS to the predefined number like to the police, emergency number or relative once along with the location of accident place. The alert message which is send by the system(GSM) it also appear with a Google Map link to the accident location coordinates, so that we can easily tracked the location of the accident. After that when we receive the alert SMS then we only need to click the link and the location will directly open with the Google map where we can see the accurate position or place of the vehicle. It also contains motion of vehicle ant it will be also sent in the SMS and that can be seen on the Liquid crystal display (LCD) panel. Fig.1 shows the block diagram of the Accident Alert system using GPS, GSM and accelerometer.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue IV Apr 2020- Available at www.ijraset.com

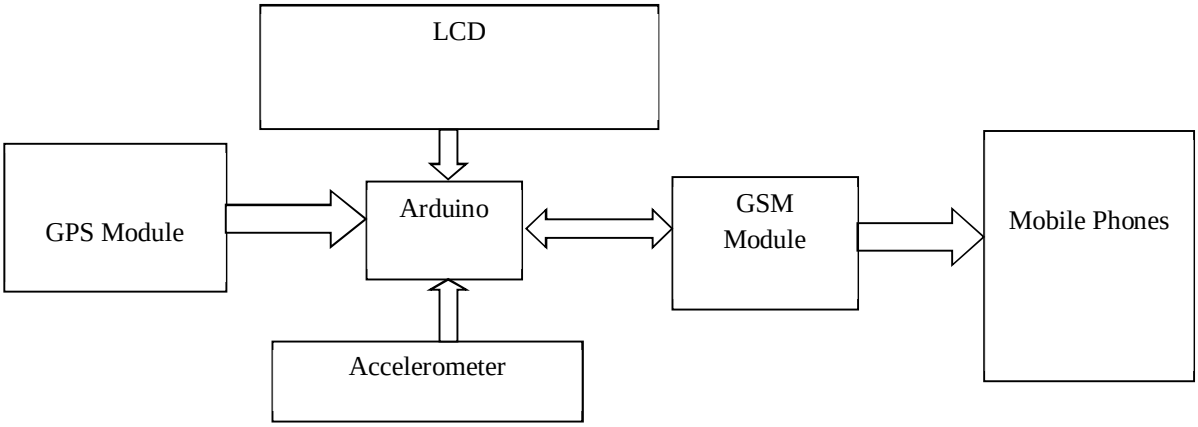


Fig.1 Block diagram of the Accident Alert system using GPS, GSM and accelerometer

III. FLOW CHART

In this section there is required flow chart of the system is shown in the Fig.2 It shows that the device is boot up on power ON. If the device is not detected normal, then it will be validated that the accident has occurred. For the validation the origin of the accident we just need to detect the rate of change of vehicle. If it is any accident happen, the alert message is sent by the GSM to the family member or which can save the life of a person which is affected by accident after that the location of the vehicle is detected by the GPS. The flow chart is given below:-

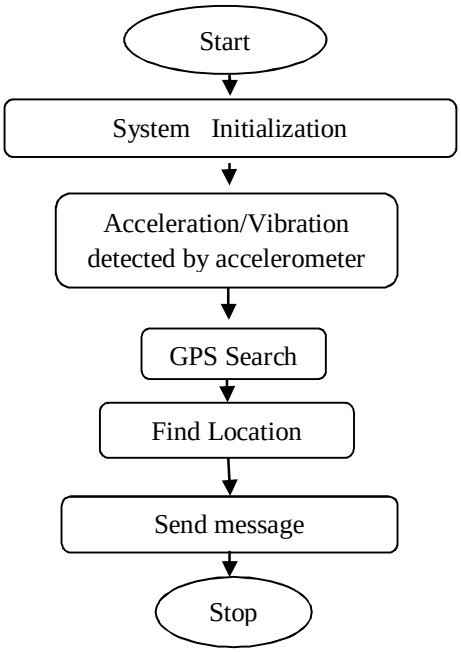


Fig.2 Flow chart of the accident alert system using GPS, GSM and accelerometer

IV. ARDUINO UNO

Arduino is a tool for controlling electronic devices. Arduino is a microcontroller-based one source electronic prototyping boards which can be programmed with an east-to-use Arduino IDE. Arduino consists of both a physical programmable circuit board and a piece of software, or IDE. The Arduino IDE uses a simplified version of C++, making it easier to learn. The UNO is one of the more popular boards in the Arduino family & a great choice for beginner. The major components of the Arduino UNO board are the following-

1) *USB Connector*
2) *Power Port:* The Arduino board can be powered through a AC-to-DC adapter or a battery.

3) *Microcontroller:* It is the most prominently visible black rectangular chip with 28 pins. And it can be think of it as the brain of Arduino.
4) *Analog Input Pins:* The Arduino UNO board has 6 analog input pins, labeled "Analog 0 to 5". These pins can read the signal from an analog sensor such as a temperature sensor and convert it into a digital value for system understanding.
5) Digital pins- You can find these pins labeled "Digital 0 to 13". These pins can be used as either input or output pins. When used as output, these pins act as a power supply source for the components connected to it and when used as input pins, they read the signals from the component connected to them.
6) *Reset Switch:* When this switch is clicked, it sends a logical pulse to the reset pin of the Microcontroller, and now runs the program again from the start.
7) *Crystal Oscillator:* This is a quartz crystal oscillator which ticks 16 million times a second. On each tick, the microcontroller performs one operation, for example, addition, subtraction, etc.
8) *USB Interface Chip:* We can think of this as a signal translator. It converts signals in the USB level that an Arduino UNO board understands.
9) *Tx Rx LEDs:* Tx stands for transmit, and Rx for receive. These are indicator LEDs which blink whenever the UNO board is transmitting or receiving data.

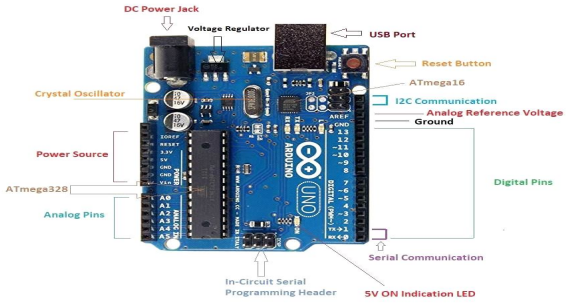


Fig3-ARDUINO UNO

V. GPS MODULE

A GPS navigation system is a GPS receiver and audio/video (AV) components designed for a specific purpose such as a car-based or hand-held device or a Smartphone app. The global positioning system (GPS) is a 24-satellite navigation system that uses multiple satellite signals to find a receiver's position on earth. GPS was developed by the U.S. Department of Defense (DoD). The technology was originally used for military purposes. Since 1980, when GPS technology was made available to the consumer market, it has become common in cars, boats, cell phones; mobile.GPS receivers find their location by coordinating information from three or four satellite signals. That information includes the position of the satellite and the precise time of transmission. With three signals, any 2D position can be found on earth; additional satellite signals make it possible to find altitude. GPS technology works in almost any condition and is accurate to within 3-15 meters, depending on the number of signals received, the spread of satellites in the sky and the technologies used in the receiver.

Fig4:- GPS module

VI. GSM MODULE

GSM, Global System for Mobile Communications originally from Group Social Mobile is the most popular standard systems in the world. GSM, its promoting industry trade organization of mobile phone carriers and manufacturers, estimates that 80% of the global

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue IV Apr 2020- Available at www.ijraset.com

mobile market uses the standard GSM is used by over people across more than 212 countries and territories. Its ubiquity enables International arrangements between providing subscribers the use of their phones in many parts of the world.

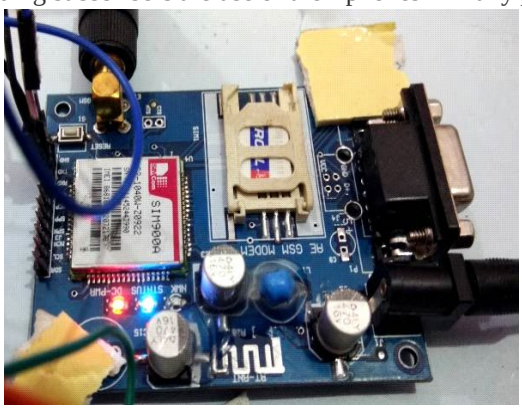


Fig5-GSM Module

VII. ACCELEROMETER

An accelerometer which works as a sensor it is a input device from this sensor we can read the data of acceleration, which is the change in an object's velocity per second. Since velocity is measured in meters per second (m/s), acceleration is measured in meters per second per second, which is written as meters per second squared (m/s2). The accelerometer can be used to detect the direction of gravity.

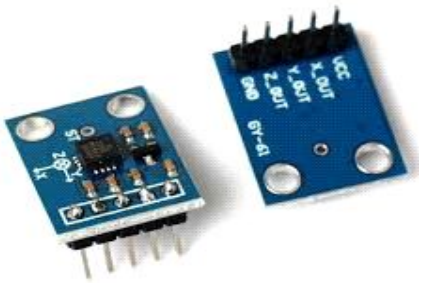


Fig6- Accelerometer module

VIII. LITERATURE REVIEW

Now a days, we cannot detect where the cases of accident will actually happens and hence, we have no information related to it, we called its some lack of technology and lack of equipment this is going to lead in to the death of human beings as well as animals or valuable life. This paper work is going on for tracking the position of the vehicle and alerts the authorized person with the message when any accident is going to happen. In our project GPS is commonly used for navigating or tracking the location and position of the vehicle, and GSM can be used as for sending the alert message it if an accident has been determined. If we see the past event and from that we can say that-

A. In past the information will be gathered manually means at the accident spot if any person is injured and any person is passed from that accident spot if there is any cell phone, id proof of the injured person are there the other person gave information to the family of injured person. Tracking of accident is a difficult process in the system because sometimes the places where accident will be occurred there is no proper network system for gathering the information of accident.[2]

B. If any treatment required to the person who are affected during accident, we are not be so much able to give medical to the needed person. Because as we know in such cases when accident happen no one are try to put some effort to save a life of the injured person. [3]

C. In such cases life of a person is loss as well as property or land loss were, we could not stop the accident also from there is damage on the roads.[4]

Considering all the above disadvantages we have proposed a system which covers all the above drawbacks.

1) The Automated system is used once the accident occurs it gave an enhancement in technology.[5]

2) In this system Arduino UNO, ADXL335, GPS SIM28ML, GSM SIM900A, LCD is used.[6]

3) In this system ADXL3335 module is used. The ADXL335 gives complete 3-axis acceleration measurement. This module measures acceleration within range ±3 g in the x, y, and z axis. Also, there is an accelerometer used in this system - Accelerometer can be used for tilt-sensing application as well as dynamic acceleration resulting from motion, shock, or vibration. So, if any accident will be happened and, in that case, vehicle gets tilt so the accelerometer changes their axis value. These values can be read by the Arduino and check if any change occurs in any axis and Arduino reads the coordinates further the GPS will give the information of the accident location with coordinates (longitude and latitude).[7]

D. This system GSM will send the alert message to the More Human life can be saved using automated system. [8]

E. In this system GPS is used which navigate the location of the vehicle if there is no GPS in the system location of the vehicle cannot be detect so GPS is important in this system.[9]

IX. APPLICATIONS

A. Automotive security system

B. This can also be developed by interconnecting a camera to the controller module that takes the photograph of the accident spot that makes tracking easier.

C. The proposed system can also be used for traffic estimation and system performance estimation to prevent loss of life to its maximum.

D. Group Management-A group or a specific type of vehicle can be management with the help of MCU.

E. Tracking of Asset -Tracking of the Vehicle at the Real Time environment is a very big advantage.

F. Tracking of On Transition devices -When the vehicle is transition from one place to another also the Tracking system is active.

X. FUTURE SCOPE

A. For future advancement we can use alcohol sensor – This will help to prevent the accident caused due to "Drink and drive" condition.

B. We can used Temperature sensor which can be used to sense temperature of medium.

C. We can also use gas sensor- A gas sensor is a technological device that detects or senses a signal, physical condition and chemical compounds. Gas sensor is a subclass of chemical sensor. Gas sensor measures the concentration of gas in its vicinity

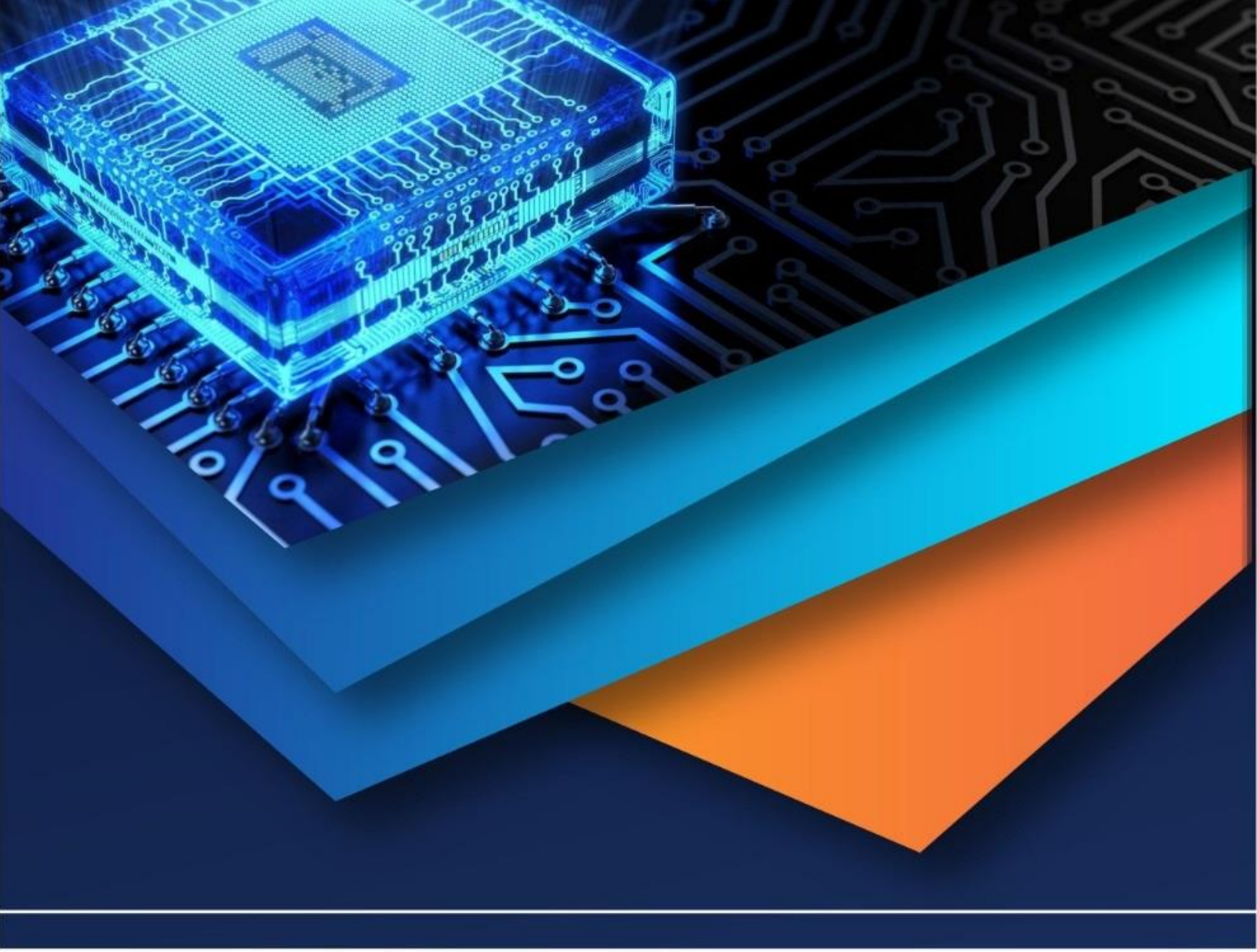
XI. CONCLUSION

This project presents a vehicle accident alert system with SMS to the user defined mobile numbers or authorized numbers. The proposed vehicle accident detection system can track geographical information automatically and send an alert SMS regarding the accident. This vehicle accident alert systems provides treatment to the accident affected person with crucial information at the earliest possible time. This paper gives a design which has many benefits like low cost, portability, small size. This system uses the arduino in conjunction with accelerometer which works as sensor; GPS and GSM. Interfacing which reduces the alarm time to a large level and give the location of accident accurately. It can also overcome the issue of lack of automated system for the detection of the site of accident. As a result, the time for detecting the site is reduced and the person can be treated as soon as possible which will save many lives. As we see in many countries the cases of accident is rising due to careless driving so we have make a system to reduce the accident cases and secure the human life.

REFERENCES

[1] https://wiki.eprolabs.com
[2] Circuitdigest.com
[3] en.wikipedia.org
[4] "VEHICLE TRACKING SYSTEM USING GPS-GSM TECHNOLOGY" Peter.O. Ohiero, Julius.U. Ukang, Okpogo, Ota Ota International Journal of Education and Research vol. 5 No. 7 July 2018.
[5] Sharath Kumar K, IJECS Volume 7 Issue 3 March 2018
[6] "Accident Alert System Using GPS And GSM ". Mohamed Imran, Arun Kumar

[7] "AUTOMATIC ACCIDENT DETECTION AND AMBULANCE RESCUE WITH INTELLIGENT TRAFFIC LIGHT SYSTEM" Mr.S.Iyyappan, Mr.V.Nandagopal, in International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 2, Issue 4, April 2013.
[8] "Automatic traffic accident detection and alarm system" International Journal of Technology Exploration and Learning (IJTEL) Volume 1 Issue 1August 2012.
[9] "Accident detection system using Piezo Disk Sensor" Ganiga, Rohit Maurya, Archana Nanade International Journal of science, Engineering and Technology Research(IJSETR) volume6,Issue3,March 2017,ISSN 2278-7798.
[10] "ACCIDENT DETECTION AND ALERTING SYSTEM USING GPS & GSM "Ajith Kumar.A1,Jaganivasan.V2, Sathish.T3, Mohanram.S*4 "International Journal of Pure and Applied Mathematics" Volume 119 No. 15 2018, 885-891
[11] " Wireless System for Vehicle Accident Detection and Reporting using Accelerometer and GPS" Shailesh Bhavthankar, Prof. H. G. Sayyed in International Journal of Scientific & Engineering Research, Volume 6, Issue 8, August-2015



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY