Smart Accident Notification System using GPS-Module and GSM-Module

Dr. Basavaraj G.M[1], Associate Professor
Electronics & Communication Engineering Department
Nagarjuna College of Engineering &Technology
Bengaluru, India

Jeevan Shetty[2], Student
Electronics & Communication Engineering
Nagarjuna College of Engineering &Technology
Bengaluru, India

Dikshith B.K[3], Student
Electronics & Communication Engineering
Nagarjuna College of Engineering &Technology
Bengaluru, India

Karthik S[4], Student
Electronics & Communication Engineering
Nagarjuna College of Engineering &Technology
Bengaluru, India

Devraja[5], Student
Electronics & Communication Engineering
Nagarjuna College of Engineering &Technology
Bengaluru, India

Abstract:- The high demand of automobiles has also increased the number of road accidents In 2016 NCRB (National Crime Records Bureau) Reported that the number of road collisions in India was 464,674, which caused 148,707 traffic-related deaths. India reported a collision rate of 0.8 per 1000 vehicles in 2015 an decrease from 0.9 per 1000 vehicles in 2015.The fatality rate due to these accidents was 11.35 per 1000 in 2015.This shows the lack of efficient first responders in our country. Our system aims to improve this condition by detecting the accident and gathering the location in terms of geographical coordinates using GPS Module and sending it to first responders. Thus, with the help of this information they will be able to reach the victim much faster and this can help overcome the loss of life due to delay in response. The information sent to the medical responders will consist of the time and co-ordinates of the location where the accident has occurred. A switch is also included in the system in case the victim is unharmed this helps to save valuable time for the responders.

Keywords:- Switch, GPS Module, GSM Module.

I. INTRODUCTION

Accident detection and vehicle messaging system using GSM modem which helps to detect accident by accelerometer sensor. Accelerometer sensor is used to detect the sudden change in acceleration , This sensor can be easily read by by observing the output voltage. Accelerometer sensor is used to send the signal to the MCU whenever there is a sudden change in acceleration this signal is then used by the MCU to determine that the impact has crossed the threshold and the alert message is to be send to the desired people. The GSM module is used to determine the exact location where the accident has occurred in terms of the co-ordinates which is included in the alert message. In a rare case that the victim has suffered minor injuries or is unharmed a switch is provided which

the victim can use to terminate the message. This system can reduce the time wasted in locating the victim and can lead to better security.

First, In paper This problem is very big in developing countries, so we designed this project for saving the human lives. This design is system that sends the location of the site of incident, In the project GPS module is used to detect the exact current location of vehicle. At the time of accident accelerometer detects heavy shock and ARDUINO sends the location link of the vehicle to the relatives or friends, we can send the alert to multiple mobile numbers provided in program. Similarly the biggest cause of accidents is drunk driving .Most of the cases of drunk driving involves commercial vehicles such as cabs which causes big loss of human life. We cannot prevent drivers from consuming alcohol but we can prevent them driving the vehicle. Here we use alcohol sensor to continuously monitor the Blood Alcohol Content (BAC) from drivers breath and if it is found above legal limit then as SMS will be send to the police control room or owner of the vehicle and vehicle will fail to start if alcohol is detected before starting of the vehicle and if it found while it is running on the road then speed will be limited to as safe speed by system, [1]

Accidents are increasing rapidly in the Sultanate of Oman this is leading to losses of lives due to the in availability of proper medical facilities. During an accident the vibration sensor will send a signal to the MCU, This information will be forwarded to the control room. In this system we use Mikrobasic software, and use GSM technology to send a text message to the police in the place of the accident, which is determined by GPS. This system is applied in navigation systems to keep track of children and animals. [2] The rapid development in technology has made our life easier. Poor and slow medical response after an accident has occurred can lead to increased rate of death in case when an accident occurs. Our project will provide an optimum solution to this draw back. An accelerometer along with GSM module can be used to detect dangerous

driving behavior. [3] It can be used as a crash or rollover detector of the vehicle during and after a crash. With signals from an accelerometer, a severe accident can be recognized. According to this project when a vehicle meets with an accident immediately Vibration sensor will detect the signal or if a car rolls over, and Micro electro mechanical system (MEMS) sensor will detects the signal and sends it to ARM controller. Microcontroller sends the alert message through the GSM MODEM including the location to police control room or a rescue team. So the police can immediately trace the location through the GPS MODEM, after receiving the information. [4]

Then after conforming the location necessary action will be taken. If the person meets with a small accident or if

there is no serious threat to anyone`s life, then the alert message can be terminated by the driver by a switch provided in order to avoid wasting the valuable time of the medical rescue team. This paper is useful in detecting the accident precisely by means of both vibration sensor and Micro electro Mechanical system (MEMS) or accelerometer. As there is a scope for improvement and as a future implementation we can add a wireless webcam for capturing the images which will help in providing driver`s assistance, [5] this research paper main intention is to reduce the amount of time required by the medical first responders to reach the accident site using Arduino nano, GPS and GSM Module and LCD 12x2.The implementation is done using Arduino Software.

II.   METHODOLOGY

Fig 1:- Methodology Accident Detection System

The accelerometer will continuously monitoring the change in acceleration if there is a sudden change in the acceleration and if that change crosses the threshold set in the MCU by an arduino program, then the GPS module will collect the location in terms of the geographical co-ordinates then this information is transmitted to the nearest hospital, police station and one of the relative, whose contact number will be saved in the GSM module.

This information is to be used by first responders for fast action. In a rare case that the passenger is unharmed a

switch is provided the user can use this if he is unharmed and does not require medical assistance.

The GPS module, GSM module and switch are the key components in this project.

It is crucial that the threshold that is set in the system is properly determined as it is one of the most critical value that is of high importance because the threshold may be different for different driving conditions and different countries.
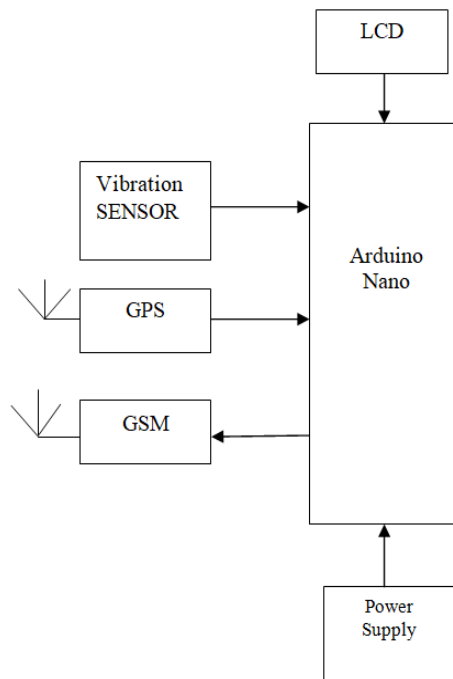
Fig 2:- System Architecture

The accident location coordinates will be sent as GPRS data Via an SMS to the saved mobile numbers. A program need to written in the receiver's such that it is able to convert the information in the coordinates into location that is accurate to street. This can also be written by using a Middleware that coverts the GPRS data into map location. The previous speed that the vehicle had been travelling is to be recorded and sent to the saved numbers. The information can be utilized by the responders to determine the severity of the accident and appropriate care can be arranged to be sent to accident location. The working of this model is clearly demonstrated in the flow chart in the diagram (Fig: 3).
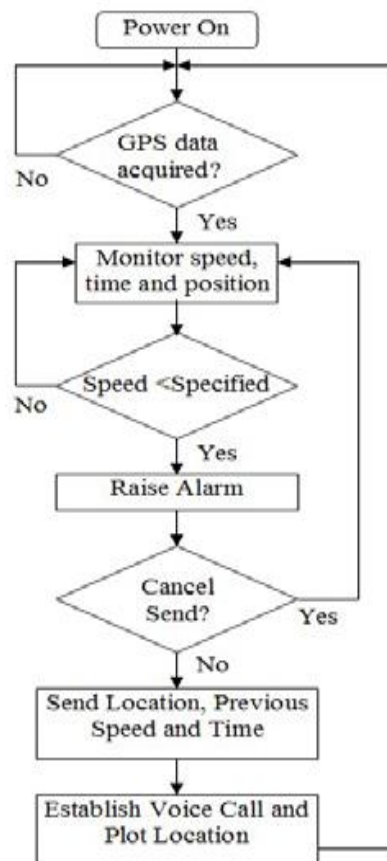

Fig 3:- Data flow diagram

III.   WORKING

As soon as the flag is raised due to the occurrence of an accident, The MCU will automatically start the process of collecting the location coordinates and sending   this information in the form of GPRS data to the numbers that have been saved unless the victim presses the   button provided in the system. This is done so that false alarm is not triggered.   The message is sent through the GPRS modem by the MCU. This message will contain the previous recorded speed of the vehicle, the time and the location where the incident has occurred. Since GPRS services are not available at all locations an SMS is also sent to the Emergency responders and relatives whose information is saved in the system. This is followed by a voice call to the Emergency responders the voice call can play be a prerecorded emergence message or if the victim is able he can describe his situation to the Emergency responders.

IV.   CONCLUSION

Road accidents are one of the leading causes of deaths in our country. This demands a robust system that can reduce the time taken for our first responders to reach the accident site as quick as possible. Keeping this in mind we have written this paper to discuss a possible solution, which includes multiple layers of security. The previous speed of the vehicle is also sent to the First responders this enables better assessment of the care that is required on the accident site. Further improvement can also be made to this system in the form of an mobile application that can convert the coordinates in to location and live tracking can also be included. Thus this system can improve the security associated with travelling by vehicles.

REFERENCES

[1]. Vikram Singh Kushwaha, Deepa Yadav and others. "Car Accident Detection System using GPS And GSM",International Journal of Engineering Research and General Science Volume 3 , Issue 3(May-June 2015), ISSN 2091-2730.

[2]. International Journal of Applied Information Systems (IJAIS) – ISSN : 2249-0868 Foundation of Computer Science FCS, New York, USA Volume 8– No.3, February 2015 – www.ijais.org by Hajer Salim Humaid AL-Farsi and Malathi B. N..

[3]. Hoang Dat Pham, MichealDrieberg, and Chi Cuong Nguyen, "Development of vehicle tracking system using GPS and GSM modem, 2013 IEEE Conference on Open Systems (ICOS), December 2 - 4, 2013, Sarawak, Malaysia.

[4]. International Research Journal of Engineering and Technology (IRJET), e-ISSN: 2395-0056, p-ISSN: 2395-0072, Volume: 06 Issue: 04, April 2019 by Pooja dharani, Tharuni.A.P, Viveka.

[5]. Md. Syedul Amin, Mohammad Arif Sobhan Bhuiyan and Mamun Bin Ibne Reaz, Salwa Sheikh Nasir "GPS and Map Matching Based Vehicle Accident Detection System", 2013 IEEE Student Conference on Research and Development(SCOReD), 16-17 December 2013, Putrajaya, Malaysia.

[6]. Peddi Anudeep and K.Hari Babu. "Wireless Reporting System for Accident Detection at Higher Speeds" .Peddi Anudeep Int. Journal of Engineering Research and Applications www.ijera.com ISSN: 2248-9622, Vol. 4, Issue 9(Version 2), September 2014, pp.17-2.