International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 04 | Apr 2021 www.irjet.net p-ISSN: 2395-0072

Smart Emergency and Security Services

D Gayathri[1], M Giridhar Reddy[2], M Raja Satya Sai kamal[3]

[1]Assistant Professor, Dept. of Computer Science and Engineering, Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya, Kanchipuram, Tamil Nadu, India.
[2]Student, Dept. of Computer Science and Engineering, Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya, Kanchipuram, Tamil Nadu, India.
[3]Student, Dept. of Computer Science and Engineering, Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya, Kanchipuram, Tamil Nadu, India.

Abstract - *The high demand of automobiles has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country. In this paper we introduce an automatic alarm device for vehicle accidents. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid center within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. In this project, we propose an Arduino Based Vehicle Accident Alert System using GPS, GSM and Accelerometer. Accelerometer detects the sudden change in the axes of vehicle and GSM module send the alert message on your Mobile Phone with the location of the accident. The advancing technology has made our day to day lives easier. Since every coin has two sides similarly technology has its benefits as well as its disadvantages. As technology increases there is also increase in road accidents which may cause huge loss of life.*

Key Words: *Accident Detection, Vehicle Tracking, Short Message Service SMS, Global Positioning System GPS, Arduino.*

1. INTRODUCTION

Today, the advanced universe of science and innovation, Transportation framework is an essential piece of living. Having this with us gives us the vibe of the generally mingled animals on the planet. Vehicles assume a crucial part in our day by day life yet like each other thing, with a few positives there are negatives as well. Street mischances are the real danger to human lives. Speed is the key factor in charge of a significant number of the incidents. PDA based mischance identification and warning framework will track the mishap with assistance of sent effect sensors, will process the information through microcontroller unit and with a Smartphone application GPS, GSM it will send a notice to the closest crisis benefits and to the casualty's family [1]. Speed is a champion among the hugest reasons for a mischance. These days, GPS beneficiary has turned into a vital piece of a vehicle. Other than utilizing as a part of different purposes, the GPS can likewise screen the speed and distinguish a mishap. It can utilize an extremely modest and well known GSM modem to send the mischance area to the Alert Service Center. It can send the last speed before mishap which will surveys the seriousness of the mishap and can start a voice call. Adjacent to the programmed recognition framework, the vehicle inhabitant will have the capacity to physically send the mishap circumstance by squeezing the Manual Detection Switch. Hence, the proposed framework can serve the mankind by an awesome arrangement as human life is important [3]. A GPS vehicle following and administration framework that gives numerous universal administrations whenever and anyplace. The framework enables individuals to track down their vehicles position, speed, stops, and developments. The checking process incorporates setting speed and geological limits, getting history reports of the vehicle`s developments or ongoing following. It can be utilized to avert auto robbery by joining the gadget with the auto alert and furthermore acquiring a guide containing the auto area if the auto is believed to be stolen. Following vehicles in our framework uses an extensive variety of new advancements and correspondence systems counting GPRS, GSM, the Internet, and GPS. For future work, more administrations could be added to the portable application and furthermore the graphical client interface could be moved forward [6].

2. LITERATURE SURVEY

KiranSawant et al. created an accident alert system using GSM and GPS modem and Raspberry Pi. A piezoelectric sensor first senses the occurrence of an accident and gives its output to the microcontroller. The GPS detects the latitude and longitudinal position of a vehicle. The latitudes and longitude position of the vehicle is sent as message through the GSM. The static IP address of central emergency dispatch server is pre-saved in the EEPROM. Whenever an accident has occurred the position is detected and a message has been sent to the pre-saved static IP address [1].

Mrs. ManasiPatil et al. described a better traffic management system using Raspberry pi and RFID technology. The vehicle has a raspberry pi controller fixed in it which is interfaced with sensors like gas sensor, temperature sensor and shock sensor. These sensors are fixed at a predetermined value before accident. When an accident occurs the value of one of the sensor changes and a message to a predefined number (of the ambulance) is sent through GSM. The GPS module which is also interfaced with the controller also sends the location of the vehicle. When the message is received by the

ambulance, a clear route has to be provided to the ambulance. The ambulance has a controller ARM which is interfaced with the RFID tag sends electromagnetic waves. When an ambulance reaches the traffic signal the RFID reader which is placed on the joints detect the electromagnetic waves of the tag. If the traffic signal is red, then the readers goes through the database in fraction of seconds and turn the red light green. And automatically in such condition the RFID on opposite joints turn the opposite signal red. This provides a clear route tothe ambulance. [2].

V.Sagar Reddy et al., developed an accelerometer based System for driver safety. The system has the advantage of tracking or identifying vehicles location just by sending a SMS or email to the authorized person. The system is designed by using Raspberry Pi (ARM11) for fast access to accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so they can take immediate action to save the lives and reduce the damages. Images captured by the camera on the vehicle are emailed to the concerned person (for example the owner of the vehicle) along with the type of accident and the time of the accident [3].

Sri Krishna ChaitanyaVarma et al., proposed an Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems. AT89C52 microcontroller is used in the system. When the system is switched on, LED is ON indicating that power is supplied to the circuit. When the IR sensors that are used sense any obstacle, they send interrupt to microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information is sent to a mobile number as a message. This message is received using GSM modem present in the circuit. The message gives the information of longitude and latitude values. Using these values the position of the vehicle can be estimated [4].

Apurva Mane et al., described the methods for vehicle collision detection and remote alarm device using Arduino. Key features of this design include real-time vehicle monitoring by sending its information regarding position (longitude, latitude), time, and angle to the monitoring station and to the user/owners mobile that should help them to get medical help if accident or the theft occurs. Also user/owner has an access to get real- time position of a vehicle in real time. Whenever accident occurs MEMS and vibration sensor detects and sends the signals to microcontroller, by using GPS particular locations where accident has occurred is found, then GSM sends message to authorized members [5].

2.2 EMBEDDED SYSTEMS

Embedded System is a combination of computer software and hardware which is either fixed in capability or programmable. An embedded system can be either an independent system, or it can be a part of a large system. It is mostly designed for a specific function or functions within a larger system. For example, a fire alarm is a common example of an embedded system which can sense only smoke.

In this Embedded Systems tutorial, you will learn:

- Example of Embedded Systems
- History of Embedded system
- Characteristics of an Embedded System
- Important terminologies used in embedded system
- What is Microcontroller?
- What is a Microprocessor?
- Architecture of the Embedded System
- Types of Embedded System
- Difference between Microprocessor and Microcontroller
- Application of Embedded Systems
- Advantages of Embedded System
- Disadvantages of Embedded System

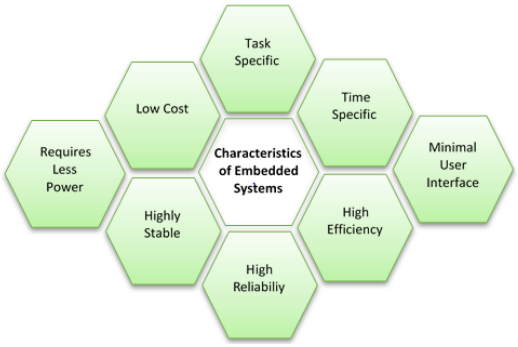

Fig.1 Characteristics of an Embedded System

Following are important characteristics of an embedded system:

- Requires real time performance
- It should have high availability and reliability.
- Developed around a real-time operating system
- Usually, have easy and a diskless operation, ROM boot
- Designed for one specific task
- It must be connected with peripherals to connect input and output devices.

- Offers high reliability and stability
- Needed minimal user interface
- Limited memory, low cost, fewer power consumptions
- It does not need any secondary memory in computer.

2.3 Types of Embedded System

Three types of Embedded Systems are:

- Small Scale
- Medium Scale
- Sophisticated

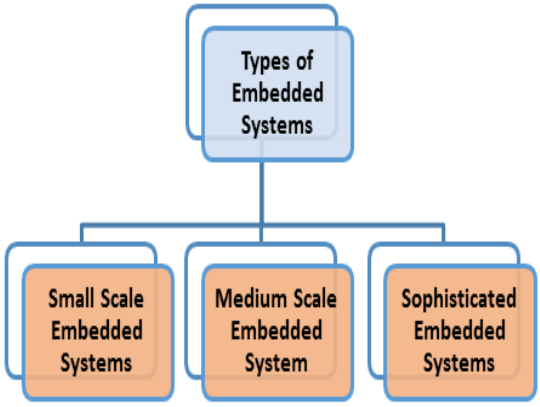

Fig.2 Types of Embedded System

1) Small Scale Embedded Systems:

This embedded system can be designed with a single 8 or 16-bit microcontroller. It can be operated with the help of a battery. For developing small scale embedded system, an editor, assembler, (IDE), and cross assembler are the most vital programming tools.

2) Medium Scale Embedded Systems:

These types of embedded systems are designed using 16 or 32-bit microcontrollers. These systems offer both hardware and software complexities. C, C++, Java, and source code engineering tool, etc. are used to develop this kind of embedded system.

3) Sophisticated Embedded Systems

This type of embedded systems have lots of hardware and software complexities. You may require IPS, ASIPS, PLAs, configuration processor, or scalable processors. For the development of this system, you need hardware and software co-design & components which needs to combine in the final system.

2.4 Application of Embedded Systems

Following are an important application of embedded system:

Robotic science:

- Ground Vehicles
- Drones
- Underwater Vehicles
- Industrial Robots

Medical

- Dialysis Machine
- Infusion Pumps
- Cardiac Monitor
- Prosthetic Device

Automotive

- Engine Control
- Ignition System
- Brake System

Networking

- Router
- Hubs
- Gateways
- Electronics Instruments

Home Devices:

- TVs
- Digital Alarm
- Air Conditioner
- DVD Video Player
- Cameras

Automobiles

- Fuel Injection
- Lighting System

- Door Locks
- Air Bags
- Windows
- Parking Assistant System
- Anti-stealing Alarms Whippers Motion

Industrial Control

- Robotics
- Control System
- Missiles
- Nuclear Reactors
- Space Stations
- Shuttles

3. METHODOLOGY

3.1 EXISTING SYSTEM

In existing system, there are 2 methods

•Manual detection system

•Driver initiated detection system

•Automatic detection system

a. Manual Detection System

In this method, accident is detected from

- -motorist report
- -transportation department
- -public crews report
- -aerial surveillance
- -close circuit camera surveillance.

The drawback of this type of detection system is that someone has to witness the incident. Driver initiated detection system. Moreover, there are delays and inaccuracies due to the expression problem of the witness.

b. Driver Initiated Detection System

Driver initiated incident detection system has more advantages which includes the quick reaction, more incident information etc. However, with the severity of the accident, driver may not be able to report at all.

PROPOSED SYSTEM:

In this project, we propose an Arduino Based Vehicle Accident Alert System using GPS, GSM and Accelerometer. Accelerometer detects the sudden change in the axes of vehicle and GSM module send the alert message on your Mobile Phone with the location of the accident. The advancing technology has made our day to day lives easier. In this system, Temperature sensor is used to detect any fire occurred in the vehicle. Here a WIFI module is used to monitor the parameters through web page.

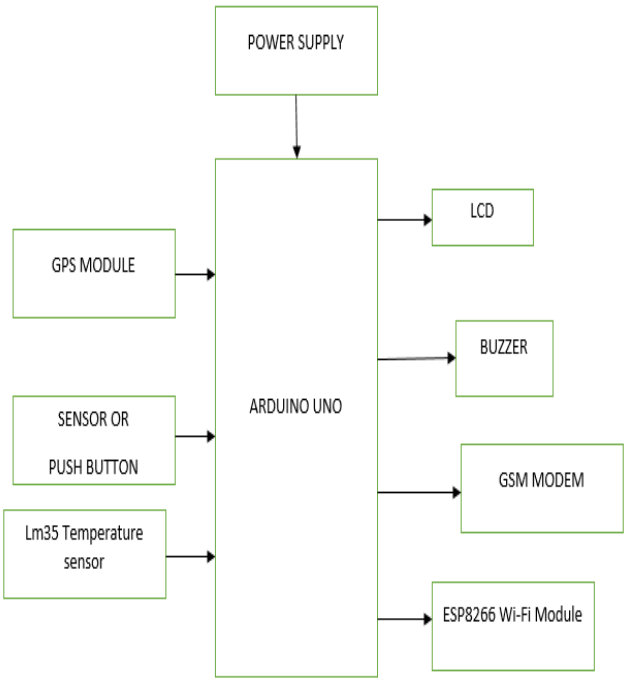

Fig.3 Block Diagram of proposed system

4. CONCLUSION

Our proposed system uses Arduino Uno for detecting accident spot and send message to relatives, emergency added list of people and rescue system and it overcomes the limitations of existing system. It uses the IOT and it revolutionizes the way in which our model interacts and helps in controlling traffic. We use GPS module to identify exact spot of accident and GSM module to dispatch messages to the emergency contacts. We believe that the way of system interaction can be revolutionized by IOT and various applications of traffic control can be responded. Our system can be combined with vehicle airbag system to prevent vehicle riders to hit inside objects like steering wheel and window. Future work can be done by attaching a camera to the system that would click photo of spot of accident for more precise location of the system and also help in claiming the insurance and suggest the cause of the accident.

REFERENCES

[1] "Execution of Accident Vehicle Tracking System and A keen application based following framework" IEEE-2017.Mradul Tiwari, HimanshuGarg, Rahul Kumar Tiwari, Swastik Gupta, Alok Kumar Yadav, Abhay Deep, MeenakshiJha.

[2] "Advancement of Vehicle Tracking System utilizing GPS and GSM Modem" IEEE-2013. Pham Hoang Oat, MichealDrieberg and Nguyen Chi Cuong.

[3] "Mishap Detection and Reporting System utilizing GPS, GPRS and GSM Technology" IEEE-2012.

[4] "Plan of Vehicle situating System Based on ARM" by Zhang Wen Department of Physics and Electronic Information Engineering, Jiang Meng.

[5] "Plan and Development of GPS/GSM based Vehicle Tracking and Alert System for Commercial intercity Busses". IEEE 2010, Fleschier, Paul, Nelson, Atso Yao.

[6] "Pervasive GPS Vehicle Tracking and Management System". IEEE 2011 by Iman M. Almomani, Nour Y. Alkhalil, Enas M. Ahmad, Rania M. Jodeh.