ISSN No:-2456-2165

IOT Based School Bus Monitoring and Security System

Dr. M. V. Vyawahare (Prof. PCE, Nagpur)
Shriya Lambat , Mayuri Belsare , Kritika Latwe , Richa Vairagade
Department of Electronics Engineering
PCE Nagpur, India

Abstract:- A vehicle monitoring system is implemented for tracking the movement of a bus from any location at a specific time. The proposed system make use of a technology that combines a smart phone application with a microcontroller. A device is placed inside the vehicle which determines the position of the bus using Global Positioning System (GPS) technology. Users will be able to continuously monitor the moving vehicle on demand using the application. This scheme uses an alcohol sensor and a panic switch for the safety of the children. In case of emergency, the status of the bus is known to the school organisation as well as parents. This paper presents experimental results of the system to efficiently track and monitor the school bus.

Keywords:- *Arduino MEGA, School Bus Tracking, Smart-Phone Application, GPS, GSM Technology , Safety and Security Enhancement.*

I. INTRODUCTION

With the increase in number of accidents, traffic and unfortunate events, parents are often concerned about their child's safety. The stress increases when they are not able to track the school bus. Not all the schools have a tracking application, so it is essential to introduce this system in as many school as possible. Using the application , parents would be able to track the school bus when it arrives and departs to and from the school. The live location can be tracked by the parents.

The school organisation and parents can continuously monitor the bus and also keep in check with the driver's behaviour. This will ensure the students safety while pick up and drop off. In case of emergency, the scheme helps the parents to receive immediate location notifications. If the schools installs this application in their bus , accidents can be reduced to a great extent .In case if , any natural events like floods or heavy rainfall occurs, the parents will know that their children might arrive late.

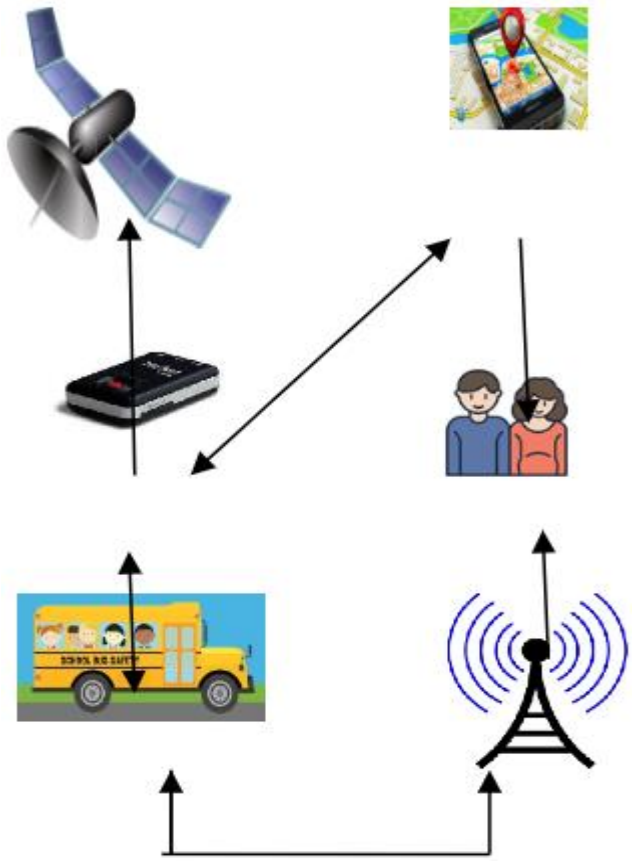

Fig 1:- School bus monitoring and security system

II. RELATED WORK

Vehicle tracking systems are used in many fields such as vehicle position tracking systems, fleet management systems and anti-theft tracking systems.

A. "Design of vehicle tracking system"

SeokJu Lee, Girma T, Jaerock K had developed and tested a vehicle tracking system to track the exact location of a moving or stationary vehicle in real time. The system was able to experimentally demonstrate its effective performance to track a vehicles location anytime from anywhere.

B. "Security Driving Using IoT"

A.Anusha had proposed a method for accessing the quality of vehicle tracking system using IoT. The work survey introduced the monitoring of the driver's sleeping pattern.

ISSN No:-2456-2165

C. "Implementation of Children Tracking System on Android Mobile"

J.Saranya and J.Selvakumar's project implementation focused on tracking a child's location and placing voice recognising sensors which senses the cry of children and send information to parents.

III. THE PROPOSED MODEL

The proposed model presents the tracking of the school bus and the condition of the school driver. In addition to this it also alerts about any emergency situation.

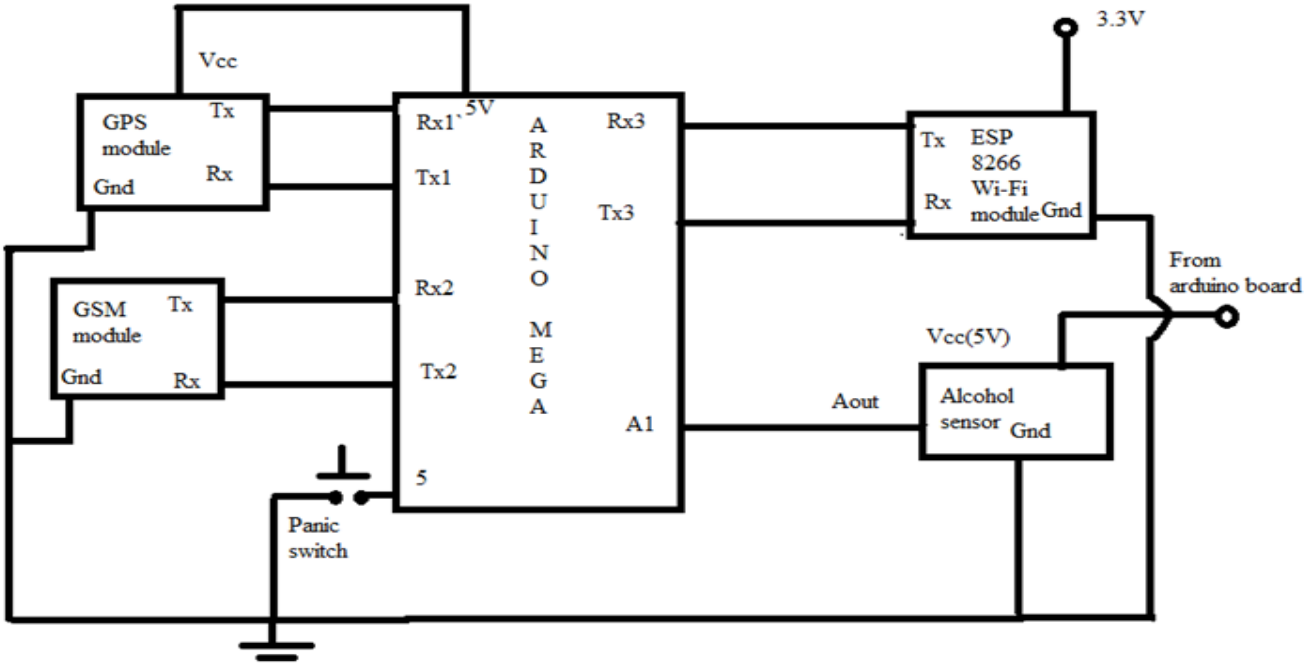

Fig 2:- Block diagram of "School Bus Monitoring System"

The figure shows the block diagram of the model, it consists of GPS , GSM module, alcohol sensor and a panic switch.

We have implemented these features in our project model:

- The owner of the bus gets an intimation if the drivers is drunk.
- When the panic switch is pressed the parents receive a message.

IV. IMPLEMENTATION DETAILS

The model consists of following components;

A. Arduino MEGA

Arduino MEGA is a heart of the school bus monitoring system .All operations like fetching the latitude and longitude locations from GPS module, sending it on server using Wi-Fi chip. Sending the SMS to the school organisation and parents when the driver is drunk and when panic switch is pressed by the student respectively.

B. GPS Module

We are using NEO 6 GPS module which sends the information serially to the Arduino MEGA through serial port1.

C. ESP 8266 Wi-Fi Module

ESP 8266 Wi-Fi module interacts with the Blynk application using Wi-Fi. Firstly, this ESP chip is connected to the Wi-Fi network whose SSID and password is given in the program. Then the latitude and longitude information is sent on the blynk server from where this data is supplied to blynk map. Where we can visualize the current location of bus. After every 20 sec the current location of bus is updated on the blynk application.

D. MQ3 Alcohol sensor

This alcohol sensor is giving the output in the form of analog voltage from it's Aout pin .In India the permitted portion of alcohol in air is 0.05% or 30mg and if above it alcohol is found then it is assumed that the person consumed the alcohol.If the bus driver consumed alcohol, then alcohol sensor sense it and it's analog voltage increases above 0.05%. This information is continuously observed by the Arduino MEGA. If it excceds above the permitted limit then a SMS related to this issue send to the bus owner and they can take necessary action.

E. Panic switch

A simple SPST switch is used here. If the is under any trouble , then a child or any member inside the bus will press the panic switch and a SMS related to this situation is send to parents of the children, who are in the bus.

ISSN No:-2456-2165

F. GSM Module

SIM900 GSM module is used for sending the SMS to the organisation and parents. SIM 900 module works on AT commands. It is connected to the serial port 3 of Arduino MEGA.

G. Power Supply

Total three different power supply are used here, first one is an adapter of 9V/1Amp for GSM module. Second of 5V/2Amp for ESP 8266 Wi-Fi module and the ESP 8266 Wi-Fi module wires on 3.3V . So, we are using a circuit shown in fig. which converts 5V to 3.3V using IC. The third power supply is for Arduino MEGA. It takes power either from USB port of PC or 9V battery.

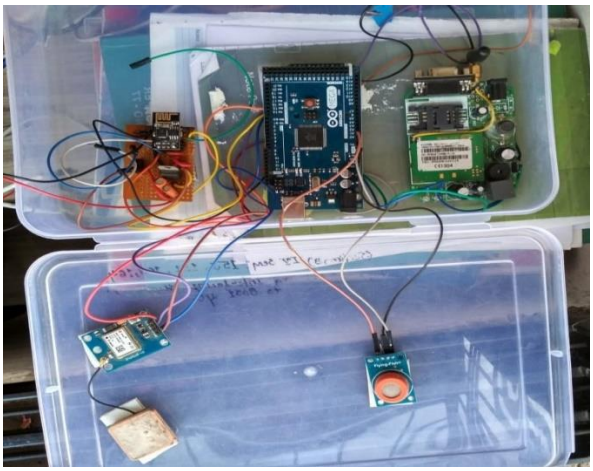

Fig 3:- Project module

V. FLOWCHART

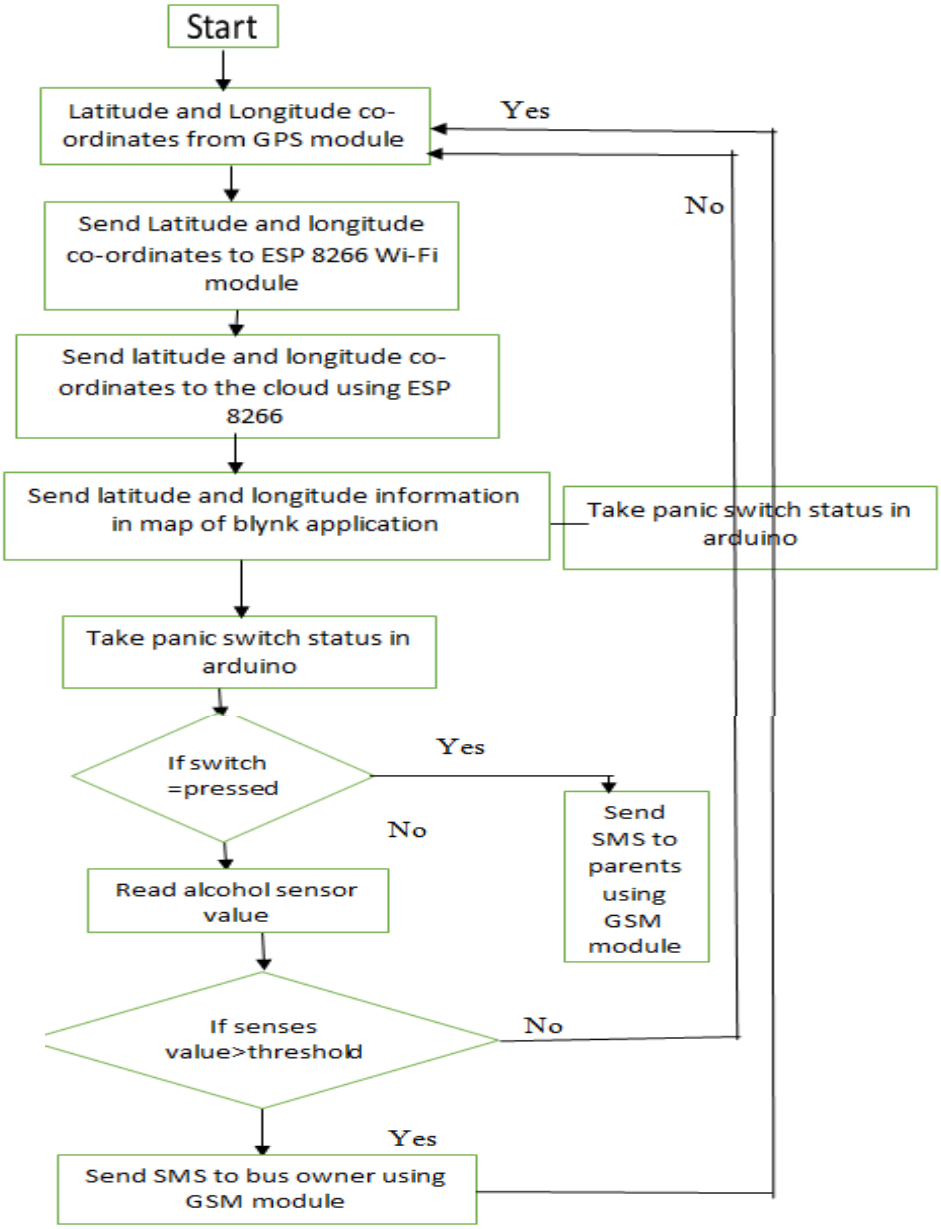

Fig 4

ISSN No:-2456-2165

VI. RESULT

Fig shows the diagram of our vehicle tracking system. It can help understand how the project is implemented.

A. Testing Smartphone (Blynk Application)

As shown in diagram, display the location of the school bus. The vehicle's location information is transmitted to the Blynk cloud via ESP 8266 Wi-Fi module.

Fig 5

The above fig show the live location of the school bus.

B. Testing Panic Switch and Alcohol Sensor

The Fig. shows the message which would be related by the parents in case of emergency. The school organisation will receive the message if the driver has consumed alcohol.

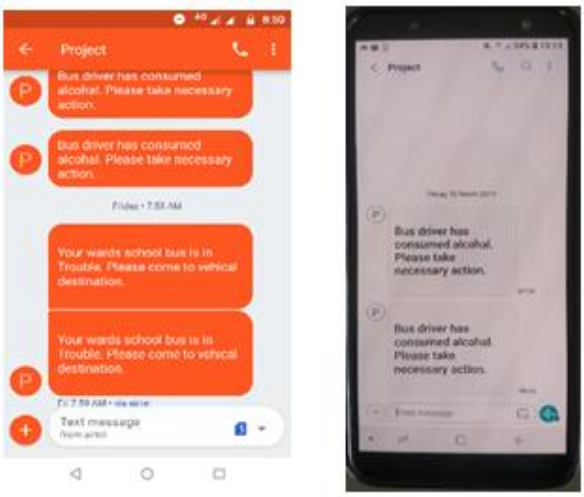

Fig 6

The above fig show the SMS received by the owner and parents.

VII. CONCLUSION

We developed and tested a vehicle tracking system to track the exact location of a vehicle. This paper has described the design and implementation of the school bus tracking system. A panic switch is placed insidethe vehicle for the safety of the students. A smartphone application can be downloaded by the parents which will continuously show the location of the bus. The system wasable to experimentally demonstrate it's effective performance to track the school bus ;thereby ensuring the parents of their child's safety.

ACKNOWLEDGMENT

We would like to thank our professors Dr. Mrs. Mohini Vyawahare and Mrs. Divya Meshram, for her constant support and feedback for our work. The authors would like to express gratitude towards the faculties and staff who helped us throughout.

REFERENCES

[1]. Aaron Smith, "Nearly half of American adults are Smartphone", http://pewinternet.org/~/media/File/Report/2012/Smartphone%20ownership%2012.pdf,2012

[2]. Jithin V mohan, Minu Balan, Sharoon Thomas, and Lynn Mariette Mendonza, "Fleet Mangement System", B.Tech Degree Thesis, College of Engineering, Munnar, Idukki, Kerala, India, 2009.

[3]. Mohammad A. Al-Khedher, "Hybrid GPS-GSM Localization of Automobile Tracking System", International Journal of Computer Science & Information Technology (IJCSIT) Vol 3, No 6, Dec 2011

[4]. Saed Tarapiah, Shadi Atalla, and Rajaa AbuHania, "Smart On-Board Transportation Management System Using GPS/GSM/GPRS Technologies to Reduce Traffic Violation in Developing Countries

[5]. Visa M. Ibrahim, Asogwa A.Victor, "Microcontroller Based Anti theft Security System

[6]. using GSM Networks with text message as feedback", International Journal of Engineering Research and Development Vol.2, Issue 10, pp.18-22, 2012.

[7]. S.Sonika, Dr.K.Sathiyasekar, S. Jaishree, "Intelligent Accident Identification System Using GPS, GSM Modem", IJARCCE, Vol.3, Issue 2, pp. 5487-5489, 2015.

[8]. Imane Benkhelifa, Nadia Nouali-Taboudjemat, Samira Moussaoui, "Disaster Management projects Using Wireless Sensor Networks", 28th International Conference on Advanced Information Networking and application Workshops, pp.605-610, 2014.

[9]. Chandra Shekar Ramaiah, Dr.S.Asif Hussain, S. Zahid Hussain,and Yahya Al Balushi, "Smart Vehicle Security System for defending against collaborative attacks by malware", 3rd MEC International Conference on Big Data and smart cities (ICBDSC), pp.1-5, 2016.