

School Bus Safety System

Nikita Takalikar ¹, Megha Ugadepatil ², Sujata Pethe ³, Prof. Ramgopal Sahu ⁴

^{1,2,3} B.E. students, Department of ECE,

⁴ Asst. Professor of ECE Department of P.E.S. Modern college of Engineering, Pune, Maharashtra, India.

Abstract - Safer transportation of school children has been a critical issue as it is often observed that, kids miss the bus or ride the wrong bus with no way to track them or driver get drunk and that cause accident or bus may get hijack .This project intends to find yet another solution to solve this problem by developing a bus safety system that will record the entry and exit of students from the bus using RFID technology and GSM to inform their parents about whether student is present or absent .The system has GPS for tracking, eye blink sensor and alcohol sensor to detect drunk or drowsy driver and relay for stopping the bus if driver is drowsy Buzzer for the alert indication. Status of the bus driver will be uploaded on the IOT site where any authorized person can control the status of the bus (on/off) in case of hijacking.

Key Words: RFID technology , GSM, GPS, Alcohol sensor, IR sensor, IOT.

1. INTRODUCTION

The bus safety system is designed to monitor the absent-present status of students in the bus. Task includes identifying personal information (i.e. Name, id) of each student using RFID tag, which will exchange the data with the RFID reader via radio waves and displaying each student name on LCD. This will let the driver know the total number of students inside the bus and the students who are absent or present. Then system will send the SMS about student status to corresponding parents using GSM modem .This project involves avoidance of accident due to drunk and drowsy driver using Eye blink & alcohol detector and relay switch. Here a eye blink sensor and a alcohol detector is fixed in vehicle which is interfaced with lpc2148 microcontroller where if anybody loses conscious or detects alcohol then that will be indicated by Buzzer, LCD and Relay will turn on that will cut the connection to the engine so that the bus would not accelerate any further and driver can steer it to roadside. Features like live tracking using GPS and remote controlling of relay is provided using IOT Also the microcontroller will upload the driver’s status on dedicated website.

1.1 BLOCK DIAGRAM

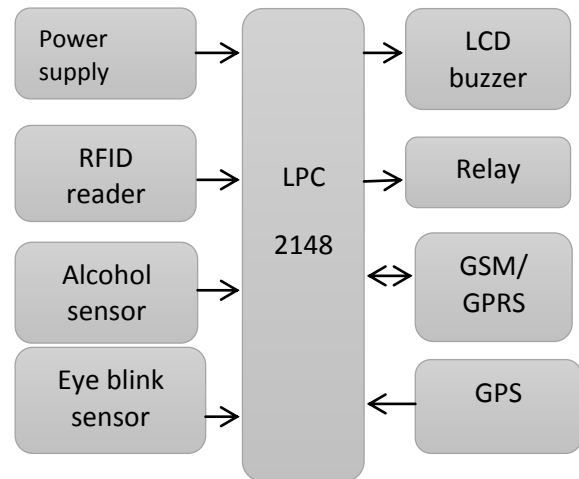


Fig.1. Block Diagram of school bus safety system

II.HARDWARE COMPONENT

1. Microcontroller: The LPC2148 microcontroller is based on a 32-bit ARM7TDMI-S CPU, which is very well suited for communication gateways and protocol converters. Lpc2148 takes all the data coming from different sensors and process it according to the program loaded in the controller.

2. Alcohol sensor: This alcohol sensor is suitable for detecting alcohol concentration in your breath, just like your common breathalyzer. High sensitivity fast response time. Sensor provides a digital output based on alcohol concentration. The alcohol detector detect the concentration of alcohol in person breathe. The sensor composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. As shown in Fig 2, standard measuring circuit of MQ-3 sensitive components consists of 2 parts. One is heating circuit having time control function (the high voltage and the low voltage work circularly). The second is the signal output circuit; it can accurately respond changes of surface resistance of the sensor.

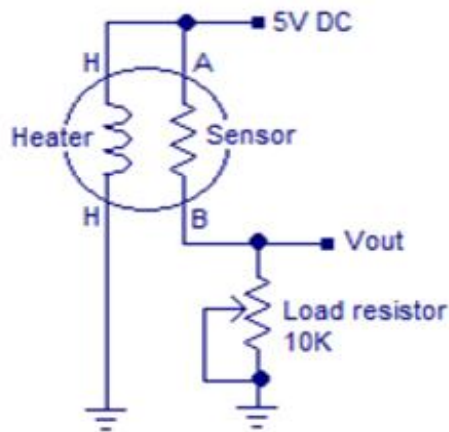


Fig. Standard measuring circuit of MQ3 sensor

3. IR sensor: The Variation Across the eye will vary as per eye blink. If the eye is closed means the output is high otherwise output is low. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye's closing or opening position. This output is given to the logic circuit i.e. comparator and if eye is closed for several seconds then this sensor will give digital output to indicate the alarm.

4. GSM&GPS: GSM (Global system for mobile communication) is developed by European Telecommunication Standard Institute in 1992 to describe 2G cellular network. GSM network operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands. In the project GSM is used for SMS sending with the help of AT commands are used. GPS (Global Positioning System) was developed by the United States' Department of Defense. It uses between 24 and 32 Medium Earth Orbit satellites that transmit precise microwave signals. This enables GPS receivers to determine their current location, time and velocity. The GPS satellites are maintained by the United States Air Force. Transmit pins of both modem are connected to the one of the serial port of controller through the NAND gate as there are only two UART port for serial communication and we require total three i.e. one more for RFID modem.

5. Relay: A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

III. FUTURE SCOPE

The Black box system can be implemented; In case of accident; message for help will be sent to the nearest hospitals, and parents .CCTV cameras can be implemented in the system. Finger print base attendance system can be used instead of the RFID system.

IV. APPLICATION

The system has applications like Real time tracking, Drunk and Drowsy driver detection, and Fast response time using GPS and GPRS technology. Automatic database managements.FID based attendance, remote controlling of status of relay using IOT.

V. RESULT

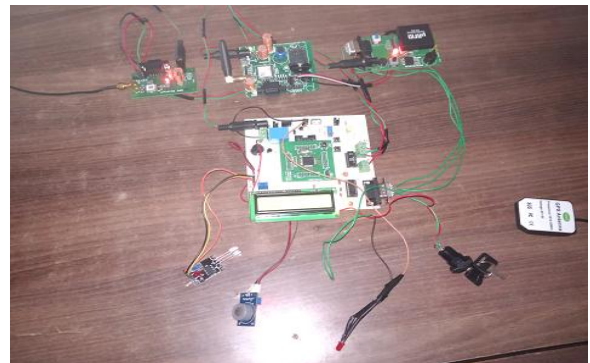
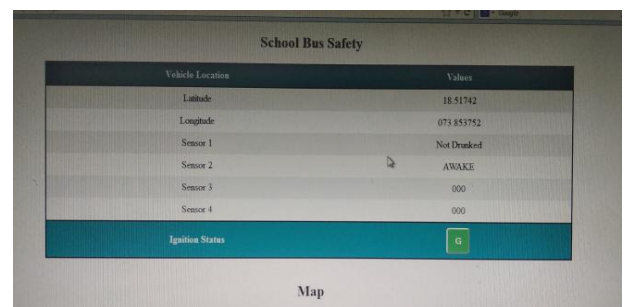


Fig. School Bus safety system



Vehicle Location	Values
Latitude	18.51742
Longitude	073.853752
Sensor 1	Not Drunked
Sensor 2	AWAKE
Sensor 3	000
Sensor 4	000
Ignition Status	0

Map

Fig. Dedicated website for tracking and driver status

VI. CONCLUSION

The bus safety and security system for school children has been developed. RFID, GSM, GPS and IOT technologies are integrated altogether in one system with ARM based controller. Student status about attendance in bus is sent to the parents by the SMS to take the right decision. The system keeps on tracking the location continuously as well as accident prevention is done by IR Sensor and Alcohol Detector and relay. IOT technology acts as one of the best solution to enhance the safety in the school buses as the bus can be stopped with online control of relay in case of hijacking.

VII. REFERENCES:

- [1] C. Kumar, "RFID based embedded system for vehicle tracking and prevention of road accident". International Journal of Engineering Research-, Vol.1, No. 6, pp3-5, 2012
- [2] H.Ben& Abdullah: Smart tracking system for school buses using passive rfid technology to enhance child safety; Journal of Traffic and Logistics Engineering, Vol, 1, No. 2 December 2013.
- [3] SaikrishnaChatrati, Sumantha Naidu 2 and Raghava Prasad: RFID Based Student Monitoring and Attendance Tracking System; IEEE - 31661.
- [4] Kowsalya Devi, Joys ShanthiniAparnaMurali, Arthi M: Real Time Alcohol Detection and Accident Prevention System for Four Wheelers; International Journal of Engineering Trends and Applications (I JETA) – Volume 3 Issue 2, Mar -Apr 2016.
- [5] DwipjoySarkar and AtanuChowdhury: A Real Time Embedded System Application for Driver Drowsiness and Alcoholic Intoxication Detection; International Journal of Engineering Trends and Technology (IJETT), Volume 10, Number 9,2014.
- [6] Abhi.R.Varma, Seema.V.Arote, ChetnaBharti: Accident prevention using eye blink and head movement; Emerging Trends in Computer Science and Information Technology - 2012(ETCSIT2012) Proceedings published in International Journal of Computer Applications® (IJCA)