

Smart Electronic School Bus for Children Transportation

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Abstract- As we know now a day's cases of kidnapping of school students are increases rapidly in metro cities. To overcome this problem or issue we design this system called smart school bus for children transportation in this system we are going to use raspberry pi as a processor. When the student entered in bus the RFID card which is given to the student was read by the RFID reader and the message to the parents. The alcohol sensor is mounted in driver's cabin. When the driver is drunk the alcohol sensor will sense it and send the message to school authority and they will take an action on it. We also provide the accident indicator. In which we use the vibration sensor to sense the major vibration. The GPS/GSM module helps to communicate with parents and school authority.

Index terms- raspberry pi 3, RFID, GSM/GPS, Children

I.INTRODUCTION

The major schools in India use buses, for the transportation of students from their home to the school. But they facing some problems like misshape of students, misbehavior of bus drivers, road accidents and the problems like tracking of bus. So the motivation of the project is the convenience of the student, parents and school authority in the field of student transportation system. Solving the problem by using GPS, GSM, various sensors like alcohol sensor, vibration sensor, RFID cards and RFID reader is our main project idea.

II. SYSTEM DESCRIPTION

The block diagram is of the smart school bus system that gives the information about the live location of the bus, number of students sitting inside the bus, it also gives indication when any accident happed. Following is the brief information of the every block. The raspberry pi is a used as processor in our project. All the sensors, GPS module and RFID reader will

give input to the raspberry pi and after getting input raspberry pi will take process on it and gives output. Whenever RFID card is swiped on RFID receiver the receiver will first identifies the card. Then it sends that information to the controller then the controller will compare the information with database.

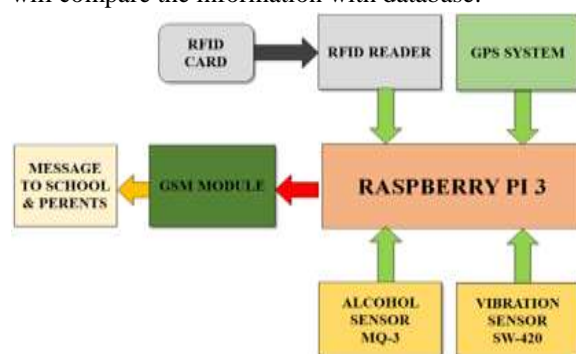


Fig 1. Block Diagram of System

If the information get matched then it will gives conformation otherwise it will blow light or buzzer. For showing the live location of the bus the GPS module is used with accordance of the latitude and longitude. Once it finds out the exact Co-ordinates of the bus then with the help of controller the co-ordinates are passed over to the processor and by using GSM module it will send the location of bus to the parents and school authority. The Alcohol sensor was fixed in driver's cabin. If driver is drunk and entered into drivers cabin then the output of sensor getting high and due to this high bit controller send the message via GPS/GSM module. The two pairs of vibration sensor fix on bus. In case of accidents happen the output of sensor will get high. After getting the high output processor gives the command to GSM module to send the message to school authority.

III. HARDWARE COMPONENTS USED

A. RASPBERRY Pi 3:

The raspberry pi 3 is a single board computer module. This board has on-board Wi-Fi module, Bluetooth module, mini HDMI connector, and USB On-to-Go (OTG) connection. This board is used as controller in this system when any of the sensors will gives high bit as an output controller will take action via GPS/GSM module.



Fig 2. Raspberry pi 3

B. SIM808 (GPS/GSM) MODULE:

SIM808 GSM/GPRS/GPS Bluetooth Compatible Development Board with GPS Antenna is a development board; with SIM808 module which makes you able to use GSM communication and GPS features with our Raspberry Pi. With this module, we can send SMS; trace a location. SIM808 module is a single chip GSM communicator and GPS receiver. The module is 5 – 26V power supply when the power supply is less than 2A the need for 9V.

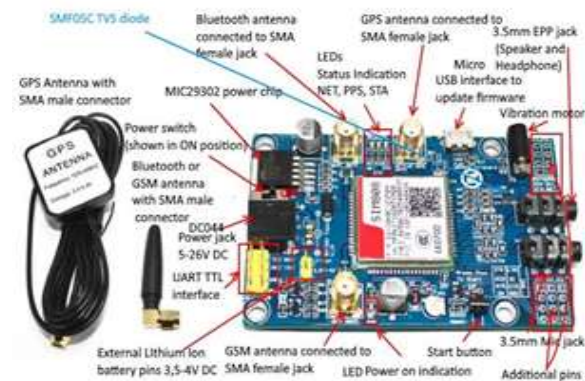


Fig.3 SIM808 (GPS/GSM) Module

C. MQ-3 ALCOHOL SENSOR:

This sensor is suitable for detecting Alcohol, Benzene, CH₄, Hexane, LPG, CO. this sensor provides the analog and digital output based on alcohol concentration. When alcohol gas exist the sensor conductivity gets higher along with gas concentration rising.



Fig.4 MQ-3 Alcohol Sensor

D. SW-420 VIBRATION SENSOR

Vibration Sensor (SW-420) is having feature of a high sensitivity non-directional. When the module is stable, the circuit is turned on and the output is high. , the circuit will be disconnected if the movement or vibration occurs. At the same time, according to our own needs we can also adjust the sensitivity. So this is a perfect module of vibration sensor.



Fig.5 MQ-3 Vibration Sensor

E. RFID CARD AND RFID READER



Fig 6 RFID card and RFID reader

RFID systems generally provides on way communication with transponder transmitting data to the interrogator. it consist of a microchip, memory and antenna. Active RFID tags have a own power source, but passive tags don't have any power source, and are activated by the RF scan of the interrogator. Active RFID tag read at greater range and more memory. In semi-passive RFID tags, the circuitry run by power source while communication is powered by

the RFID reader. Tags can be read-only or have read-write capabilities. Smart labels and smart tags have emerged as a category of specially configured flat RFID tag. Smart labels and smart tags can be inserted into an item identification slip. A smart label is also used to parameter detection in shipped goods, including temperature, shock, tilt, vibration too.

IV. WORKING

In this system we use sensors like Alcohol Sensor (MQ3) and Vibration Sensor (SW-420), we also use RFID cards and reader for identification of students. To track the path of school bus and send the message to authority and parents we use SIM808 GPS/GSM module. To control this all we used Raspberry pi as a controller.

When we on power supply the entire module start. When students entered into the bus they can swipe or show their RFID card to reader module. Once the card was read by the reader module then this module gives data to the raspberry pi. After getting data from RFID reader the raspberry pi will give the command to GPS/GSM module to send the message to respective number. Now here we implement the alcohol sensor in driver's cabin. If the alcohol is sense by the sensor then the sensor will send data to controller and controller will send message to school authority. When vibration sensor senses some vibration then it also follows same producer like alcohol sensor.

System operation is as bellows-

- Swipe the RFID card at reader module.
- Check the information of student and send the message to the parents.
- Send the live location to the parents by SMS via GPS/GSM module after same interval of time.
- Sense the alcohol in alcohol at driver's cabin if output is detected high the send the SMS to school authority.
- If any major vibration sense by the vibration sensor then send intimation to school authority.

V. RESULTS

The above Fig. 7, 8 and 9 shows the output result of the projects. It shows the message on parent's mobile and live- bus location link. The messages include kid

name and arrival timing in bus. It also shows the different sensor outputs.



Fig.7 Output message1

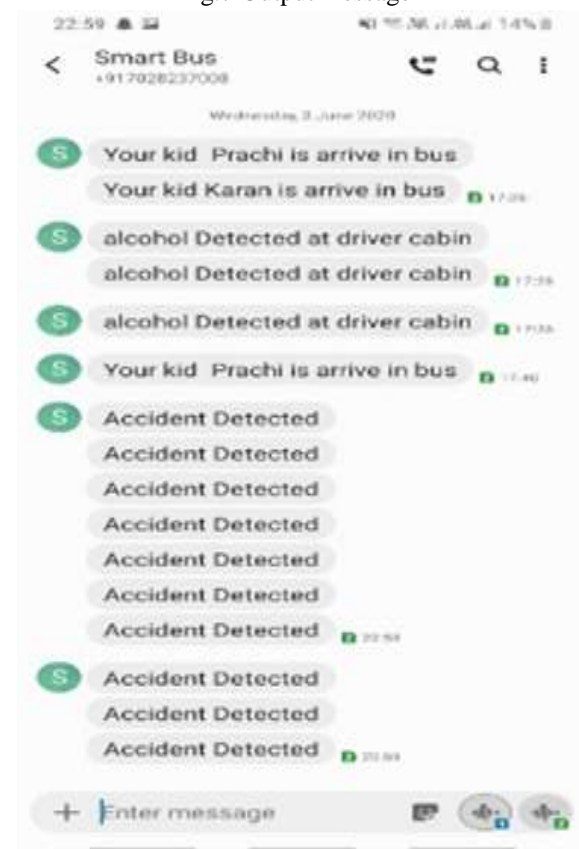


Fig. 8 Output message 2



Fig.9 Bus location tracking

VI. CONCLUSION

All in all, final hardware of our system met our expected requirements. We focus mainly on safety of students while travelling from home to school or school to home. This system has low power consumption, low cost and is convenient way to control real-time monitoring for unprotected school bus. Here we tried to provide safety to students from all possible threat. We provide the student information, live location of bus to their parents via wireless communication. Due to this the waiting time of parents was reduced. And we also try to reduce the accidents happened because of drunk and drive by implementing Alcohol sensor in driver's cabin in case of driver is drunk the system will send the message to school authority and they will take action on driver. By using the vibration sensor we try to make accident indicator when the accident happens the system will send the message to school authority. Overall, we consider the project a success.

REFERENCES

- [1] Ajit Jadhav, Ashish shinde, Nilesh Nanavare, Ganesh Ranmode, A.B. Gavali, "RFID based secure smart school bus system" IAETSD JOURNAL FOR ADVANCED RESEARCH IN APPLIED SCIENCES VOLUME 5, ISSUE 3, MAR/2018 ISSN NO: 2394-8442
- [2] Mrs. Gowthamy J. AP(OG), Jay Patel, "school bus tracking & monitoring system", IAETSD JOURNAL FOR ADVANCED RESEARCH IN APPLIED SCIENCES VOLUME 5, ISSUE 4, APRIL/2018 ISSN NO: 2394-8442
- [3] Arifa K, Aryadas R, Asha KR, Amrutha J, Anju P, "smart school bus" international journal of scientific & engineering research, volume 7, issue 2, february-2016 1036 ISSN 2229-5518
- [4] P. Ambedkar, P. Suresh babu, "smart school bus for children transportation safety enhancement with IOT" international journal of innovative research in computer and communication engineering, issn(online): 2320-9801 ISSN (print): 2320-9798
- [5] PRASHANTHA N C, RASHMI P, RASHMI P S, "SMART COLLEGE BUS TRACKING SYSTEM" international journal of advance engineering and research development volume 5, issue 05, may -2018