BUS MAINTENANCE AND PASSENGER MONITORING SYSTEM USING ARDUINO

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Abstract—*Bus maintenance plays an important role in transport system just as mechanics monitor all aspects of an engine to optimize performance, maintenance manages must monitor all aspects of their operations to ensure that labor, equipment, and financial resources are used as efficiently as possible. The best way to assure school children's safety while travelling in the school vehicle is to employee the real time GPS school bus tracking software. It is a convenient solution that can be accessed through your personal computer or your mobile device. It helps in driver management, reduces expenditure and provides convenient for both parents and school management.*

Keywords—Arduino; GPS; Bus Maintenance Bus; Monitoring

1. INTRODUCTION

Transportation plays a major role in our day to day life. Bus transportation is essential for school and college students because safety of their children is very much important for every parents because nowadays we are hearing lot about missing of childrens in daily news and newspapers to overcome this problem many actions were taken to provide security for the children by monitoring of them. And if the accident occurs safety measures are placed and message will be send to the near by police station and hospital for quick rescue and due to this many lives can be saved. Accidents are also happen due to improper maintenance of the vehicle. FC(Fitness Certificate) is very much important for every vehicle to denote that the vehicle is in good condition and they are fit for transportation. Due to the proper maintenance of the vehicle accidents can also be prevented. GSM and GPS tracking devices are the tracking devices which helps to track the location of the vehicle and we can easily track the vehicle and identify the location of the vehicle. If some emergency situation occurs buzzer are placed inside the vehicle and it will automatically produce horn sound. To provide security various technology are introduced because human lives are more important and this system is to provide solution for

2. LITERATURE SURVEY

The Recent studies on the existing method for bus maintenance and passenger monitoring system process using design and implementation of vehicle tracking system. This paper propose the tracking of the vehicle through the modern technology using smartphones with microcontroller and it is used to monitor the location of the vehicle [1]. RFID based system for school children transportation safety enhancement. This paper is based on the safety of the school children during the transportation and this process consist of bus unit and school unit it is used to monitor the children when they boards or leaves the bus [2]. GPS-GSM based inland vessel tracking system for automatic emergency detection and position notification. This paper is an modern version of vehicle tracking system which consist of GPS-GSM network to detect the position of the system and notification will be send to the owner or authority[3]. RFID based missing person identification system. The news which we read in media is about the missing person. RFID technology is used to detect the person and to rescue them [4]. Automatic Accident Location Detection System. The objective of this paper is to detect the location of the accident the system includes accident locator device and accident management website to enhance the emergency service and to yield quick medical attention [5]. GPS based bus tracking system. In this busy life, waiting for bus is authentic so the transportation system has improved GPS tracking system is included in the system so the information are send to the control unit using RF receiver [6]. An RFID based system for bus location tracking and display. This paper presents the tracking the location of the bus through RFID and the server which is placed in the town will get the information from receiver and display the arrival time and route in the stop[7].

Design of RF based multithreaded RFID student attendance management information. The initiate of this paper is to manage the attendance of the students in this method students are provided with RFID tags and when the reader detect the tag automatically reader will mark the attendance for the students[8]. Intelligent system for vehicular accident detection and notification. This paper come up with detection of the accidents through various method camera is placed.

3. EXISTING SYSTEM

Nowadays, School buses carry millions of children to the school or from the school. The safety of school children became the most important issue nowadays, as there are many previous incidents, where the child was forgotten in the bus or the child was missing in the bus. Also in some of the cases the bus was hijacked by an unknown person in which, driver and students were killed. To avoid such situations, there is a need to develop a safety system for the school bus, which monitors the In time and Out time of every child in a school bus as well as it will allow only authenticated person inside the bus. In this paper, we study different safety systems available for children till now and we propose a system that overcomes the problems of other systems.

4. PROPOSED SYSTEM

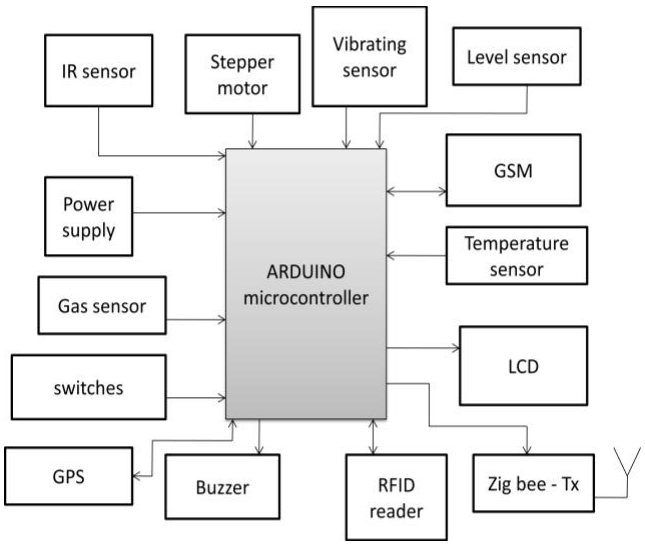
Bus maintenance performance is becoming increasingly important because of ongoing reductions in maintenance budgets by tracking specific elements of maintenance, managers can identify areas that need improvement and allocate resources accordingly. And here we have explained the full description of our project.

The mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input /output pins(of which 15 can be used as PWM output),16 Analog inputs,4 UARTS, a 16MHZ crystal oscillator, a USB connection, a power jack, an ICSP header, and a RESET button. It contains everything needed to support the micro controller, simply connect it to a computer with a USB cable or power it with a AC to DC adapter or battery to get started. The Mega 2560 board is compatible with most shields designed for the UNO and the former boards Duemilanove or Diecimila.

The high-performance, low power microchip 8-bit AVR RISC/based microcontroller combines 256 KB ISP flash memory, 8KB SRAM, 4KB EEPROM,86 General purpose I/O lines,32 general purpose working registers, real time counter, six flexible timer/counters with compare modes, PWM,4 USARTS, byte oriented 2-wire serial interface, 16-channel 10-bit A/D converter, and a JTAG inside the vehicle to monitor the situation of the passengers by GSM modem along with GPS to detect the vehicle [9]. Accident detection and reporting system using GPS and GSM technology. The system is tender with the IR to monitor the speed of vehicle and it send the location of the accident to alert service center[10].

Interface for on-chip debugging. The device achieves a throughput of 16 MIPS at 16 MHZ and operates between 4.5-5.5 volt. Three types of sensors were used in this system and they are Temperature Sensor, vibration Sensor, Gas Sensor.
Arduino mega 2560 controller consist of 54 digital input/output pins and 16 analog pins as input. The controller has peripherals such as Temperature Sensor, Vibration Sensor, Gas Sensor, IR Sensor, Level Sensor, GPS, GSM, LCD, Buzzer, Stepper Motor, DC Motor and RFID Reader.

Temperature Sensor is attached to the controller which detect abnormal temperature inside the bus and takes the temperature by using temperature sensor then identifies the location using GPS and sends the information through GSM. Vibration Sensor is attached to the controller which detect abnormal vibration inside the bus and takes the vibration using Vibration Sensor then identifies the location using GPS and sends information through GSM. Gas Sensor is attached to the controller which detect alcohol content in breath like a Breath Analyzer and takes alcohol content using Gas Sensor then identifies the location using GPS and sends information through GSM. IR Sensor is attached to the controller which is used to find the speed DC Motor.



Block diagram – Tx

Level Sensor which is attached to the controller which detect the level oil present in the tank. GSM is attached to the controller which is used to sense the controller of various sensor such as Temperature Sensor, Vibration Sensor, Gas Sensor, Level Sensor, IR Sensor and GPS. GSM is attached to the controller which is used to send messages to the registered number . While detecting the abnormal signals from the sensor such as Temperature Sensor, Vibration Sensor, Gas Sensor, IR Sensor and Level Sensor.

Block diagram - Rx

The controller tracks the location through GPS and passes messages through GSM. LCD is attached to the controller which is used to read all values of the sensors. Buzzer is attached to the controller which is buzzers while the sensors are active. Stepper motor is attached to the controller which is used to open and close the door automatically. RFID Reader is attached to the controller which is used to read the information of RFID Tags and display the information to the LCD.

1. *Temperature Sensor*

The LM35 series are precision integrated circuit temperature sensor which are linearly proportional to the Celsius temperature. Operates from 4 to 30 volts and it is less than 60 microAmps low impedance output is 0.1 for 1 microAmps load.

The LM35 series are precision integrated circuit temperature sensors whose output voltage is linearly proportional to the Celsius temperature. Operates from 4 to 30 volts and less than 60 microAmps and low impedance output 0.1 for 1 milliAmps.

The temperature sensor which transmits the temperature in the bus, when the temperature is raised the controller accesses the location of the bus through the GPS and sends the location via the GSM.

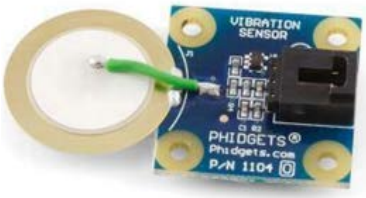
In case the bus met an fire accident while travelling the temperature sensor measures the abnormal temperature and takes the current location through the GPS and sends the location via the GSM.

2. *Vibration Sensor*

Vibration Sensor are extremely important to determine level of vibration to activate the sensor. Its frequency response is 0.5 to 22 kHz and the velocity of the vibration sensor is about 500mm/s.

The vibration sensor which transmits the abnormal vibrations in the bus, when the vibration level is raised the controller accesses the location of the bus through the GPS and sends the location via the GSM.

In case the bus met an accident while travelling the vibration sensor measures the abnormal vibrations and takes the current location through the GPS and sends the location via the GSM.



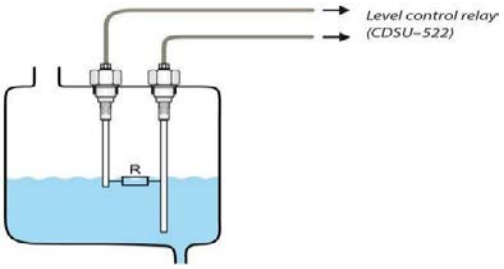
3. *Gas Sensor*

The gas sensor MQ-3 is suitable for detecting alcohol concentration on the breath, it is just like the common breathalyzer. Its detection range is about 100-10,000 ppm and heater voltage is 5.0V.

The gas sensor which transmits the abnormal alcohol detected in the bus like a breath analyzer, when the alcohol level is raised the controller accesses the location of the bus through the GPS and sends the location via the GSM.

4. *Level sensor*

The level sensor is used for the oil maintenance in the bus, whereas the indication of the engine oil condition takes place in the system for the bus maintenance. Fore coming the bus engine maintenance the engine oil takes the major part thus provides the descent mileage, torque for the engine and the engine condition.



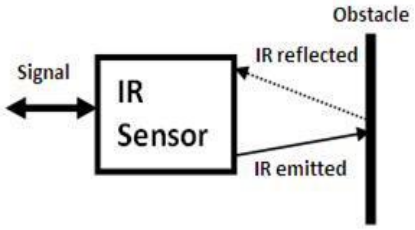
5. *Stepper motor*

Stepper Motor is used for the automatic opening and closing of door.Whenever the RFID reader reads RFID tag the stepper motor runs for opening and closing of the door in the bus.

6. *IR Sensor*

The IR Sensor is used to measure the speed by using IR Transmitter and IR Receiver.

Transmitter is placed at one side of the object and the Receiver will be placed at the other end, by interfacing the transmitter and the receiver the speed of the object will be found in RPM.



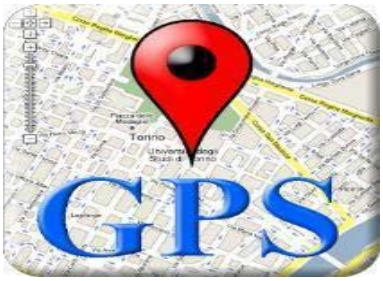
7. *RFID reader*

RFID Reader are used to read the information from the RFID Tags.

For the supply of the theme of the project begins with the RFID reader.

8. GPS

GPS is used to track the location of the bus. Whenever the sensors get the high values the current location by using GPS will be sent via the GSM.

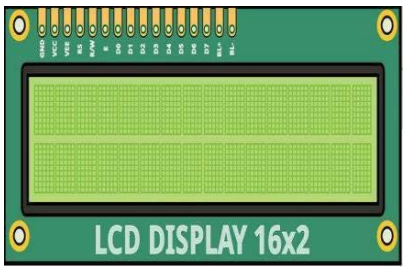


9. *GSM*

GSM is used to send messages to the registered number. When the value of the sensor such as Temperature Sensor, Vibration Sensor, Level Sensor, IR Sensor, Gas Sensor is high.

10. LCD

LCD is used to display the values of the sensors such as Temperature Sensor, Vibration Sensor, Level Sensor, IR Sensor, Gas Sensor . The values are frequently updated.



11. Switches

Switches which are placed in this system consist of 5 switches and they are used send messages to the registered number through GSM.

12. Power supply

Power supply provides the required voltage for the Temperature Sensor, Vibration Sensor, Gas Sensor, IR Sensor, Level Sensor, GPS, GSM, LCD, Buzzer, Stepper Motor, DC Motor and RFID Reader.

5. RESULT

Every sensors(Level sensor, Vibration sensor, IR sensor, Temperature sensor, Gas sensor) done with its corresponding working. The wireless formation of communication is given as notification is done with the GSM. As finally providing the maintenance of the vehicle as well as the safety communication for emergency cases.

6. CONCLUSION

In this we approach the future development by enhancing and enriching the maintenance and monitoring of travelling vehicle. Involving safety measures for travelers. Providing emergency notifications

7. FUTURE WORK

Physical Attachments will be added for the controlling of vehicle during the emergency situations. Enhancement of maintenance by providing the further communication for accessing the service call. Wireless service will be provided for further process. Emergency safety measures and methods will be developed.

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