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AERI College Bus Tracking System

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ABSTRACT: In today's busy and congested traffic conditions, it takes a lot of time to wait for transportations. It is very difficult to predict the arrival time of the bus at the bus stop. This project focuses on providing a bus tracking system for college students. It helps the students to easily track the bus location through their mobile phones with both online and offline modes. The bus tracking system consists of a GPS and GSM module through which the whereabouts of the bus is shared with the students. When the user sends the message to the tracking system, the message is converted into AT commands which finally reaches the microcontroller. The microcontroller receives the data in terms of bits which in turn sends the information about the location of the bus.

KEYWORDS: Arduino,GPS,GSM,LCD

I. INTRODUCTION

Every college organizes a vast bus network every day for the convenience of students. The arrival time of the buses is influenced by different circumstances such as traffic congestion, irregular vehicle dispatching time, unexpected accidents and changing climatic conditions. Students are often late to the classes due to the inconvenient arrival time of the bus. To overcome this inconvenience, students are provided with latitude and longitude details of the bus through SMS with the help of GSM. By using this, the student can easily view the exact location of the bus. AERI college bus tracking system consists of Arduino, GSM, GPS, and LCD. This setup is installed in the college bus. This system works based on the principle of request and response method. When the student requests the location of the bus, the system responds by sending the location details of the bus through GPS and GSM. With the help of this technology, the students can manage their time efficiently and arrive at the bus stop at the estimated time. This will make the college transport system user-friendly for the students.

II. RELATED WORK

AERI College Bus Tracking System consists of two units such as tracking unit and mobile unit. The tracking unit consists of GPS (Global Positioning Satellite), GSM(Global System for Mobile), LCD, and Arduino Uno. This tracking unit is installed in the college bus. GPS module is used to get the location details such as latitude and longitude of the bus from the satellite. GSM module is used to communicate with the user for sending the information about the location of the bus. LCD is used to display the status of the tracking system. Arduino UNO is the microcontroller unit that controls incoming and outgoing signals from the tracking unit to mobile unit. This system works based on the principle of request and response method. When the user sends the message to the tracking unit, the GSM receives the message as AT commands. In response to the command, the microcontroller performs the appropriate operation. The GPS updates the location details to the microcontroller repeatedly. The GSM module sends the location details as a text message to the user. Using the location details, the user can track the location of the college bus.

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III. PROPOSED SYSTEM

The proposed system consists of both hardware and software modules. The hardware layer consists of a tracking module. The core part of the tracking module is the Arduino microcontroller with various peripherals such as GSM, GPS modules. The software layer consists of live location tracking and exact latitude and longitude which is shared as a text message. The proposed model conceptualizes a comprehensive monitoring system that would track the bus continuously in real-time. The user then sends the messages through his phones those reach the GSM, through the AT commands all those messages reach the microcontroller. That microcontroller takes the data in terms of bits. That information will be transmitted to the LCD display.

IV. BLOCK DIAGRAM

The block diagram of the proposed system is as follows:

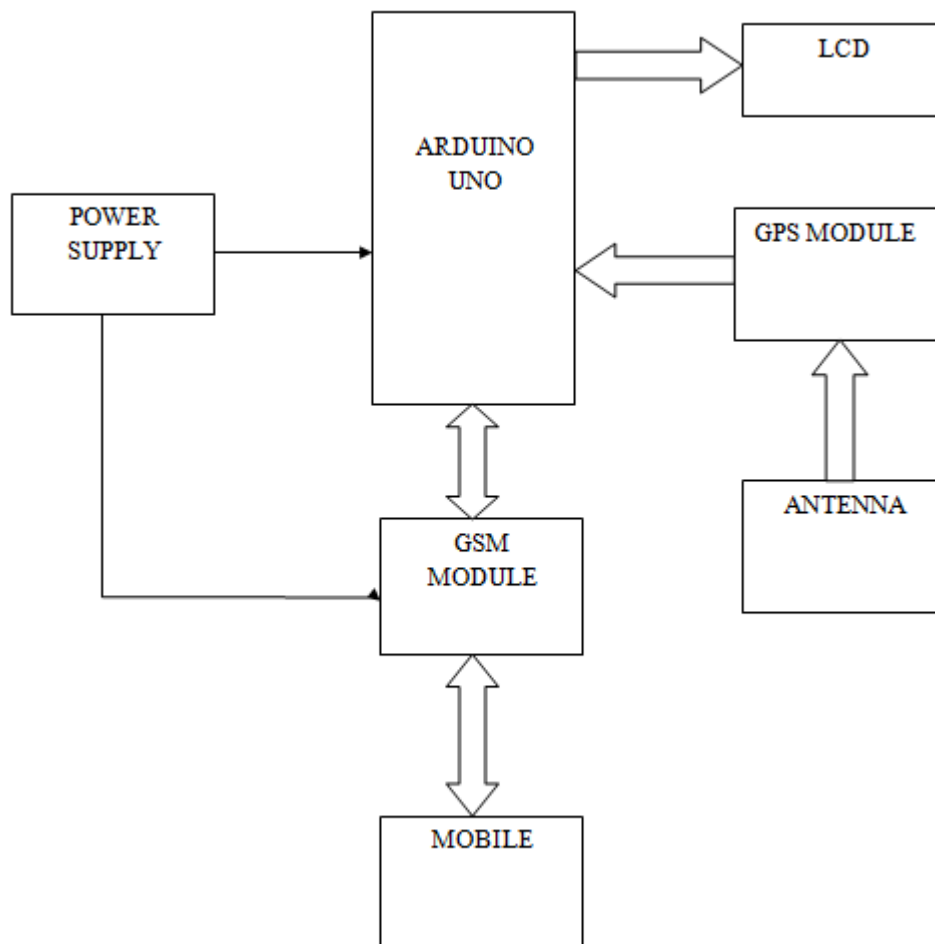


Figure.1 Block Diagram

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V. HARDWARE IMPLEMENTATION

A. GPS

The Global Positioning System is used to fetch the latitude and longitude details of the bus. The advantage of using this GPS module is that it has high precision output, high sensitivity, battery for power backup.



Figure.2 GPS Module

B. GSM

Global System for Mobile communication acts as a communication interface between the user and the system. GSM is used to digitize and compress data, establish communication between a mobile device and a GSM system. In this system, the SIM900A GSM module is used. GSM module supports serial communication which can be used for various applications like controlling SMS, transferring data etc. It can be communicated using AT commands.



Figure.3 GSM Module

C. LCD DISPLAY

An LCD (Liquid Crystal Display) is used to display information required. LCD works based on the principle of blocking light. In this project, the I2C LCD display is used. It consists of four pins such as VCC, GND, SDA, SCL.

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Figure.4 LCD Display

VI. SOFTWARE DESCRIPTION

A. ARDUINO UNO

Arduino is an open-source platform consisting of both hardware and software. The language used for coding in Arduino software is either C or C++. The binary code can be written and uploaded to the required devices. It acts as a serial port to the interfacing devices and also supplies power to the devices. In this project, Arduino UNO R3 is used.

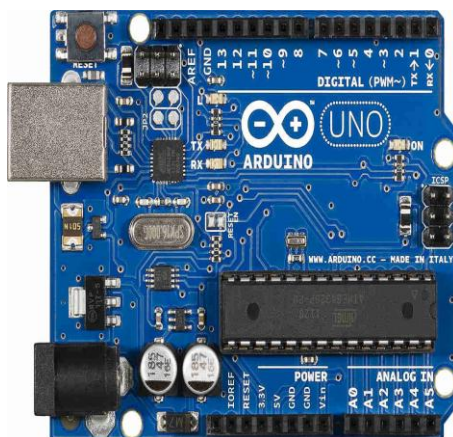


Figure.5 Arduino UNO R3

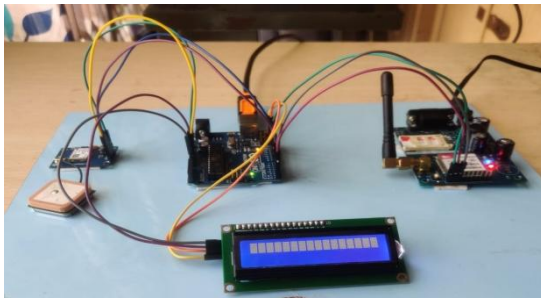
VII. WORKING PRINCIPLE

The proposed system works based on the principle of request and response method. Request and response method is a process of exchanging information or data between two systems. When the user requests data from the system, it responds by sending the required information. In the proposed system, the user requests the location from the tracking system. In response to that request, the system sends the location details to the user as a text message with the help of GPS and GSM.

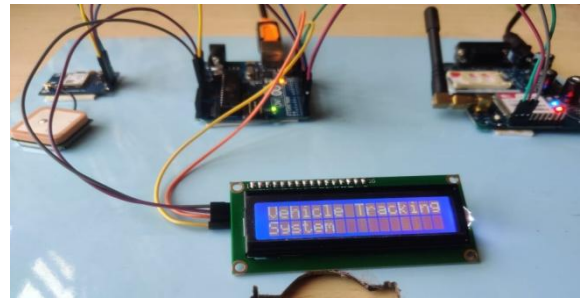
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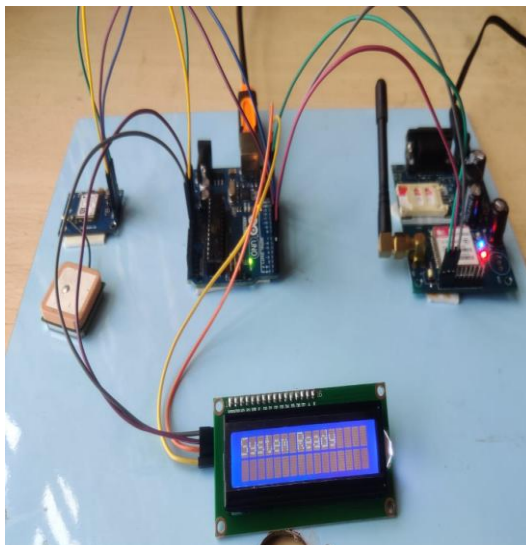
VIII. EXPERIMENTAL RESULTS



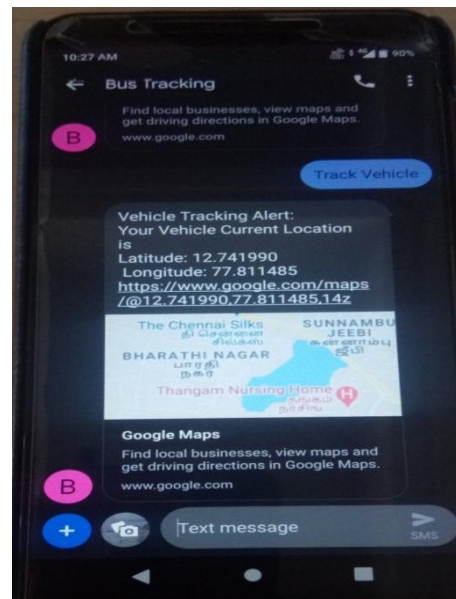
(a)



(b)



(c)



(d)

Figure (a) shows the experimental setup of AERI College Bus Tracking System,s

(b) shows the initial stage of the module,

(c) shows the system readiness,

(d) shows the SMS sent to the user with the location details of the bus.

IX. CONCLUSION AND FUTURE ENHANCEMENT

By implementing this project, the user can easily track the location of their bus and can reduce their waiting time at the bus stop. This system helps the user to plan accordingly to the arrival time of the bus. It serves as a communication medium between the user and the bus.

In future, this system can be upgraded to detect unexpected accidents with the help of vibration sensor and send the information along with location details to the management. Further, it can be installed in any kind of transportation used by the people.

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