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IOT Based Intelligent Real-Time System for Vehicle Tracking

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ABSTRACT: Bus transportation service has very poor transportation data system nowadays. Bus users don't know the precise point for a bus, but only know the scheduled approximate time of arrival. Bus transportation service doesn't have a correct system to trace all buses position and therefore the actual point in time in every stop. These problems occur because current public utility system failed to apply real time tracking technology to trace on each buses on the road and also lack of a platform to update latest vehicular traffic information to bus users. so as to resolve these problems and enhance current public-service corporation system, real time bus tracking system should develop and implement. With real time bus tracking system, bus position data is connected real time and transmitted to a central server for processing and extracting transit information. The most technology won't to develop this method is Global Positioning System (GPS). GPS technology ready to receive the position of an object from space-based satellite navigation system through a GPS receiver.

KEYWORDS: IOT, Intelligent Controller, Monitoring System, Bus Tracking

I. INTRODUCTION

Vehicle tracking systems were first implemented for the shipping industry because people wanted to understand where each vehicle was at any given time. These days, however, with technology growing at a quick pace, automated vehicle tracking system is being employed during a kind of ways to trace and display vehicle locations in real-time. However, bus transportation service has very poor transportation data system nowadays. Bus users don't know the precise point for a bus, but only know the scheduled approximate point. Bus transportation service doesn't have a correct system to trace all buses position and therefore the actual point in every stop. These problems occur because current public-service corporation system failed to apply real time tracking technology to trace on each buses on the road and also lack of a platform to update latest vehicular traffic information to bus users. so as to resolve these problems and enhance current public utility system, real time bus tracking system has got to develop and implement. With real time bus tracking system, bus position data is connected real time and transmitted to a central server for processing and extracting transit information. The most technology accustomed develop this technique is Global Positioning System (GPS).

GPS technology ready to receive the position of an object from space-based satellite navigation system through a GPS receiver. For wireless data transmission, GSM and SMS technology are commonly used. The SMS technology through GSM network and GSM modem provide a user with vehicle location information. Rather than using SMS, the bus tracking system uses the smart phone application to trace and monitor a bus location obtained from the in-vehicle tracking device. The bus location is automatically placed on Google maps, which makes it easier for tracking a vehicle and provides users with more accurate vehicle location information. The developed bus tracking system are going to be ready to provide bus users a true time platform to test on updated vehicle traffic information, as an example bus arrival or time of departure. Besides, this method also reduces workload for bus management team and provides a right away platform to update latest and accurate vehicular traffic information to bus users.



II. EXISTING METHOD

In the existing system, Road Safety says that bus traveling in the safest form of the road transport system is safer than the private car for the Student and that the record for college bus travel, in particular, is very good. Global Positioning System and Global system for mobile communication module are designed for tracking and positioning the college bus. Also, the research undertaken by National Highway Traffic Safety Administration in the USA notes that when comparing the number of fatalities of Students aged 5 to 18 years during normal college transportation hours college buses are 87 times safer than private cars This system will issue the messages to parents to convey them that their student is reached to college safely and they are in the college and also give an alert message if any fire accident occurs LCDs the message about the speed of the college bus. The tracking system includes the location and speed of the vehicle in the current movement, the speed of the vehicle is monitored and then an SMS alert is sent to the parents through the GSM.

III. PROPOSED METHOD

The proposed system is used to detect the speed of the vehicle and send an alert to the parents if the bus crosses the speed limit. Parents use Google Maps in android to track the bus. If the parents open the Google map the speed of the bus and the current location of the bus can display on the android. The GSM and GPS module is used to send the alert message to the parents and also to the college unit. The LCD is fixed on the college bus to display the identification student to the driver. The proposed system is used to intimate parents about the bus location and also about the Student boarding the college bus. The system addressed the problem faced by parents of waiting at the bus stop for a long duration. The system includes RFID identification and the GPS is used for the tracker which is inbuilt in the android for unique location phones the complete location and Student details are stored in the database. Each student has the unique key at the college side to display the student details not only at the entry and exit of the student at any time. If the first key is pressed the respective student details are displayed in the android mobile in the college unit.

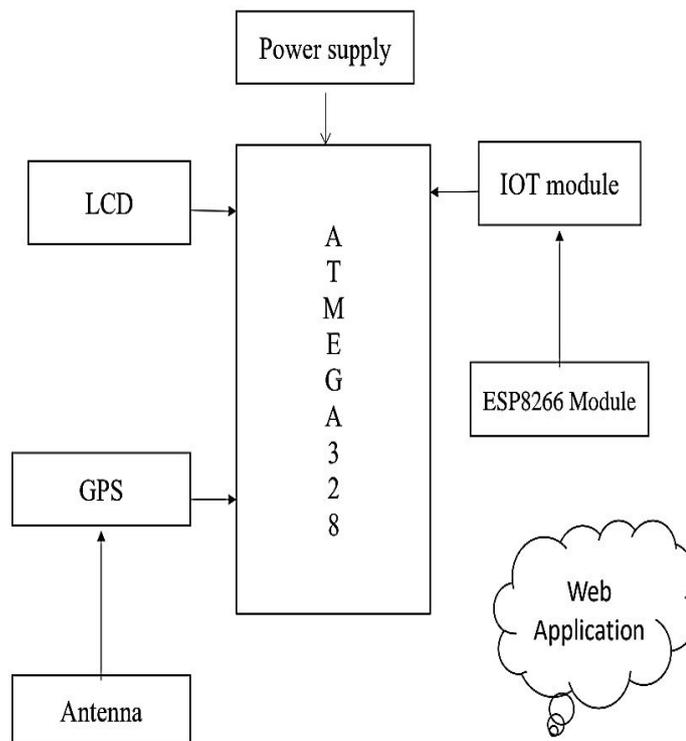


Figure .1: Proposed Block diagram of Proposed System

A key is fixed in a bus unit at a driver's side to send an alert message to parents which overcome the problem faced by the parents of waiting at the bus stop for a long duration. Driver press the key every 5 minutes for that GSM module to send an alert message for the nearby stops which are fixed in a database. The GPS module which is present in the



android mobile starts to track the location of the bus in the form of latitude and longitude with the help of the GSM module which is fixed in the bus unit. Technology is a practical option for monitoring and tracking Student during their trip to and from college on a college bus. The system tracks the college bus by the GPS Module and also gives an alert if the bus crosses the speed limit. The 11 GPS Module is used for Live Tracking of the College Buses and alerting if a fire accident occurs and sending an alert message to the parents, college, and also for the fire engine. The system monitors the Student inside the bus in a safer manner. It uses the combination of RFID (Radio Frequency identification), GPS (Global Position System) technologies. Each Student carries a unique RFID card embedded in each of the student's college bags. When the student enters or exits from the bus the reader records and transfers data in the database. Radio Frequency Identification (RFID) is used to transmit information about a subject using radio waves. This information consists of a unique digital number that differentiates various objects. An RFID system is made up of two different parts viz. RFID tag and RFID reader. There is a microchip antenna inside the tag this chip consists of useful data in different forms. A study has shown that the performance of the reader decreases rapidly with an increase in distance. The student carries a unique RFID card. This RFID card is embedded in his smart card. When students are in or out of the college bus, the reader will record a response and send an alert to parents and the college.

A. ATMEGA328 SPECIFICATION

- Microcontroller: ATmega328
- Operating Voltage: 5V
- Input Voltage (recommended): 7-12V
- Input Voltage (limits): 6-20V
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 6
- DC Current per I/O Pin: 40mA
- DC Current for 3.3V Pin: 50mA
- Flash Memory: 32KB (ATmega328) of which 0.5 KB is used by a boot loader
- SRAM: 2KB (ATmega328)
- EEPROM: 1KB (ATmega328)
- Clock Speed: 16MHz
- Revision 3 of the board (A000066) has the following new features:
- ATmega16U2 instead 8U2 as USB-to-Serial converter
- pin out: added SDA and SCL pins for TWI communication placed near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board and the second one is a not connected pin, that is reserved for future purposes
- Stronger RESET circuit

B. Esp8266 MODULE

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor.

C. LCD

A Liquid Crystal Display (LCD) is flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly.

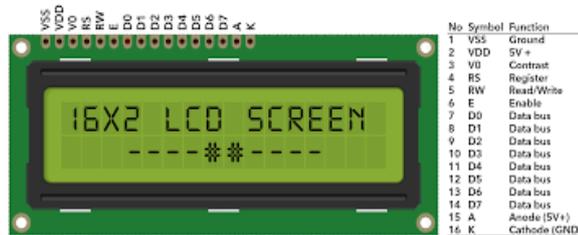


Figure 2: LCD Display

IV. SOFTWARE DESCRIPTION

An embedded system is an application that contains at least one programmable computer (typically in the form of a microcontroller, a microprocessor or digital signal processor chip) and which is used by individuals who are, in the main, unaware that the system is computer-based. Arduino software is used to control all the components. It is a type of Integrated Development Environment (IDE). This software can be written in C, C++ for the automation process. It can be run on operating systems like Windows, macOS, Linux etc. It is used to write and upload programs to Arduino compatible boards. Here the program for controlling the wheel movement and the movement of arm that are connected to the motors are uploaded in this Arduino software. The Arduino board exposes most of the microcontroller's I/O pins for use by other circuits. The current Uno provide 14 digital I/O pins, six of which can produce pulse width modulated signals, and six analog inputs, which can also be used as six digital I/O pins. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures.

V.SIMULATION RESULT

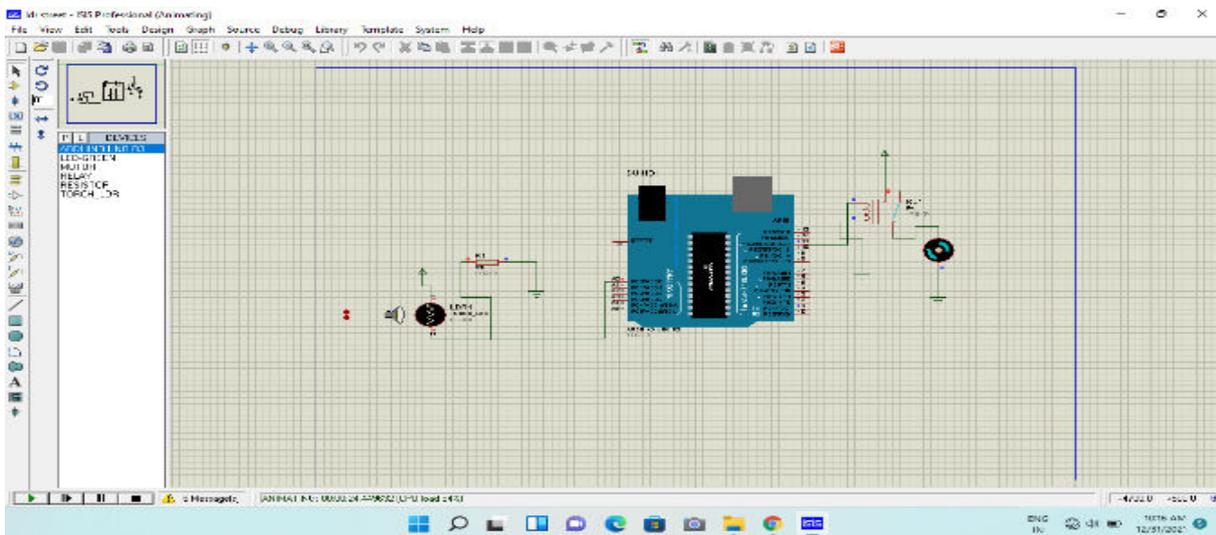


Figure 3. Vehicle move to the destination

The RFID tag connected with the Arduino and resistor. The resistor is connected with the ground. This is the starting position of the vehicle or RFID tag.

VI. HARDWARE IMPLEMENTATION

The system has two sub systems namely the college bus sub system and remote server sub system. The school bus subsystem is associated with student identification using RFID and location tracking using GPS. Each entry and exit in bus involves activation of RFID reader and acquisition of student ID.

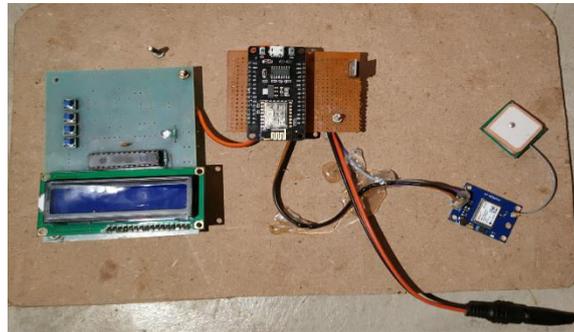


Figure 4.Snapshot of Hardware Implementation

This is used to determine student status which is transmitted to server via Wi-Fi module. The location is transmitted at regular intervals to server to track the bus. The server subsystem involves remote database that stores the student status as well as GPS coordinates along with student details. This is used to display relevant information to parents after login. Server subsystem is used to update the data and relay the same to application. Each student has a passive RFID tag which stores unique data for identification. When the tag is in vicinity of reader, internal inductive current produced by the tag in response to the wireless signal transmitted by reader allows the tag to provide the data to the reader. It can work without manual intervention at all making the process automatic. Server sub system takes care of the data received from bus sub system. It updates the database based on the received query. It extracts relevant data to be included in the application when checked by students.

VII. CONCLUSION

This proposed system aims at enhancing the safety of students during daily transportation to and from college. RFID Reader located inside the bus detects the RFID tags of the Student. It sends an instant notification with the relevant data from the college database server via the internet. The parents can log into the Application and monitor the details of their Student and track the location of the bus. The admin can add stops, and generate an optimized route, and can have live tracking of the bus. Further, this system can be enhanced by Parking Management System, having VANET for a bus to bus communication. This system can be extended for full-time monitoring of Students that will be helpful for parents and guardians at minimum cost.

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