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# College Bus Tracking System

Mrs. Vijayalakshmi[1], N. Dhikshitha[2], S. Reshma[3], S. Akshaya Priya[4], T. Poushika[5]
[1]*M. Tech., Assistant professor/CSE,* [2, 3, 4, 5]*Final year CSE, Achariya College of Engineering Technology, Puducherry*

***Abstract:*** ***Our project aim is to design a system that will automate the college transport fare collection process using GPS contactless smartcard technologies as well as provide industrial IOT facilities to knows present location of the college vehicle and the arrival time at the particular bus stop. The system keep tracking of each passenger will be able to know the current balance in his smartcard amount and can recharge it when needed. The present generation requires the information time to time. The use of technology has been increasing day by day. So, we are planning for the combination of present technology with the requirements of information transmission, we planned for the creative approach " Vehicle Tracking System Using GPS and GSM". To overcome the drawback of the previous method of a Project based and we introduced a project to track a vehicle using GPS and GSM. Vehicle tracking system can also be used for accident detection alert system. The tracking system and many more by just make few changes in hardware and software and widely in tracking cab/taxi, stolen vehicles, school/college buses etc. Student safety is a primary in our society. Increased rate of children abduction signify the relevance of a proper mechanism to track children. The current system involves parents calling the cab driver to ensure student has boarded the bus and to know the current location. There us always an element of uncertainty regarding student whereabouts. Proposed system involves a low-cost solution by allowing parents to track child location via a mobile application. The system involves allotment of a unique identification for each student using RFID (Radio Frequency based identification system). Live tracking of the bus is enabled using GPS (Global Positioning System).***

## I. INTRODUCTION

College bus tracking system is a technology used to determine the location of the vehicle using different methods like GPS and other radio navigation system operating through satellite and ground-based station. By following method the tracking system unable to calculate easy and accurate location of the vehicles. Vehicle information like location details, speed, distance travelled etc. Can be view on the digital mapping with the help of the software via internet. Even data can be stored and download to the computer from the GPS unit at the base station and that can be later we used for analysis. The system is the important tool for tracking vehicle at the given period of time and now it is becoming increasing population for people having expensive cars and has hence as a theft prevention and retrieval device.

The system consists of modern hardware and software components enabling one to track their vehicle online or offline. Any vehicle tracking system consists of mainly three parts mobile vehicle unit, fixed based station and, database and software system.

Vehicle unit: It is the hardware component attached to the vehicle having either a GPS/GSM modem. The unit is configured around a primary modem that functions with the tracking so0ftware by receiving signals from GPS satellites or radio station points with the help of antenna. The controller modem converts the data and sends the vehicle location data to the server. Fixed based station: consists of a wireless network to receive and forward the data to the data center. Base stations are equipped with tracking software and geographic map useful for determining the vehicle location. Maps of every city and landmarks are available in the based station that has an in-built web server.

The microprocessor-based system is not intended to be configured by the end user in the same manner that a PC is characterized as an embedded system since it is created for controlling a certain function or set of functions. An embedded system is created to carry out a certain purpose, although with a variety of options and choices. Processing cores in embedded systems can either be microcontrollers or digital signal processors.

## II. RELATED WORKS

Priyanka V. Narkhedeal, "Bus Tracking System based on Location-Aware Services", International Journal of Emerging Technologies in Engineering Research, Volume 6, Issue 3, March 2018. In day-to-day life, people travel from one place to another and most of the population use Bus as a medium to reach their destination. This project mainly focuses on the problem with the buses, that the passengers do not know the exact timing of the arrival of buses. The location of the bus and routes taken by the buses could be easily tracked on a smartphone. Global Positioning System and Google Maps are used for navigation.

 

An application based on the android is used, which includes information of all routes and bus details. The application is updated occasionally so that all the changes in bus routes and timings are noted. The user could request for the location of the bus, and the details stored in the database via a GPS device fitted on the bus can be retrieved whenever needed. International Research journal of Engineering and Technology (IRJET), Sep Real Time College Bus Monitoring and Notification System M. S. Minu, Deepak Adithya K. N. In today economic and traffic condition no one can predicts at what time and when the required transportation of a person can arrive .The aim of the project work to provide a app which can be used for college students so that they can manage the time during all days usefully and get to their transport point at the right time and not lose the bus or any other college transportation receive provided by the college. Shubham Jain et al., "Application-based bus tracking system", 2019 International Conference on Machine Learning, Big Cloud and Parallel Computing, 1416 Feb 2019. This project is based on a bus tracking system, in which a GPS Tracking application is used to track the bus. The passengers are unaware of the information regarding bus timing and therefore waste their time waiting for the bus on their particular route. GPS technology is user-oriented, to receive the navigating instructions at any instant of time. Here, the location of the bus is received from the satellite and then with the help of cellular networks, it is further processed and sent to the web-server. The coordinates received are processed through Google Maps API. Google Maps API helps to collect data like latitudes and longitudes, locations, etc. The data received is processed in the user's device, to display the real-time information. Sharmin Akter et al., "A Cloud- Based Bus Tracking System based on Internet of Things Technology", 2019, 7th International Conference on Mechatronics. In this project, a Cloud-based bus tracking system based on IoT is proposed. The combination of cloud computing and the Internet of Things enables monitoring the bus services, which need to be stored, processed, and assessed. This project proposed a mobile application, through which the mainly focuses on the problem with the buses, that the passengers do not know the exact timing of the arrival of buses. The location of the bus and routes taken by the buses.

## III. EXISTING SYSTEM

Tracking systems based on GSM are mainly accessible today .GSM technology is viewed as being antiquated for a number of reasons, including the fact that it does not support cloud databases and is not user pleasant. The school bus subsystem and the remote server subsystem are the two subsystems that make up the system. GPS position tracking and RFID student identification are both connected to the school bus subsystem. RFID reader activation and student ID collection are required for each entry and exit from the bus. The student status is determined using this and sent to the server via the Wi-Fi module. To track the bus, the location is sent to a server at regular intervals. The server component uses a remote database to hold information about the students, including their status and GPS coordinates. After login, this is used to show parents pertinent information. The data is updated and relayed to the application using the server subsystem. Each pupil has a passive RFID tag that stores specific information needed for identification. The tag may communicate data to the reader when it is close by thanks to the internal inductive current it generates in response to the wireless signal the reader transmits. There is no need for a manual.

### *A. Disadvantages*

Less user-friendly interface and lack of support for modern Android apps in GSM High operating costs because it continues to employ message-based data transmission.

## IV. PROPOSED SYSTEM

In this project, the user will receive text messages on a regular basis with the longitude and latitude of a college bus's whereabouts. Once the user or parent receives the SMS, they can easily monitor the bus using those details and Google Maps. The routing and scheduling method will allow school management to track each bus's route, identify pickup locations, estimate arrival times, and even track how many students are still on board.

Additionally, this will improve operational efficiency and result in cost savings. The GPS Tracker initiative is necessary to increase schoolchildren's safety and eliminate unnecessary financial waste. Everyone complains about the traffic during school hours. By improving the GPS and GSM-based School bus tracking system project, we can provide society with more services in addition to ensuring the safety of schoolchildren. By using the daily traffic analysis, the bus can be directed along the best path, reducing traffic in urban areas and helping to solve the urban issue. Additionally, this will improve operational efficiency and result in cost savings. GPS The tracking system for school buses is a small device. In one device, GPS and GSM technologies are combined. This gadget can be quickly installed because it only requires one piece of hardware.

### A. *Advantages*

Our approach will do away with the unusual fare collection practises currently in use in our nation. This will eliminate the requirement for human labour to collect fare, eliminating the risk of human error. Passenger time will be used very effectively, and unnecessary waits and tension will be avoided by integrating a remote location announcement system via notification.

## V. ARCHITECTURE

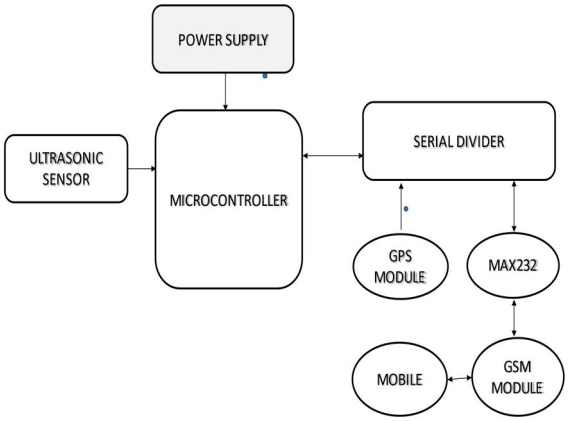


FIG.NO.V.1 Architecture Of Proposed System

## VI. METHODOLOGY

### A. *Arduino Board*

A microcontroller board called Arduino/Genuino Uno is based on the ATmega328P. It has a 16 MHz quartz crystal, 6 analogue inputs, 14 digital input/output pins (of which 6 can be used as PWM outputs), a USB port, a power jack, an ICSP header, and a reset button. It comes with everything required to support the microcontroller; to use it, just plug in a USB cable, an AC-to-DC adapter, or a battery to power it. You can experiment with your UNO without being overly concerned that you'll make a mistake; in the worst case, you can replace the chip for a few dollars and start over. The Italian word "uno" (which translates to "one") was chosen to signify the 1.0 release of the Arduino Software (IDE). The Uno board with the Arduino Software (IDE) version 1.0 served as the foundation for later generations of Arduino. The Uno board is the first in a line of USB Arduino boards and serves as the platform's standard model. For a comprehensive list of all current, previous, and out-of-date models, visit the Arduino index of boards.

### B. *Power Supply*

The Arduino/Genuino Uno board can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the GND and VIN pin headers of the POWER connector. The board can operate on an external supply from 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may become unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The suggested range is between 7 and 12 volts. These are the power pins:

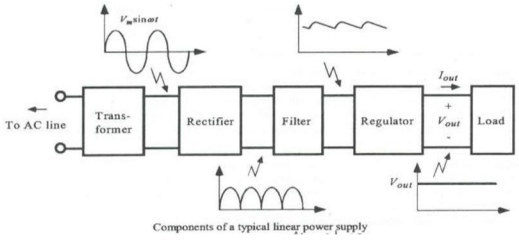


FIG.NO.VI B.Block Diagram Of Power Supply

*C. LCD Display Module*

A flat-panel display or other electronically manipulated optical device that makes use of liquid crystals' ability to modulate light is known as a liquid-crystal display (LCD). Liquid crystals don't emit light directly; instead, they create images in either colour or monochrome utilising a backlight or reflector. There are LCDs that can show arbitrary graphics (like those on a general-purpose computer display) or fixed images with little information that can be seen or hidden, such text, numbers, and 7-segment displays like those found in digital clocks. They both make use of the same fundamental technology, however different displays use larger elements whereas random images are composed of a lot of tiny pixels. Computer monitors, televisions, instrument panels, cockpit displays in aircraft, and interior and outdoor signs are just a few of the many applications for LCD. Portable consumer electronics like digital cameras, watches, calculators, and mobile phones, especially smartphones, frequently use small LCD screens. Consumer electronics items like DVD players, gaming consoles, and clocks all employ LCD screens.

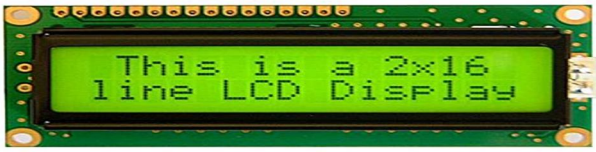


FIG. NO.: VI C.LCD DISPLAY

In almost all applications, LCD screens have taken the place of heavy, clunky cathode ray tube (CRT) displays. Compared to CRT and plasma displays, LCD panels come in a larger range of screen sizes, with sizes ranging from tiny digital watches to enormous big-screen television sets. When a static image is shown on a screen for an extended period of time (such as the table frame for an airline timetable on an indoor sign), LCD panels do not have image burn-in since they do not employ phosphors. However, image persistence can happen with LCDs.

*D. Global Positioning System*

When a GPS receiver is turned on, the orbital data of all the satellites is first downloaded. The first time through this procedure, it may take up to 12.5 minutes, but once completed, the information is downloaded and stored in the receiver's memory for later use. Even if the GPS receiver is aware of the satellites' exact locations in space, it still needs to know how far away each satellite is from the one it is receiving a signal from. The receiver determines that distance by multiplying the signal's velocity during transmission by the signal's transit time. The speed of a radio wave, or 186,000 miles per second (the speed of light), is already known to the receiver. The receiver compares its own code to the satellite's transmitted code to determine how much time it needs to delay its code in order to match the satellite's code in order to calculate the time component of the formula.

*E. Global System For Mobile Communication Module*

In Europe and other parts of the world, many mobile phone customers use the GSM (Global System for Mobile communication) digital mobile network. The most popular of the three digital wireless telephone technologies—TDMA, GSM, and code-division multiple access—GSM makes use of a version of TDMA. GSM converts data to an electronic form, compresses it, and delivers it along with two other streams of user data, each in its own time slot, down a channel. Either the 900 MHz or 1,800 MHz frequency band is where it operates. The evolution of wireless mobile telecommunications comprises High-Speed Circuit-Switched Data (HSCSD), General Packet Radio Service, Enhanced Data GSM Environment (EDGE), and Universal Mobile Telecommunications Service, in addition to GSM, among other technologies.

## VII. CONCLUSION

This project serves as a prototype for a bus tracking device that uses GPS and an IoT modem. With better fleet management, the vehicle tracking system improved overall productivity and increased return on investment. You can handle more work within a given time frame with better scheduling or route planning. Vehicle tracking enhances safety and security, communication tools, performance monitoring, and productivity when used for personal or corporate purposes. Therefore, it will have a significant impact on how we live in the following year. The The project "tracing down the vehicle using GSM and satellite communication" serves as a prototype for a device that tracks vehicles using GPS and GSM modems.

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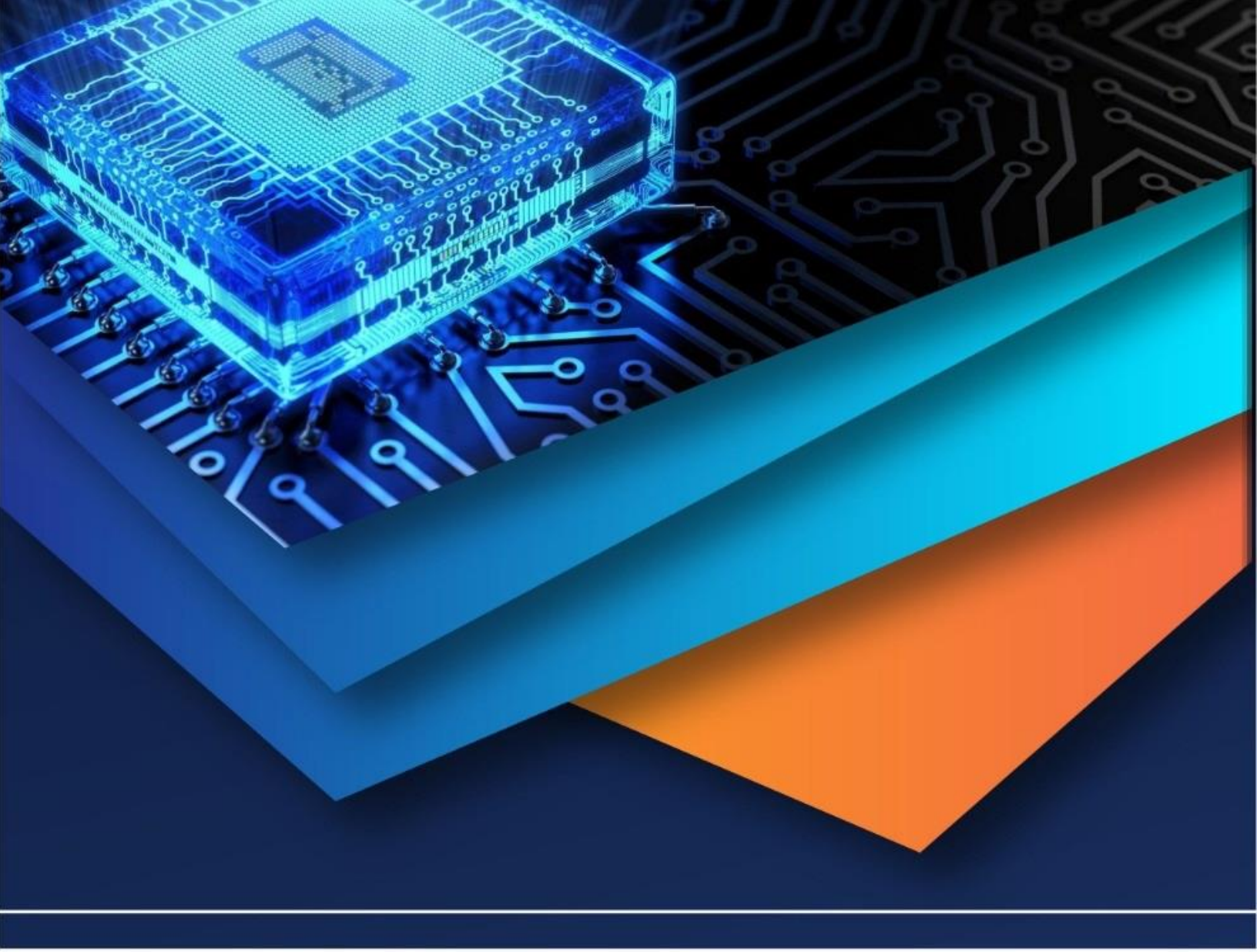

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