

Vehicle Tracking System using GPS and GSM

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Abstract:- The vehicle tracking system using GPS and GSM is a technology that enables real-time tracking and monitoring of vehicles. The system uses a Global Positioning System (GPS) and a Global System for Mobile communication (GSM) to track the location and transmit the data to a central server. The GPS module on the vehicle receives signals from satellites to determine its precise location, which is then transmitted to the server using the GSM network. The system also includes features such as geo-fencing, speed monitoring, and real-time alerts, which improve vehicle security and reduce the risk of theft. This abstract provides an overview of the vehicle tracking system using GPS and GSM, its functionality, and the benefits it offers to vehicle owners and fleet managers.

Keywords:- GPS

technology, GSM technology, Arduino UNO, Location data

I. INTRODUCTION

A vehicle tracking system using GPS and GSM module is an advanced technology that allows individuals and businesses to monitor the location and movement of their vehicles in real-time. This system relies on the Global Positioning System (GPS) to determine the precise location of a vehicle, and the Global System for Mobile Communications (GSM) network to transmit this location data to a remote server or device.

The system can be used to track a single vehicle or an entire fleet of vehicles, and provides a range of benefits such as improved security, better vehicle management, and enhanced efficiency. The GPS technology allows for

accurate and reliable location tracking, while the GSM network provides reliable communication between the vehicle and the monitoring device.

Overall, a vehicle tracking system using GPS and GSM module is a powerful tool for businesses and individuals who want to improve the security and efficiency of their vehicles. It can help to reduce costs associated with theft, improve response times to emergencies, and optimize routes for increased productivity.

II. METHODOLOGY

A vehicle tracking system is a technology that enables the real-time tracking and monitoring of vehicles. The methodology for developing such a system involves several steps. The first step is to determine the requirements of the system, including the type of vehicles to be tracked, the level of accuracy required, the frequency of updates, and the type of user interface. Once the requirements are defined, the appropriate technology can be selected. GPS and GSM modules are commonly used for location tracking and communication, respectively. The design and development of the system involves selecting and integrating the hardware components, programming the microcontroller, and developing the user interface. The system acquires data from the GPS module, processes it, and communicates it through the GSM module. The data is stored locally or remotely and can be accessed through a user interface, such as a web-based application or a mobile app. The system is tested and optimized for performance to ensure that it meets the requirements of the user.

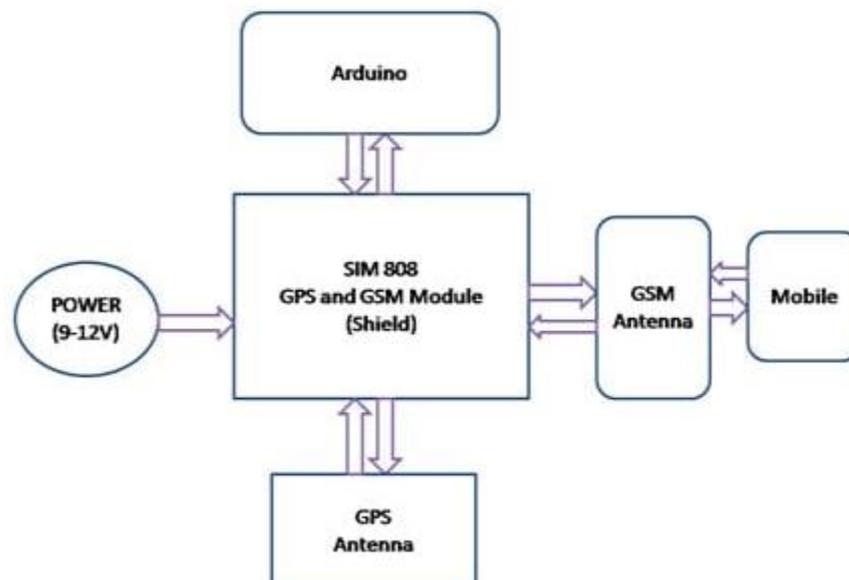


Fig.1: Block diagram

III. HARDWARE DESCRIPTION

A. Arduino Uno

Arduino Uno is a physically programmable circuit board which is also known as microcontroller. It contains a software piece and integrated development environment like in computer that are used for writing and uploading programming code into the Arduino. They generally prefer running in C language or C++ language. They are designed based on ATmega328pP with 14 input and output pins along with USB connection, power jack and a reset button. The software used for writing code in Arduino Uno is Arduino IDE(integrated development environment) which can be easily downloaded in the official webpage of Arduino site. It has a crystal oscillator of operation frequency at 16 MHZ and 6 analogue pins starting from A0 to A5. Apart from USB port it can also be powered by battery using ac or dc adapter.

B. GSM module:

The GSM module, or Global System for Mobile Communications module, is a type of wireless communication module that allows devices to transmit and receive data over a cellular network. Some of the functions of a GSM module include:

- **Voice communication:** The GSM module can be used for making and receiving voice calls.
- **SMS messaging:** The module can be used to send and receive SMS messages.

GPRS/EDGE data communication: The module can be used for sending and receiving data over the cellular network, using GPRS (General Packet Radio Service) or EDGE (Enhanced Data rates for GSM Evolution) technology.

- **GPS tracking:** Some GSM modules have built-in GPS functionality, which allows for location tracking and monitoring.
- **Remote control:** The module can be used to remotely control devices, such as turning lights on and off or opening and closing doors module.

C. GPS module

A GPS (Global Positioning System) module is a device that receives signals from GPS satellites and calculates the device's precise location on the earth's surface. Some of the functions of a GPS module include:

- **Positioning:** The GPS module is primarily used for positioning and navigation purposes. It receives signals from GPS satellites and calculates the device's latitude, longitude, and altitude.
- **Timing:** The GPS module can also be used for timing applications, such as synchronization of clocks, by providing highly accurate time information.
- **Speed and direction:** By measuring the device's position over time, the GPS module can calculate the device's speed and direction of travel.
- **Geofencing:** The GPS module can be used to set up geofencing, which allows the user to define a virtual boundary around a specific location. When the device crosses this boundary, an alert can be triggered.
- **Tracking:** The GPS module can be used to track the movement of devices, vehicles, or people in real-time.

D. Jumper wires:

Jumper wires are electrical wires used to create connections between electronic components on a breadboard, circuit board or any other circuitry. They can be used to create temporary or permanent connections, depending on the application.

The primary role of jumper wires is to provide a means of transferring electrical signals and power between different components within an electronic circuit. They are particularly useful in prototyping and testing stages of electronic projects, as they allow for easy and quick modifications to be made to the circuit.

E. Power supply:

A power supply that is capable of providing an output voltage between 6 and 9 volts can be used to power a variety of electronic devices. These devices may have different power requirements, and the appropriate voltage and current rating of the power supply should be chosen accordingly. The current rating of the power supply is also important, as it determines the amount of power that can be delivered to the device. The current rating should be equal to or greater than the current required by the device to ensure that it can function properly.

In general, when selecting a power supply, it is important to consider the voltage and current requirements of the device to be powered, as well as the efficiency, reliability, and safety of the power supply itself.

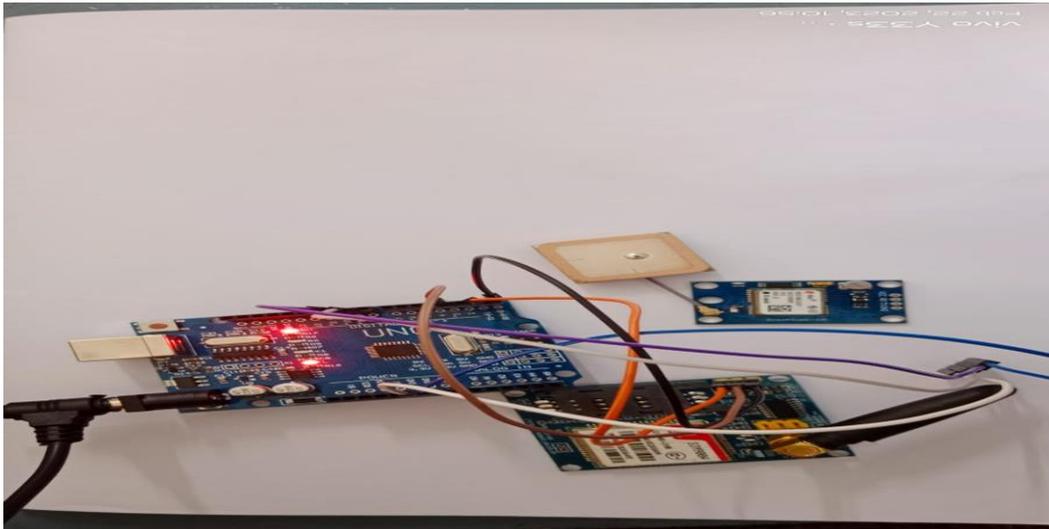


Fig. 2: Component set up

IV. SOFTWARE DESCRIPTION

A. Arduino IDE software

The Arduino Integrated Development Environment (IDE) is a software platform used to write and upload code to Arduino microcontroller boards. It is available for free download and can be used on Windows, Mac OS X, and Linux operating systems.

The Arduino IDE provides a simple, user-friendly interface that makes it easy to write, compile, and upload code to an Arduino board. It includes a code editor with syntax highlighting, automatic code completion, and error highlighting, making it easy to write and debug code.

The IDE also includes a serial monitor that allows you to view the output of your Arduino board and send data to it in real-time. This can be especially useful when developing projects that interact with sensors or other hardware.

In addition to the basic features, the Arduino IDE can be extended with a variety of plugins and libraries to add functionality and make programming easier. Overall, it is a versatile and powerful tool for developing projects with Arduino boards.

V. RESULTS

By this project the vehicle tracking systems that use GPS and GSM modules offer many benefits for businesses and individuals who want to monitor their vehicles' locations and activities. These systems typically use a GPS receiver to determine the vehicle's location and then transmit that data to a remote server via a GSM network. With this information, the vehicle's owner or manager can track the vehicle's movements in real-time, monitor driver behavior, and optimize routes to save time and fuel costs. In addition, these systems can provide valuable data for fleet management, logistics planning, and theft prevention. Overall, the use of GPS and GSM modules in vehicle tracking systems has revolutionized the way businesses and individuals manage their fleets and ensure the safety and security of their vehicles.

VI. CONCLUSION AND FUTURE SCOPE

In conclusion, a vehicle tracking system is a useful tool that can provide several benefits to individuals and businesses alike. It enables real-time tracking of vehicles, improving their efficiency and safety. It also helps businesses monitor their fleets, increase productivity, reduce costs, and provide better customer service. Furthermore, vehicle tracking systems can help in the recovery of stolen vehicles, increasing the chances of retrieving them and reducing losses. Overall, a vehicle tracking system is a valuable investment that can provide numerous benefits to individuals and businesses who rely on vehicles for their operations.

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