



Car Tracking System: Pros and Cons

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DOI: 10.5281/zenodo.7102272

Submission Date: 24th July 2022 | Published Date: 22nd Sept. 2022

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Abstract

An effective car tracking system that uses an Android app to track the position of any equipped vehicle is offered. The SIM808 module, which combines GPS and GSM modules, is used. The GPS module is utilized to determine the car's location. These coordinates are transmitted to the smartphone using a GSM signal. module. An Android-based app is developed to display the vehicle's location on a Google map on a smartphone. The application also includes the option to save the vehicle's prior journey history.

Keywords: Arduino Microcontroller, Vehicle tracking, GPS Module, GSM Module, Arduino Application

INTRODUCTION

Satellite-based navigation systems like GPS and GLONASS can be used to track, locate, guide, and navigate people and other objects. Its applications range from vehicle and traffic navigation to military applications in guided missiles and bombs, freight and asset tracking, marine and sea navigation, air transport, homing location beacons, use in smart phones and handheld devices, etc. ^[23]. Nigeria's crime rate is currently rising quickly, including occurrences of stolen vehicles. Many tools have been developed to lower crime rates. This is due to the fact that criminals are now more cunning and employ a variety of tactics while committing crimes. The demand for car detection equipment is now escalating on occasion, keeping pace with Nigeria's rising vehicle population. Many tracking devices have been added to vehicles, either by the automaker or by independent software developers. The use of tools that can be operated directly through phones or computers is increasing as electronic technology advances quickly ^[22].

RELATED WORKS

Finding the car is the initial step in several automotive emergencies, such as theft, accident, stealing, and breakdowns, where a rapid response is required ^[1, 2, 3]. There are a few techniques that can be used to localize a car in order to discover it, such as the Global Positioning System (GPS) or the cellular network ^[4, 5]. However, it is believed that the GPS method uses a lot of energy and consumes a lot of power ^[6, 7]. However, that is no longer a concern as long as the car has a battery. GPS technology is used by the GSM/GPRS and GPS tracking systems to determine the exact location of the vehicle. When the GPS is connected to the vehicle, that location can be discovered. By following and tracking a car, a tracking system may be able to locate a stolen or lost one. That might result in the car thieves being apprehended ^[8, 9, 10]. The thieves can offer the full vehicle for sale or just spare components. Therefore, we require a quick transmission, cost-effective tracking system ^[11, 12, 13]. Since the GPS must be used continually at all times, the driver may consider a remedy if the GPS's power is turned off. On the other hand, with such systems, an administrator should be able to maintain track of the car by seeing the coordinates on a map and checking the driver's whereabouts in real-time using a computer, a mobile device, or any other device as long as it has an internet connection ^[1, 14]. The server that receives the data supplied from the car could be a standard server with only one administrator watching the map, or it could be in the cloud, sharing the data in a database tied to it with other administrators or users. Maps may be accessed anywhere, at any time, with the help of the cloud ^[15]. Reliability, adaptability, scalability, and accessibility are all provided by cloud-based servers ^[16, 17, & 18]. Reduced HTTP requests from Arduino and smaller GPRS module data transmissions to the remote server are the

key contributions of this study. Additionally, by using bogus data and outfitting the system with an auto-connecter circuit to ensure that the GPS is always operational even after someone cuts the main, this study has added extra security for the information about the car ^[19]. ^[20] Presented an integrated, economical system that tracks the vehicle using GPRS and GPS. The administrator has access to the vehicle's record from any location at any time. The GPS/GPRS SIM908 module and Arduino UNO are both utilized in this setup. This vehicle-attached embedded system updates the remote server's location on a Google map every 10 seconds by sending coordinates every 10 seconds. For the implementation, they employed a variety of languages, including HTML, CSS, Ajax, XML, and PHP for web design and the interface between the web and the database, which was done using MySQL. ^[21] The creation and implementation of an embedded systems-based anti-theft vehicle tracking system, as well as the design and development of an automobile theft control system, are both necessary to stop and manage auto theft. Based on GSM and LTE Release 8, this system. The target vehicle contains the embedded system. The suggested system includes a Raspberry Pi Microcontroller as its brain, a GSM/GPRS SIM900A module, a GPS NEO 6M module, a 5MP Raspberry Pi 3 Model B Camera Module Rev 1.3, the Google Maps application, and relay circuits. The information is utilized for further processing after the vehicle owner notices that the car has been stolen. The owner can call the unique number for the mobile interface that goes with the hardware kit that is already installed in the vehicle. By reading the signal from the mobile user and instructing the engine to lock up or immediately stop, it gives the owner the ability to control how the engine operates. After entering a security key that is predefined in both the owner and the embedded system, the owner can control the system. Was used to take a picture of the driver and send it as an MMS to the owner of the car. The owner can use an SMS to halt the car and a GPS module to locate the car's location. The Arduino IoT platform, which serves as a tracking device, is used in the development of the vehicle tracking system. All car users can easily track their vehicle's whereabouts with the use of this technology, which was built for them. Users must register online and put the tracking device (an Arduino) on their car before they may track it. The system consists of a Global Positioning System (GPS) module, a Global System for Mobile Communications (GSM) module, and an Arduino Uno R3 microcontroller for the Internet of Things (IoT) platform. More specifically, the primary controller that manages and communicates with GPS and GSM is the Arduino Uno R3 microcontroller. The GPS module is in charge of obtaining the location information from the satellite in the form of latitude and longitude. Following processing by the Arduino microcontroller, the position will then be forwarded to the GSM module. The GSM module is in charge of communicating the position to the users via Short Message Service (SMS) or data transfer to the web server in the interim. The installation of this tracking gadget is done inside the car, out of sight. There are two methods for tracking. The first one would involve logging into the system using a web-based application. The user must next register the tracking device and supply a phone number so that tracking through SMS can be done. When a user clicks the track button, they are taken to the tracking page, where a map with the vehicle's location is marked. SMS is the second method. Users merely need to send the tracking device a legitimate tracking command. Before providing the user with the vehicle's current location, the tracking device verifies that the command and phone number are legitimate ^[24]. The objective of this research is to design and construct a portable, wireless GPS tracking tool that can be used for online remote tracking. The first element is a mobile device with GPS and a wireless Internet connection. The second part is our hardware project, which includes an LCD, GPS, GSM, Arduino Uno, and a sensor connected to a service ^[25].

Benefits of car tracking systems

1) Higher Security

Trackers can assist car owners in keeping one of their most valuable possessions safe from criminals. The gadget you select may utilize sensors to sound an alert to prevent theft and establish safe zones. Safe zones, also referred to as geofences, are digital walls constructed around a particular area. When the tracker enters or exits the virtual border, an instant notice will be delivered to you as a preventative measure against theft.

2) Fraud Recovery

If the worst happens, real-time tracking makes it possible to locate a stolen automobile within minutes from a smartphone or laptop, allowing you to quickly and effectively call the police and have your car recovered.

3) Personal Security

Few individuals are aware that certain trackers can lower auto accidents and improve driver safety. To stop coworkers or family members from operating the automobile recklessly, the owner can establish speed limits and notifications for unsafe driving.

4) Increasing output

The advantages of GPS tracking are crucial for management! You can use it to boost employee efficiency in addition to giving customers access to the precise location of their order at any time throughout the delivery process.

With the use of a GPS tracker, you can keep an eye on the whereabouts of your fleet and your personnel, preventing unauthorized stops and breaks and keeping tabs on their overall mileage and delivery schedules.

5) Save cash

Even while purchasing the tracking gadget can be somewhat pricey, there are other methods you can save money. Such as obtaining insurance policy discounts just by installing a tracker and using driving data to reduce fuel costs.

The drawbacks of vehicle tracking systems

1) Privacy Concerns

Many individuals view car tracking as a violation of privacy, which could be problematic if you want to utilize the device for commercial purposes. Fortunately, there are rules in place to protect the personal information of employees when it comes to vehicle tracking in the sector. Before placing a tracking device on an employee's vehicle, as the employer, you must always acquire their consent and make sure they understand how it functions.

2) Price

You should prepare to spend a significant amount of money on a good vehicle tracker with all the bells and whistles. However, there are a variety of trackers available, some of which are extremely affordable. To prevent overspending, do your research to make sure the tracker you buy meets your needs.

3) Signal throttling

Devices that interfere with satellite signals can jam GPS trackers, making it impossible for you to find your car. Thieves who are tech adept are increasingly using these. Unfortunately, reporting the issue is the only way to cease signal jamming.

4) Energy sourcing

Hardwired and battery-powered tracking systems have their drawbacks. Battery-powered trackers must be constantly charged in order to function, which can be time-consuming. A device's charging time varies greatly between models, and they are thought to be simple to install. On the other hand, hardwired trackers get power from your car's battery, eliminating the need for recharging. They are more challenging to install, and if they're not installed properly, this could result in their depletion^[26].

CONCLUSION

This study's goal is to create a system that can track the position of the car when it has been lost or stolen. Additionally, this study decreases the amount of automobiles that have been stolen in Nigeria. The theory is that if the GSM module will get a message from the owner and the GSM module will respond to the message. The answer the message will include coordinates and a Google Maps URL link. The system will automatically update the user's position every minute once it has been launched. The user will be directed to the Google Map after clicking the URL link. The user can utilize the marker to see the vehicle's location there.. The time it takes to find the stolen car can be cut in half because the user can see the road on the map. Therefore, a user can obtain the location of the car and real-time vehicle location information by utilizing the method. There are many methods to make the system better. To connect with a satellite, first make use of the GPS module's superior quality. The GPS NEO-6P module is one instance, which can gather data more accurately and maintain contact with the satellite. The system must then be balanced with modern technology, and research can be enhanced by sending data to a server via IOT (Internet of Things). Finally, by using the internet to view the webpage, the location can be determined. There is discussion of both the benefits and drawbacks of car monitoring devices.

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CITE AS

M. A. Baballe, A. S. Bari, A. L. Musa, N. K. Mustapha, U. H. Hussain, D. Bello, & A. A. Umar. (2022). Car Tracking System: Pros and Cons. Global Journal of Research in Humanities & Cultural Studies, 2(5), 188–191.
<https://doi.org/10.5281/zenodo.7102272>