International Journal of Innovative Research in Computer Science & Technology (IJIRCST)
ISSN: 2347-5552, Volume-10, Issue-4, July 2022
https://doi.org/10.55524/ijircst.2022.10.4.31
Article ID IRPV1049, Pages 236-239
www.ijircst.org

Vehicle Tracking System Powered By IoT

T. Sriram Murthy[1], G.Gouthami[2], B.Aparna Durga[3], K.Supraja[4], and B.Naga Sai Smanth[5]

[1]Assistant Professor, Department of Electronics and Communication Engineering, PACE Institute of Technology and Sciences, Ongole, Andhra Pradesh, India.
[2,3,4,5]UG Students, Department of Electronics and Communication Engineering, PACE Institute of Technology and Sciences, Ongole, Andhra Pradesh, India.

Correspondence should be addressed to T. Sriram Murthy; SriramMurthy_t@pace.ac.in

Copyright © 2022 Made to T. Sriram Murthy et al. This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT- Nowadays, safety is of highest importance to us, whether it pertains to our possessions like cars, homes, or kids. GPS tracking gadgets are really helpful in this situation. In the event of any emergency, such as theft, accidents, etc., it is simple to follow the current location of the assets or vehicles. They can be maintained with kids to track their whereabouts. Here, we are creating a similar GPS tracking system so that anyone can see the vehicle's current position in real time. The history sites the car has traveled through will be stored in the Thing Speak IOT cloud in this case. Previously, we used the Node MCU ESP8266 to connect to GPS and displayed the location information on a website. This IOT vehicle tracking system will also include a link that will direct users to a Google map that shows the location of the vehicle.

KEYWORDS- IoT, Tracking System, GPS, Mobile Applications

I. INTRODUCTION

The Internet of Things (IoT) connects number of devices worldwide. It's widely used in daily life. IoT is used in tracking systems.

Cab/bus aggregate owners can utilize the vehicle tracking technology for security and administration. The technology can locate a vehicle using GPS and other navigation systems. Installation of a vehicle-tracking device offers location and real-time data storage. The data can be displayed on maps and other tools.

Vehicle tracking systems are popular among vehicle owners and commercial fleet dispatchers, but students and parents who want to track college/school buses or working professionals who use company transportation can also use them. Traffic or other factors might delay buses. This is a serious concern for college students and professionals. Most passengers miss the bus or wait longer due to non-adherence to bus timings. Manual bus tracking by staying close to the passengers is impractical and unproductive. Thus, a system that permits users to be independent is needed.

The proposed system uses GPS Module, a popular tracking technology. The device is connected to the car. Raspberry Pi connects GPS modules. The vehicle tracking system employs the GPS module to track vehicles in real time. Raspberry Pi transmits and updates. The vehicle's location to a database regularly. Real-time vehicle coordinate monitoring is done using a Web app. Google Maps API background is used to map the vehicle's active position on the website. These capabilities, such as ETA and distance, keep users updated on vehicle coordinates.

II. LITERATURE SURVEY

GPS-based vehicle tracking is implemented in this research. GPS and GSM are used to retrieve vehicle information like location, distance, etc. The following features transform information: Vehicle information like position is acquired after each user-defined time interval. This periodic location data is sent to a monitoring or tracking server. Goggle Earth displays vehicle location in electronic goggle maps on the display device.

This device helps city taxis and buses by providing Tele monitoring and management. This paper describes a system with a "On-board module" mounted in the vehicle to be tracked. This on-board module has GPS, GSM modem, and ARM processor. The vehicle terminal GPS receiver receives and resolves GPS position satellite navigation messages. This satellite computes vehicle coordinate longitudes and latitudes, converts them into short messages using a GSM communication controller, and sends them to the monitoring center through the GSM network[1].

Global Positioning System is used to locate the car in this paper. The GPS receiver sends SMS to the user through GSM. After receiving this SMS, the GSM modem sends a response to the car owner. The accelerometer sensor detects vehicle errors and accidents and sends a signal. Instead of a microcontroller, this system employs an FPGA Spartan processor to manage all system parts according to the program[2].

This system utilizes GPS to receive latitude and longitude coordinates from satellites during important information. We all know that tracking systems are crucial today. This device can monitor soldiers, track car theft, and more. This system uses microcontroller, GPS, and GSM. This system uses one GPS device and GSM for two-way

communication. GSM modems have SIM cards that employ the same communication technique as phones [3] [4].
This study employs an RF transmitter attached to a car with its own identifier. The data sent continually to the microcontroller's RF receiver. The microcontroller receives vehicle location data from the GPS. If the RF transmitter is not receiving the signal, the receiving unit triggers a signal to the microcontroller, which we can use to identify the theft. If the vehicle is stolen, it automatically broadcasts its location to its user through SMS over the GSM modem. This system is simpler and cheaper. The vehicle stops if the user sends an SMS password [5].

III. PROPOSED SYSTEM:

The proposed Vehicle Tracking System is built on a robust architecture that combines hardware, software, and connectivity technologies:
IoT Devices: Each vehicle in the fleet is equipped with IoT devices, such as GPS trackers, accelerometers, and sensors for various parameters like fuel level, temperature, and vehicle diagnostics.
Data Communication: The IoT devices transmit real-time data to a central cloud-based platform using wireless communication protocols like GSM, 4G/5G, or LoRaWAN, ensuring continuous connectivity.
Cloud Platform: A cloud-based server hosts the system's core functionalities, including data storage, processing, and analysis. The platform provides scalability, security, and easy accessibility.
Web and Mobile Applications: Users, including fleet managers, drivers, and administrators, access the system through user-friendly web and mobile applications. These applications provide real-time vehicle tracking, alerts, and reporting features.

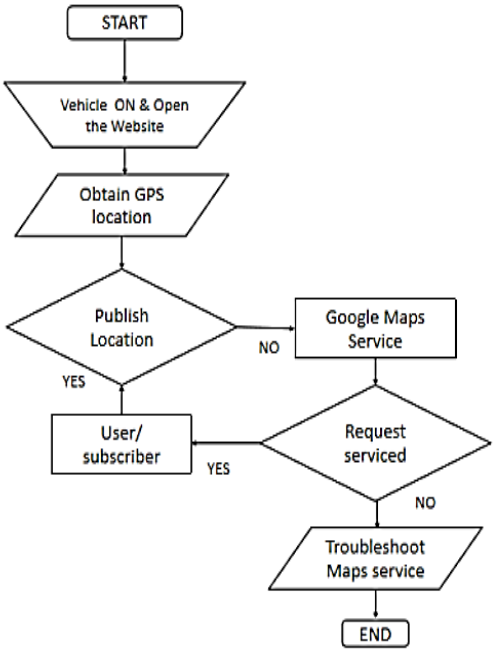

Figure 1: Flow chart of proposed system

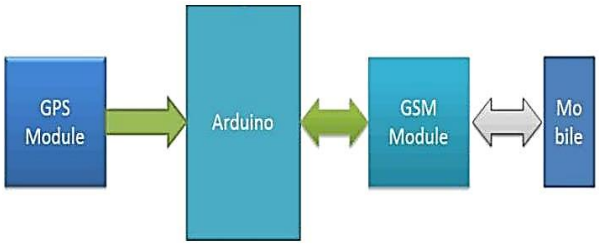

Figure 2: Block diagram of proposed system

GPS RX and TX pins go to Arduino D2 and D3 pins. GPS's GND and VCC pins go to Arduino's 5V power source pins. GSM Module's RX and TX pins go to Arduino's D1 and D2 pins, while its GND pin goes to Arduino's GND pin.

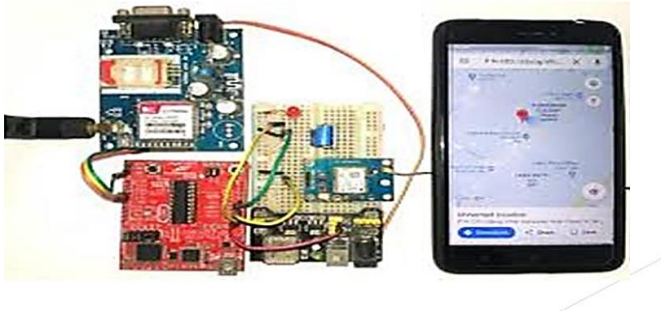

Figure 3: Circuit Diagram

Main component of vehicle tracking system **is**embedded.Open-access microcontroller Arduino UNO Arduino controller board interfaces embedded devices with 16 input/output pins. In Figure 1 the 5v voltage works. It contains 32KB flash memory and 2KB static RAM. Arduino IDE can program controller in embedded c.

IV. WOKING OF PROPOSED SYSTEM

This process includes two extra phases than the usual one. The first stage involves storing data on the board before transferring it to the system. Cloud. The second stage compares location and the newest record temperature are compared of the preceding one. Longitude and latitude are location compared. If location data match, we compare temperature data. The temperature differential between two is less than the threshold, temperature data will be displayed not uploaded as from references. Otherwise, the new temperature data will be cloud➢ GPS module tracks vehicle location using latitude and longitude values.

- GSM modems convey these values to users via mobile networks.
- The sensor values can be monitored globally via the Thingspeak channel.
- The suggested tracking system combines three components:
  - GPS
  - Raspberry Pi
  - Web App

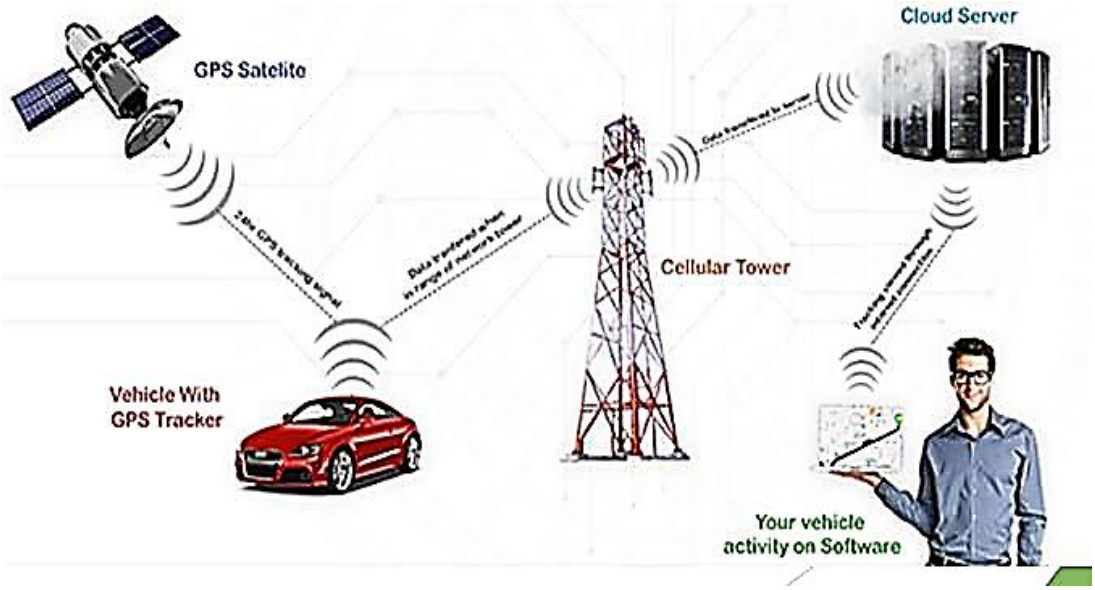

Figure 4: Components of tracking system

Vehicle Tracking System powered by IoT offers a range of features and functionalities:

- Real-time Tracking: The system provides real-time location tracking of vehicles, enabling fleet managers to monitor their positions on a map.
- Geofencing: Geofencing capabilities allow for the creation of virtual boundaries, triggering alerts when vehicles enter or exit designated areas.
- Fuel Monitoring: Sensors track fuel levels and consumption, helping to optimize fuel efficiency and reduce costs.
- Driver Behavior Analysis: Accelerometer data and sensors monitor driver behavior, promoting safe driving practices and reducing accidents.
- Maintenance Alerts: The system generates automatic alerts for vehicle maintenance based on diagnostic data, reducing downtime and repair costs.
- Route Optimization: Fleet managers can optimize routes, reduce idle times, and improve delivery efficiency through real-time traffic data.
- Security: The system enhances vehicle security by enabling remote immobilization in case of theft or unauthorized access.
- Data Analytics: Data collected from vehicles can be analyzed to derive insights for decision-making, predictive maintenance, and performance optimization.

V. BENEFITS

- The proposed Vehicle Tracking System offers numerous advantages:
- Cost Efficiency: Improved fuel efficiency, reduced maintenance costs, and optimized routes lead to significant cost savings.
- Enhanced Safety: Monitoring driver behavior enhances road safety, reduces accidents, and lowers insurance premiums.
- Fleet Optimization: Better fleet management, route optimization, and maintenance planning lead to increased productivity.
- Data-Driven Decisions: Data analytics empower organizations to make informed decisions based on vehicle performance and operational insights.
- Environmental Impact: Reduced fuel consumption and optimized routes contribute to a smaller carbon footprint.

VI. RESULT

The results obtained from the implementation and evaluation of the Vehicle Tracking System powered by IoT demonstrate its effectiveness in improving vehicle tracking, fleet management, and operational efficiency. The system's ability to provide real-time data, optimize routes, monitor driver behavior, and offer security features contributes to cost savings and enhanced safety. Additionally, the data analytics capabilities empower organizations to make informed decisions for better overall performance and sustainability in the automotive industry.

VII. CONCLUSION

Our car tracking technology, Smart technology (SVS), efficiently tracks, records, analyzes, and alerts users of incidents. It contains three primary parts: a Tracking Unit, Cloud, and Android app• Constructed a vehicle tracking system controlled by a smartphone specifically an embedded device.

- Designed and implement cost effective vehicle tracking system yet an efficient one.
- Designed a user friendly and a safe system to control vehicles especially aimed to aid the elders.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

REFERENCE

[1] Sowjanya kotte & Hima Bindhu Yanamadala, "Advanced Vehicle Tracking System on Google Earth Using GPS and GSM‖", International Journal of Computer Trends and Technology (IJCTT)‖ – volume 6 number 3– Dec 2013.

[2] Hubert Vijay A, Karthikeyan N & Prabhu K ―Vehicle Tracking and Accident Warning System Using GPS and Its Implementation in FPGA‖.

[3] Shikha Parashar , Sushil Kumar Tripathi. "A Review on Solar Tracking System", International Journal of Innovative Research in Engineering & Management (IJIREM), 8, no.6, pp. 366-369 (2021), doi:10.55524/ijirem.2021.8.6.78.

[4] Abid Khan & Ravi Mishra, "GSM Based Tracking System", International Journal of Engineering Trends and Technology, Volume 3 Issue 2- 2012 ISSN: 2231-5381.

[5] Pankaj Verma & J. S. Bhatia, "Design and Development of GPS-GSM Based Tracking System with Google Map Based Monitoring", International Journal of Computer Science, Engineering and Applications (IJCSEA) vol.3, no.3, June 2013.