ISSN: 2321-2152

IJMECE

International Journal of modern electronics and communication engineering

E-Mail
editor.ijmece@gmail.com
editor@ijmece.com

www.ijmece.com

ISSN 2321-2152
www.ijmece.com
Vol 12, Issue 4, 2024

IOT Based Real -Time Vehicle Tracker On Google Maps Using NodeMCU

[1]M SIVA KUMAR 21tq1a0409@siddhartha.co.in [1]T PREM SAI VISWANADH 22tq5a0403@siddhartha.co.in [1]G SANDEEP CHAITANYA 22tq5a0421@siddhartha.co.in [2]Mrs. D. Shirisha shirishadubbaka.ece@siddhartha.co.in

SIDDHARTHA INSTITUTE OF TECHNOLOGY & SCIENCES Korremula Road, Ghatkesar, Medchal-Malkajgiri (Dist)-500 088

ABSTRACT

This proposed system is used for Driver & Road safety system. Based on computer vision techniques, the driver's face is located from a color video captured in a car. Then, face detection is employed to locate the regions of the driver's eyes, which are used as the templates for eye tracking in subsequent frames. The tracked eye's images are used for drowsiness detection in order to generate warning alarms. The proposed approach has three phases: Face, Eye detection and drowsiness detection. The role of image processing is to recognize the face of the driver and then extracts the image of the eyes of the driver for detection of drowsiness. The Haar face detection algorithm takes captured frames of image as input and then the detected face as output. It can be concluded this approach is a low cost and effective solution to reduce the number of accidents due to driver's Drowsiness to increase the transportation safety. This project presents a real-time driver drowsiness detection system for driving safety. Basedon computer vision techniques, the driver's face is located from a color video captured in a car. Then, face detection is employed to locate the regions of the driver's eyes, which are used as the templates for eye tracking in subsequent frames. Finally, the tracked eye's images are used for drowsiness detection in order to generate warning alarms.

I.INTRODUCTION

In recent years, the need for efficient and reliable vehicle tracking systems has grown significantly across various sectors, including logistics, public transportation, and private security. Traditional vehicle tracking solutions often involve cumbersome hardware setups, high costs, and limited real-time visibility, which can hinder effective decision-making and response. For fleet managers, private vehicle owners, and even law enforcement, the lack of affordable, flexible, and easy-to-implement tracking solutions remains a major barrier.This project focuses on developing a low-cost, IoT-based real-time vehicle tracking system utilizing NodeMCU and Google Maps integration to provide a live view of a vehicle's location. By using a GPS module connected to the NodeMCU, data is transmitted wirelessly over the internet, allowing users to track a vehicle's real-time location on Google Maps with minimal hardware. This real-time tracking capability can prove beneficial not only for asset management but also in reducing theft incidents and enhancing operational efficiency.The motivation for this project stems from the growing need for affordable, IoT-enabled tracking solutions that leverage wireless communication and cloud technologies to enable smarter and more secure vehicle management. Traditional GPS tracking systems can be costly and challenging to implement, often requiring extensive wiring, large hardware, and high maintenance. By integrating NodeMCU (a microcontroller with built-in Wi-Fi) with GPS modules, this project leverages the simplicity and affordability of IoT to design a flexible tracking solution.The rapid adoption of smartphones and GPS-enabled devices has increased public familiarity with location-based services, creating a demand for user-friendly tracking solutions that work in real-time and are accessible from anywhere. Moreover, with the availability of Google Maps API and open-source IoT frameworks, there is an opportunity to create a cost-effective tracking solution that anyone can deploy with basic programming knowledge.

II.LITERATURE SURVEY

The author of the paper provides a solution for tracking and monitoring the public transportation vehicles using devices such as Raspberry Pi and GPS Antenna. Raspberry Pi processing board can be used to receiving values and gives the result. This method can find a way to monitor the transportation vehicle from the location source to destination. In this paper, there is a use of GPS receiver module for receiving the latitude and longitude values of the present location of the vehicle continuously. A passenger of the vehicle will give different locations to the system between the source and destination locations. These values will be stored in the Raspberry Pi database and Raspberry Pi processor will compare the passenger specified values with the current vehicle location values and if the result is not the same then the passenger will be informed with warning message via display system that driver is driving in the wrong direction.[3]In this paper implementation and designing of a real-time GPS tracker system via

Arduino was applied. This method was applicable for salesman tracking, private driver and for vehicle safety. The author of the paper also tried to solve the problem of owners who have expensive cars to observe and track the vehicle and find out vehicle movement and its past activities of vehicle. The system has GPS/GSM modules controlled by Arduino MEGA placed inside the vehicle. The vehicle position will be updated every time as the vehicle moves. Then User will send SMS on registered number and they will receives the coordinate location. At the same time the data will get stored on SD card continuously. The location will be accessible to users by system via website over the internet.

III.EXISTING METHOD

Traditional vehicle tracking solutions often rely on GSM and GPRS modules, which are effective but relatively expensive and complex. They require monthly data subscriptions, which add recurring costs. These systems also face limitations in terms of flexibility and scalability, especially for individual users or small businesses. In contrast, an IoT-based vehicle tracker, powered by a NodeMCU microcontroller, provides an affordable and adaptable solution. The NodeMCU is based on the ESP8266 Wi-Fi module, making it highly suited for internet-based applicationsIn this system, the NodeMCU connects to a GPS module (such as the NEO-6M) to collect real-time geographical coordinates (latitude and longitude) of the vehicle. This data is then sent over Wi-Fi to a cloud server, where it can be accessed by users for real-time visualization on Google Maps. The system uses Google Maps API to convert raw location data into a dynamic map display, providing users with an intuitive and visual representation of the vehicle's current location. By leveraging cloud storage and real-time data transmission, this system enables continuous monitoring without requiring specialized software or complex network infrastructure.

Objectives of the Existing System

The primary objectives of this IoT-based vehicle tracking system include:

1. Real-Time Location Tracking: Enable continuous, real-time monitoring of the vehicle's position on Google Maps.
2. Cost Efficiency: Utilize inexpensive components like NodeMCU and GPS modules to make the solution affordable and accessible.

3. Ease of Use: Provide a user-friendly web-based interface through Google Maps, allowing users to view the vehicle's location on any device with internet access.
4. Scalability and Flexibility: The system should be scalable, allowing for multiple vehicles to be tracked simultaneously by integrating each vehicle's data into the cloud.

IV.PROPOSED METHOD

The image above showcases an IoT-based Real-Time Vehicle Tracker on Google Maps using a NodeMCU microcontroller. This project integrates key components such as the ESP8266 NodeMCU, a GPS module, an LCD display, and a power supply, enabling real-time vehicle tracking. The NodeMCU, a Wi-Fi-enabled microcontroller, serves as the central processing unit to gather data from the GPS module and transmit it to a cloud server, which is then visualized on Google Maps.

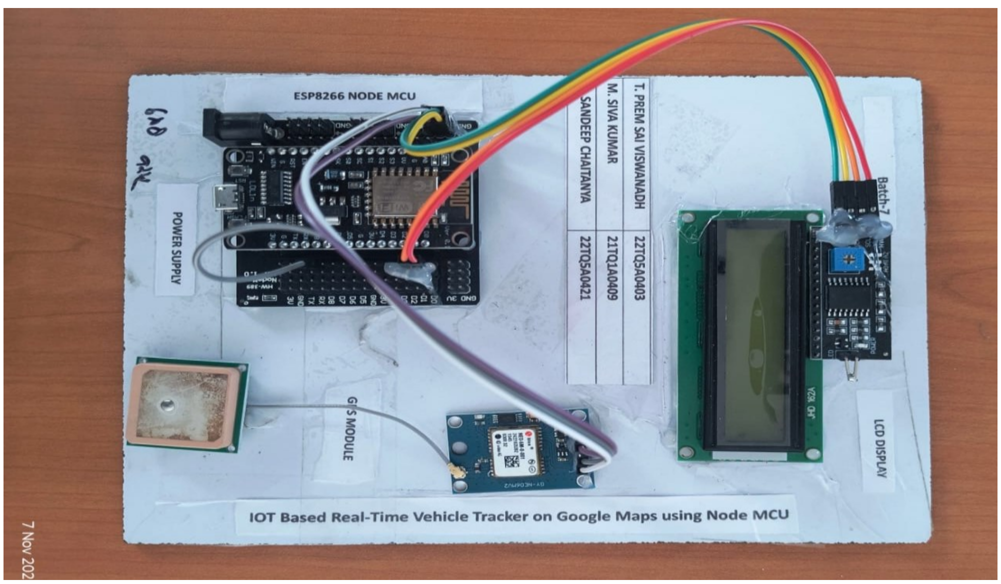

Fig.9.1: Project Hardware kit

The GPS module (visible on the bottom left) receives latitude and longitude coordinates of the vehicle's location. These coordinates are sent to the NodeMCU, which processes the data and transmits it via Wi-Fi to an online platform (such as Google Firebase or Thingspeak). This data is later retrieved and displayed on Google Maps for real-time tracking. The LCD display on the right shows current location coordinates or tracking statuses, providing a local visual interface for monitoring. The wiring and connections between the components are critical for data flow.

Colored wires connect the GPS module, NodeMCU, and LCD display, ensuring power and signal transfer. The system's power is provided via a power supply module, which stabilizes the voltage for the components, as labeled in the image. The team members responsible for this project are also listed on the board, indicating a collaborative engineering effort. This project effectively demonstrates how IoT and GPS technologies can be combined to enable real-time tracking of vehicles. Applications of such a system include logistics management, personal vehicle tracking, and public transportation monitoring, offering cost-effective and scalable solutions for enhancing vehicle security and efficiency.

IoT based Vehicle Tracking using Raspberry Pico W

Latitude Value	Longitude Value
17.410967	78.638023

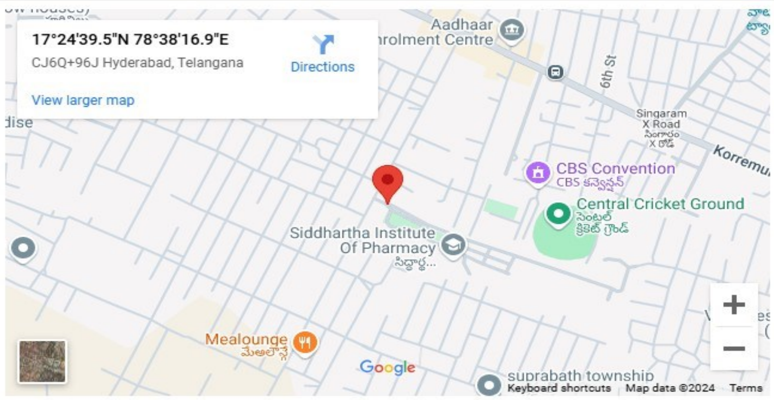

Fig.1: Project Output

V.CONCLUSIONS

The IoT-Based Vehicle Tracking System using GPS, I2C LCD Display, and NodeMCU offers a low-cost, efficient solution for real-time vehicle monitoring. By integrating GPS data collection, local display, and web-based mapping, this system provides a seamless tracking experience with minimal components and setup. This solution is suitable for personal and small-scale vehicle tracking applications, making real-time location access straightforward and accessible from any internet-enabled device. The system highlights IoT's power in creating flexible, cost-effective solutions that enhance vehicle security and accessibility.

VI.FUTURE SCOPE:

Future enhancements could add GSM/4G connectivity for broader coverage, geofencing alerts for unauthorized movement, and cloud storage for route history and analytics. Integrating sensors for accident detection and predictive maintenance alerts would boost safety and efficiency, expanding the system's applications to fleet management, logistics, and personal vehicle security.

BIBLOGRAPHY

[1]. Dinesh Suresh Bhadane, Pritam B.Bharati, Sanjeev A.Shukla, Monali D.Wani, Kishor K.Ambekar, "A Review on GSM and GPS Based Vehicle Tracking System" Volume 3, Issue2, March-April, 2015, ISSN 2091-2730.

[2]. Christeena Joseph, A.D. Ayyappan, A.R.Aswini, B.Dhivya Bharathy, "GPS/GSM Based Bus Tracking System (BTS)" Volume 4, Issue 12, December-2013, ISSN 2229-5518.

[3]. Akshatha S.A, "GPS based vehicle tracking and monitoring system- a solution for public transportation", Volume: 04 Issue: 04 | Apr -2017.

[4]. Hazza Alshamisi, Veton Këpuska, "Real Time GPS Vehicle Tracking System", Volume 6, Issue 3, March 2017.

[5]. Jessica Saini, Mayank Agarwal, Akriti Gupta, Dr. Manjula R, "Android app based vehicle tracking using GPS and GSM", volume 6, issue 09, September 2017.

[6]. Amol Dhumal, Amol Naikoji, Yutika Patwa, Manali Shilimkar, Prof. M. K. Nighot, "Survey Paper on Vehicle Tracking System using", Volume 3 Issue 11 November 2014.

[7]. Prashant Kokane, Sawant Kiran, Bhole Imran, Prof. Yogesh Thorat "Review on Accident Alert and Vehicle Tracking System", Vol. 3, Issue October - December 2015.