Intelligent Traffic Light Color based Speed Suggestion system for vehicles through OBD tracker

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ABSTRACT-

ESP32, GSM808 for GPS, RTC Module DS3231 for current time, and HTTP Methods are used in this project to create a Traffic Light Color Based Speed Suggestion System. Based on the car's location and the current time, the system uses a pre-made CSV file that is stored on a server and queried via HTTP protocols to determine the color of the traffic light. When a traffic signal is green, the ESP32 microcontroller analyses this data and recommends the fastest possible speed for a vehicle to arrive, enhancing traffic flow and lowering fuel usage.

KEYWORDS

GPS Module, ESP32 microcontroller, Arduino, OpenCV.

1. INTRODUCTION

Urban regions frequently experience traffic congestion, which increases fuel consumption, creates air pollution, and wastes time in traffic. Ineffective timing or red-light running by vehicles can cause further delays and congestion, despite the fact that traffic lights are necessary instruments for controlling traffic flow at crossings. The use of technology to improve traffic flow and traffic light timing has gained popularity in recent years.

Utilizing real-time information from moving cars, such as their location and speed, to calculate the ideal moment to turn on traffic lights is one method of streamlining traffic signal timings. Traffic signals can adjust to the actual traffic circumstances on the road using this method, known as vehicle-to-infrastructure (V2I) communication, which minimizes unnecessary stops and delays.

In this project, we present a traffic light color-based speed suggestion system that makes use of real-time GPS location data from moving vehicles to advise the best speed to go when a traffic light is green, thereby enhancing traffic flow and easing congestion.

The project uses a GPS module, an RTC module, and an ESP32 microcontroller to gather and process data. The ESP32 is a potent microcontroller with integrated Wi-Fi and Bluetooth that can connect to the internet and communicate with a server. While the RTC module makes sure the system runs with precise timekeeping, the GPS module gives accurate real-time position data for the car. In order to retrieve and update data, the project additionally communicates with a server using HTTP techniques. The project's objective is to optimize traffic signal timings and lessen unneeded stops and delays for vehicles by combining real-time GPS location data with traffic light color data from a prepared CSV file. This can result in better traffic flow, lower fuel consumption, and less air pollution, all of which help to make urban transportation more effective and sustainable.