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Vehicle System Implementation Using CAN Protocol

Dr. M. G. Wani¹, Shinde Vandana Babasaheb², Pujari Kunal Machhindra³, Vetal Nikita Dattu⁴, Dongare Shivani Dattatray⁵.

¹Assistant Professor, Department of Electronics & Telecommunication Engineering ^{2,3,4,5}Student, Department of Electronics & Telecommunication Engineering ^{1,2,3,4,5}Adsul's Technical Campus,Chas, Ahmednagar

Abstract: This project presents the implementation of an IoT-based vehicle monitoring and automation system using the CAN (Controller Area Network) protocol with the ESP32 microcontroller, aiming to enhance vehicle safety, efficiency, and connectivity. The ESP32, integrated with Wi-Fi and Bluetooth capabilities, serves as the central controller, communicating with various sensors via the TJA1050 CAN Bus Driver Interface Module to ensure seamless data transmission across the vehicle. Key components include a rain sensor for automatic wiper control, a water level sensor for monitoring essential fluid levels, and a DS18B20 waterproof temperature sensor for tracking engine temperature to prevent overheating. Real-time data is displayed on an LCD 16x2 screen and also transmitted to an Android application and a web dashboard for remote monitoring. The system features a robust power supply designed to deliver regulated 5V DC output, supported by a transformer, rectifier, and filter capacitor setup. By utilizing the CAN protocol, the system reduces wiring complexity, increases transmission speed, and ensures reliable communication between Electronic Control Units (ECUs). This advanced integration enables predictive maintenance, real-time alerts, and remote diagnostics, making it highly suitable for modern smart vehicles, fleet management systems, and electric vehicle ecosystems

Keywords: IoT, Vehicle Monitoring, CAN Protocol, ESP32, Automation

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