**ELECTRIC VEHICLE MAINTENANCE SCHEDULING USING ESP-32**

**A PROJECT REPORT**

**EED 4395**

IoT enabled Electric vehicle monitoring and control

**(Project Based Learning)**

###### **Submitted by**

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**BONAFIDE CERTIFICATE**

This is to certify that this project report **“ELECTRIC VEHICLE MAINTENANCE SCHEDULING USING ESP-32”** is the bonafide work of **“R E Dharshan (21113049), N Dani (21113004)”** who carried out the project work as a part of the subject **“EED4395 IoT-enabled Electric vehicle monitoring and control (Project Based Learning)”** under my supervision during the academic year 2023-2024.

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**ABSTRACT**

The increasing adoption of electric vehicles (EVs) necessitates efficient maintenance scheduling to ensure their optimal performance and longevity. This project proposes a novel approach utilizing an ESP32-based system for EV maintenance scheduling. The ESP32 is integrated into a customized PCB board, featuring components like an OLED display, RTC (Real-Time Clock), and other essential peripherals.

The system utilizes an ultrasonic sensor to measure distances, enabling real-time monitoring of EV conditions. Initially, the ESP32 is programmed to set the time using the RTC module, ensuring accurate timestamping of data. Subsequently, the system continuously measures distances and timestamps them, creating a dataset consisting of time-distance pairs.

To optimize maintenance scheduling, the collected data is analyzed using machine learning techniques. Specifically, K-means clustering is employed to categorize the dataset into distinct clusters based on temporal and spatial parameters. The clustering enables the identification of patterns and anomalies in EV behavior, facilitating proactive maintenance interventions.

The ESP32 system communicates with the Thing Speak IoT platform, allowing seamless data transmission for remote monitoring and analysis. Additionally, an OLED display provides real-time visualization of critical information such as distance, date, and time, enhancing user accessibility.

Overall, this project offers a comprehensive solution for electric vehicle maintenance scheduling, leveraging ESP32's capabilities and advanced data analysis techniques. By proactively addressing maintenance needs, the proposed system aims to enhance EV reliability, performance, and longevity in a cost-effective manner.

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**LIST OF ABBREVIATIONS**

|  |  |
| --- | --- |
| IDE | INTEGRATED DEVELOPMENT ENVIRONMENT |
| WI-FI | WIRELESS FIDELITY |
| IoT | INTERNET OF THINGS |
| DC | DIRECT CURRENT |