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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In partial fulfilment for the award of the degree
of
BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE ENGINEERING

HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE

PADUR, CHENNAI - 603 103

MAY 2024

HINDUSTAN
INSTITUTE OF TECHNOLOGY & SCIENCE
(DEEMED TO BE UNIVERSITY)

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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ACKNOWLEDGMENT

We are pleased to acknowledge our sincere thanks to Board of Management of Hindustan Institute of Science and Technology for their kind encouragement in doing this project and for completing it successfully. We are grateful to them.

We would like to express our sincere and deep sense of gratitude to our Project Guide Dr. G. Muthukumaran for his valuable guidance, suggestions and constant encouragement which paved the way for the successful completion of our project work.

We wish to express our thanks to all Teaching and Non-teaching staff members of the Department of Electronics and Communication Engineering who were helpful in many ways for the completion of the project.

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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.

LIST OF FIGURES

LIST OF ABBREVIATIONS

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