ELECTRICAL ENGINEERING DEPARTMENT
COLLEGE OF ENGINEERING AND SCIENCES
FINAL YEAR PROJECT

SUPERVISOR:
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PROJECT:
Motor Health Monitoring Using IoT

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ABSTRACT

This project focuses on the development and implementation of a motor health monitoring system for single-phase induction motors using Internet of Things (IoT) and Artificial Intelligence (AI) techniques. The aim of this project is to address the need for continuous monitoring and analysis of motor parameters to ensure optimal performance, prevent unexpected failures, and minimize downtime. The proposed system incorporates IoT technology, where sensor nodes are strategically placed on the motor to collect data on key parameters such as voltages, current, power, temperature, RPM, power factor, frequency, and fault detection. An AI-based analysis module, employing machine learning algorithms, processes the collected data to detect anomalies and predict potential motor faults.

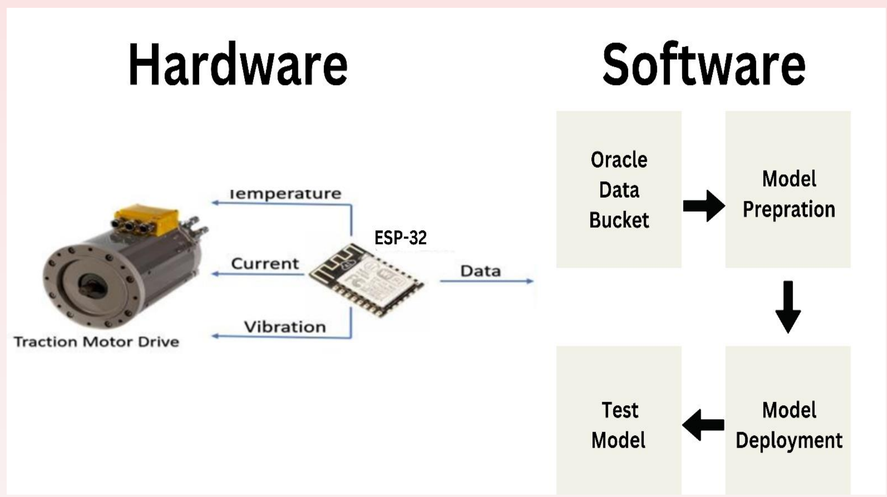
PROJECT COMPONENTS

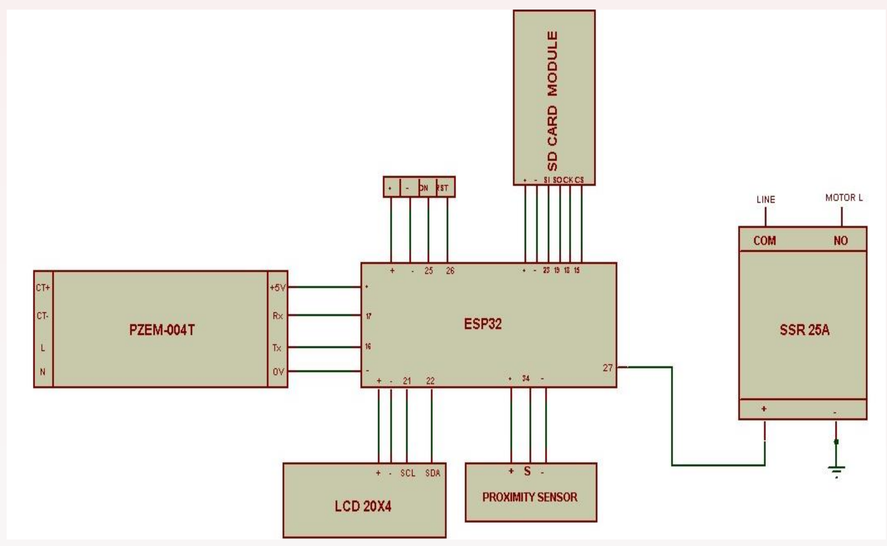
- Hardware:
  - PZEM-004T
  - ESP32
  - SSR25A
  - Sensors
    - Proximity Sensor
    - Voltage Sensor
    - Current Sensor
    - Temperature Sensor
  - SD Card Module
  - LCD
- Software:
  - Arduino IDE
  - Blynk Cloud
  - Programming Language
    - C++

INTRODUCTION

Electric motors play a vital role in various industries, commercial settings, and even homes. However, these motors can experience wear, degradation, and faults over time, leading to unexpected failures and costly downtime. To address these challenges, this project focuses on developing a motor health monitoring system that utilizes Internet of Things (IoT) technology and Artificial Intelligence (AI) techniques. The system aims to continuously monitor and analyze important parameters of a single-phase induction motor, such as voltage, current, power, temperature, RPM, power factor, frequency, and fault detection. By employing AI models, the system can detect abnormalities in motor behavior, enabling proactive maintenance and minimizing the risk of motor failure.

BLOCK DIAGRAM





PROBLEM STATEMENT

The main problem addressed in this project is the lack of continuous monitoring and analysis of critical motor parameters. Traditional maintenance practices are often based on scheduled inspections or reactive repairs after a motor failure occurs. This approach can be inefficient, costly, and may result in extended periods of downtime. By implementing a motor health monitoring system, it becomes possible to proactively identify potential issues and take preventive measures before they escalate. The system aims to overcome the limitations of manual monitoring and provide a comprehensive solution for efficient motor health management.

IMPACT & RESULTS (SDGS, CEPS)

- Depth of Engineering Knowledge: Demonstrates expertise in motor systems and IoT integration.
- Depth of Analysis: Utilizes AI models for advanced anomaly detection and predictive maintenance.

- Affordable and Clean Energy:
  - Supports the transition to sustainable energy sources.
  - Promotes affordable and clean energy solutions.
- Industry, Innovation and Infrastructure (SDG 9):
  - Enhances industrial infrastructure and innovation.
  - Promotes technological advancements for sustainable industries.