Electric Motor Temperature Prediction Using Machine Learning

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Duration: [Start Date - End Date]

1. Abstract

This project presents a machine learning-based solution for predicting the internal temperatures of an electric motor's critical components, namely the rotor and stator. Accurate temperature prediction is essential for predictive maintenance and avoiding motor failure. The project uses a Random Forest Regression (RFR) model trained on sensor data that includes torque, speed, current, and voltage. The trained model is then integrated into a web application using Flask, enabling users to input values and instantly receive temperature predictions. This system has practical applications in industrial automation and smart manufacturing environments.

2. Introduction

Electric motors are central to various industrial applications and their efficiency, longevity, and safety depend significantly on maintaining optimal internal temperatures. Overheating of motor components like the rotor or stator can lead to irreversible damage, production downtime, and high replacement costs.

Manual monitoring of motor conditions is inefficient and delayed. This project proposes an automated, intelligent system that uses a machine learning model to predict internal motor temperatures from external measurable features. The ultimate goal is to make maintenance predictive rather than reactive.

3. Problem Statement

To develop a machine learning model capable of accurately predicting electric motor internal temperatures (rotor and stator) from real-time sensor readings (voltage, torque, speed, current, etc.), and integrate this model into a Flask-based web application for user-friendly interaction.