Defined Problem Statement: Electric Motor Temperature Prediction using Machine Learning

1. Background

Electric motors are critical components in industries such as manufacturing, electric vehicles, and automation systems. Overheating is one of the primary causes of motor failure, resulting in operational downtime, high maintenance costs, and reduced equipment lifespan.

2. Core Problem Statement

There is a need to accurately predict the temperature of an electric motor based on operational parameters such as voltage, current, torque, speed (RPM), and ambient conditions. Traditional monitoring systems detect overheating only after it occurs, which may be too late to prevent damage.

3. Detailed Problem Definition

- How can we use machine learning techniques to predict motor temperature in real-time?
- Which input features most significantly influence motor temperature?
- How accurately can the model forecast temperature before a critical threshold is reached?
- How can the prediction system be integrated into existing monitoring systems?

4. Expected Outcome

The expected outcome is a reliable machine learning model capable of predicting electric motor temperature with high accuracy. The system should provide early warnings for overheating, enabling predictive maintenance and reducing unexpected breakdowns.