

Project Design Phase
Proposed Solution Template

Date	
Team ID	LTVIP2026TMIDS45779
Project Name	Electric Motor Temperature Prediction Using Machine Learning
Maximum Marks	2 Marks

Proposed Solution Template:

S.No	Parameter	Description
1	Problem Statement (Problem to be solved)	Electric motors used in industries often overheat due to heavy load, poor cooling, and environmental variations. Overheating leads to unexpected breakdowns, production downtime, high maintenance costs, and reduced equipment lifespan. Traditional monitoring using physical temperature sensors increases hardware cost and may fail in harsh environments. There is a need for a predictive, cost-effective, and reliable system to estimate motor temperature in real time.
2	Idea / Solution Description	The proposed solution is a Machine Learning-based Electric Motor Temperature Prediction System. The system uses motor operational parameters such as ambient temperature, coolant temperature, voltage (u_d), and current components (i_d , i_q) to predict Permanent Magnet (PM) surface temperature. A Random Forest Regression model is trained on the Kaggle Electric Motor dataset and deployed through a Flask-based web application. Users input motor parameters via a web interface, and the system instantly predicts motor temperature.
3	Novelty / Uniqueness	<ul style="list-style-type: none"> • Eliminates dependency on physical temperature sensors. • Uses AI-based predictive analytics for motor health monitoring. • Lightweight and easy-to-deploy web application. • High prediction accuracy ($R^2 = 0.964$). • Can be integrated with IoT systems for real-time predictive maintenance.
4	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> • Reduces industrial downtime and operational losses. • Improves equipment lifespan and safety. • Supports smart manufacturing and Industry 4.0 initiatives. • Helps industries adopt predictive maintenance strategies. • Provides user-friendly interface for easy monitoring.
5	Business Model (Revenue Model)	<ul style="list-style-type: none"> • Subscription-based model for industries (monthly/annual plan). • SaaS (Software as a Service) deployment for industrial clients. • Enterprise licensing model for manufacturing plants. • Integration services for IoT-based motor monitoring systems. • Customized deployment and maintenance support packages.