

**Project Design Phase-II**  
**Solution Requirements (Functional & Non-functional)**

Date	31 January 2026
Team ID	LTVIP2026TMIDS38689
Project Name	Electric Motor Temperature Prediction using Machine Learning
Maximum Marks	4 Marks

**Functional Requirements:**

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Access Management	<ul style="list-style-type: none"><li>- User Login via secure credentials to access the dashboard.</li><li>- Session management for Industrial Operators.</li></ul>
FR-2	Predictive Inference	<ul style="list-style-type: none"><li>- <b>Manual Prediction:</b> Input 11 features via JSON/Form for specific testing.</li><li>- <b>Sensor Prediction:</b> Input 8 key sensor values (Ambient, Torque, Coolant, etc.) for real-time calculation.</li></ul>
FR-3	Data Preprocessing	<ul style="list-style-type: none"><li>- Automatic feature scaling using StandardScaler (scaler.pkl).</li><li>- Handling of missing values and null data points in input.</li></ul>
FR-4	Result Visualization	<ul style="list-style-type: none"><li>- Real-time display of predicted temperature in Celsius (°C).</li><li>- Error messaging for invalid or out-of-range sensor inputs.</li></ul>

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-5	Model Training	<ul style="list-style-type: none"> <li>- Ability to retrain models using updated measures_v2.csv data.</li> <li>- Exporting of trained weights to .pkl files for production use.</li> </ul>

#### Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The interface (index.html) must be intuitive, using a modern dark theme and Inter font for high readability in industrial control rooms.
NFR-2	Security	The system must validate all inputs to prevent injection attacks and ensure only authorized personnel can trigger model retraining.
NFR-3	Reliability	The predictive engine must consistently load the best_model.pkl and handle exceptions without crashing the Flask server.
NFR-4	Performance	The inference (prediction) time should be less than 500ms to ensure real-time responsiveness for critical motor monitoring.
NFR-5	Availability	The system should be hosted on a stable platform (like IBM Watson or a local server) with 99.9% uptime for continuous motor tracking.

FR No.	Non-Functional Requirement	Description
NFR-6	Scalability	The backend architecture must allow for the integration of additional sensor types (e.g., vibration sensors) in the future without major code restructuring.