

Project Design Phase-II

Data Flow Diagram & User Stories

Date	31 January 2025
Team ID	LTVIP2026TMIDS42870
Project Name	electric motor temperature prediction using machine learning
Maximum Marks	4 Marks

Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

Example: (Simplified)

DFD Level 0 – Context Diagram

System Name: Electric Motor Temperature Prediction System

External Entity:

- Maintenance Engineer (User)

Input Data:

- Torque (Nm)
- Current (A)
- RPM
- Ambient Temperature (°C)

- Coolant Temperature (°C)

Process:

- Input Validation
- Feature Scaling (StandardScaler)
- Random Forest Model Prediction

Output:

- Predicted Rotor Temperature (°C)

Data Stores:

- `model.save` – Trained Random Forest Model
- `transform.save` – StandardScaler Parameters

Data Element	Description	Data Type	Range	Source	Destination
torque	Motor torque output	Float	0–200 Nm	User	Model
current	Motor current draw	Float	0–500 A	User	Model
rpm	Rotational speed	Integer	0–6000 RPM	User	Model
ambient_temp	Ambient temperature	Float	20–35°C	User	Model
coolant_temp	Coolant temperature	Float	18–40°C	User	Model
rotor_temp	Predicted temperature	Float	40–120°C	Model	User
model	Trained ML model	Binary	-	<code>model.save</code>	System
scaler	Scaling parameters	Binary	-	<code>transform.save</code>	System

User Stories

Use the below template to list all the user stories for the product.

Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance Criteria	Priority	Release
Temperature Prediction	US-01	As a maintenance engineer, I want to input motor parameters so that I can predict rotor temperature.	Form accepts valid input ranges and displays prediction.	High	Sprint-1
Quick Decision Making	US-02	As a maintenance engineer, I want to see the predicted temperature immediately.	Prediction displayed within 2 seconds in °C.	High	Sprint-1
Safety Monitoring	US-03	As a maintenance engineer, I want temperature safety indicators.	Color coding: Green (<80°C), Yellow (80–95°C), Red (>95°C).	Medium	Sprint-2
Data Saving	US-04	As a maintenance engineer, I want to download prediction results.	CSV download option with timestamp available.	Low	Sprint-3

Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance Criteria	Priority	Release
Model Training	US-05	As a data scientist, I want to retrain the model with new data.	Training script available and MAE, R ² displayed.	High	Sprint-1
Feature Analysis	US-06	As a data scientist, I want to view feature importance.	Feature importance chart generated after training.	Medium	Sprint-2
Model Comparison	US-07	As a data scientist, I want to compare algorithms.	MAE comparison table available.	Low	Sprint-3