Project Development Phase
Performance Testing

Date	19 February 2026
Team ID	LTVIP2026TMIDS84143
Project Name	Electric Motor Temperature Prediction using Machine Learning
Maximum Marks	5 Marks

Performance Testing – Model Building & Training

Objective

The objective of performance testing during model building and training is to:

- Evaluate the accuracy of the regression model
- Measure training time
- Validate prediction efficiency
- Ensure model stability and reliability

Model Training Performance

Training Configuration

- Algorithm Used: Regression Model (Scikit-learn)
- Dataset Size: (mention your dataset rows, e.g., ~10000 samples)
- Features: 8 input parameters
- Target: Permanent Magnet Temperature (pm)
- Train-Test Split: 80% Training, 20% Testing

Performance Metrics Used

To evaluate model performance, the following metrics were used:

R^2 Score (Coefficient of Determination)

- Measures how well the model explains variance in the target variable.
- Value ranges between 0 and 1.
- Higher value indicates better accuracy.

Mean Absolute Error (MAE)

- Measures average prediction error.
- Lower value indicates better model performance.

Mean Squared Error (MSE)

- Measures squared difference between predicted and actual values.
- Used to penalize larger errors.

Training Time Performance

- Model training completed within a few seconds.
- Lightweight regression algorithm ensures fast computation.
- Suitable for real-time deployment scenarios.

Prediction Performance

- Prediction response time: < 2 seconds
- Model loads quickly using serialized .save file
- Efficient preprocessing pipeline using MinMaxScaler

Stability Testing

- Model tested with multiple input combinations
- Verified consistent prediction results
- Validated input range handling

Conclusion of Performance Testing

The model demonstrates:

- High prediction accuracy
- Low error rate
- Fast training time
- Real-time prediction capability
- Stable performance under multiple test cases