PrognosAI — AI-Driven Predictive Maintenance System

Date: October 24, 2025

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Milestone 3 — Model Evaluation & Performance Assessment

The goal of Milestone 3 is to test how accurately our AI model predicts the Remaining Useful Life (RUL) of machines. The evaluation uses metrics like RMSE, MAE, R^2, and approximate accuracy, alongside visual graphs and error analysis.

Key Highlights

• Predictions are generated using preprocessed test data.

• Results are saved in CSV files for easy review.

• Visualizations include Predicted vs Actual RUL, Residual Distribution, and Error Trends.

• Bias analysis identifies over- or under-predictions to guide model improvement.

Performance Metrics

Metric	Description
RMSE (Root Mean Squared Error)	Measures prediction error magnitude.
MAE (Mean Absolute Error)	Measures average prediction error.
R^2 Score	Shows how well predictions match actual values.
Interpretation	Lower RMSE/MAE = higher accuracy; R^2 close to 1 = well-trained model.

Milestone 4 — Risk Thresholding & Alert System

Building on model predictions, Milestone 4 implements an alert system to monitor machine health and prevent failures.

Alert Levels

Alert Type	Condition
Warning	RUL ≤ 50 cycles
Critical	RUL ≤ 20 cycles

Deployment Steps

• Run the evaluation to generate predictions.

• Run the alert system to flag at-risk machines.

• Review saved results, graphs, and reports.

Recommendations

• Adjust thresholds based on real operational data.

• Use smoothing to reduce false alerts.

• Integrate the system with APIs for real-time monitoring.

End of Milestone 3 & 4 Summary