# Predictive Maintenance for Industrial Equipment

**Aim**: Develop a predictive maintenance system that can analyze sensor data from industrial machinery and predict when components are likely to fail.

**Scope**:
- Understand the principles of predictive maintenance and its importance in industrial settings.
- Explore techniques for time series analysis, anomaly detection, and supervised/unsupervised machine learning.
- Investigate feature engineering and selection methods for sensor data.
- Evaluate the system's performance using appropriate metrics and real-world datasets.

**Objectives**:
- Collect and preprocess sensor data from industrial equipment.
- Implement time series analysis techniques for anomaly detection and fault prediction.
- Develop supervised and unsupervised machine learning models for predictive maintenance.
- Optimize model performance through feature engineering, hyperparameter tuning, and ensemble methods.
- Evaluate the system's accuracy, precision, recall, and F1-score on test datasets.
- Develop a user-friendly interface or dashboard for monitoring and visualization.

**Deliverables**:
- Codebase for data preprocessing, model implementation, training, and evaluation.
- Trained machine learning models for predictive maintenance.
- Report detailing the methodology, experiments, results, and analysis.
- User-friendly interface or dashboard for monitoring and visualizing equipment health.
- Presentation or demo showcasing the system's capabilities and real-world applications.