***Python project -Predictive Maintenance System***

**Predictive maintenance:** Predictive maintenance (PdM) is a proactive maintenance strategy that uses data analysis tools and techniques to detect anomalies in the operation and possible defects in equipment and processes so that they can be fixed before they result in failure. The goal of predictive maintenance is to minimize unplanned downtime, optimize maintenance schedules, and reduce maintenance costs by addressing issues before they lead to equipment failure.

****Sensors and Data Collection:****

* Installation of sensors on equipment to collect real-time data on various parameters like vibration, temperature, pressure, and current.
* Data transmission to a central system for storage and analysis.

****Predictive Modeling:****

* Advanced analytic and machine learning algorithms are employed to identify patterns, anomalies, and degradation trends in equipment behavior.
* Predictive models are developed to forecast potential failures and generate maintenance recommendations.

****Human Expertise Integration:****

* Domain experts provide valuable insights into equipment behavior, failure modes, and maintenance best practices.
* Human input is used to refine predictive models, validate recommendations, and make informed decisions.

### **Model Selection**

Choose a machine learning model suitable for predictive maintenance. Common choices include:

* Regression models (Linear Regression, Decision Tree Regression)
* Classification models (Logistic Regression, Random Forest, SVM)
* Time series models (ARIMA, LSTM)

### **Model Training**

Split the data into training and testing sets. Train the model on the training data.

### **Feature Engineering**

Create features that are meaningful for predicting maintenance needs. This could include statistical features (mean, standard deviation), time-based features, and domain-specific features.