



**Introducing:**  
**AI-POWERED PREDICTIVE  
MAINTENANCE SYSTEM**  
**Technical Documentation**

AI-driven system for predicting equipment failures, optimizing maintenance schedules, and reducing downtime using sensor data and machine learning.

Developed By: [thirdeyedata.ai](https://thirdeyedata.ai)



# Overview

## About the Solution

The AI-powered Predictive Maintenance System leverages machine learning to estimate the Remaining Useful Life (RUL) of industrial assets and recommend optimal maintenance windows. By analyzing sensor data, operating conditions, and maintenance history, the system predicts failures before they occur.

Using a Random Forest regression model trained on real-world data, the solution provides accurate time-to-failure predictions, risk classification, and actionable insights to reduce downtime, optimize maintenance costs, and improve operational safety.



# Business Problem / Challenges

Industrial operations face critical challenges in maintaining equipment reliability and efficiency:

Unplanned downtime due to unexpected equipment failures disrupts production.

Calendar-based maintenance leads to over-servicing or missed failures.

Fragmented asset data across multiple systems reduces visibility.

Dependence on expert judgment limits scalability and consistency.



# Solution Overview

The system uses AI models to analyze equipment data and predict failures, enabling proactive maintenance planning.

By analyzing sensor data, operating conditions, and maintenance logs, the system provides:

Time-to-failure predictions with risk classification (LOW, MODERATE, HIGH, CRITICAL).

Single-asset and batch-level predictions for fleet-wide monitoring.

Fragmented asset data across multiple systems reduces visibility.

Dependence on expert judgment limits scalability and consistency.

Scan To Try:



# Key Capabilities

Estimate remaining  
useful life in  
hours/days.

Prioritize high-risk  
assets across fleets.

Recommend  
optimal service  
timelines..

Track  $R^2$ , RMSE, MAE  
for accuracy..

Identify key drivers of  
equipment failure.

Connect with CMMS,  
ERP, and IoT systems.



# Value Proposition

01

Reduced Downtime : Shift from reactive to predictive maintenance.

02

Cost Optimization: Reduce unnecessary maintenance and spare usage.

03

Improved Safety : Detect high-risk conditions before failures occur.

04

Data-Driven Decisions : Replace manual judgment with AI insights.

05

Scalability : Extend across plants, assets, and geographies.

Scan To Try:



# Primary Tools & Technologies

01

## AI Models

Random Forest Regressor for predicting remaining useful life (RUL) and failure risk.

02

## Backend APIs

Python with Flask APIs for model inference, data processing, and integration with enterprise systems.

03

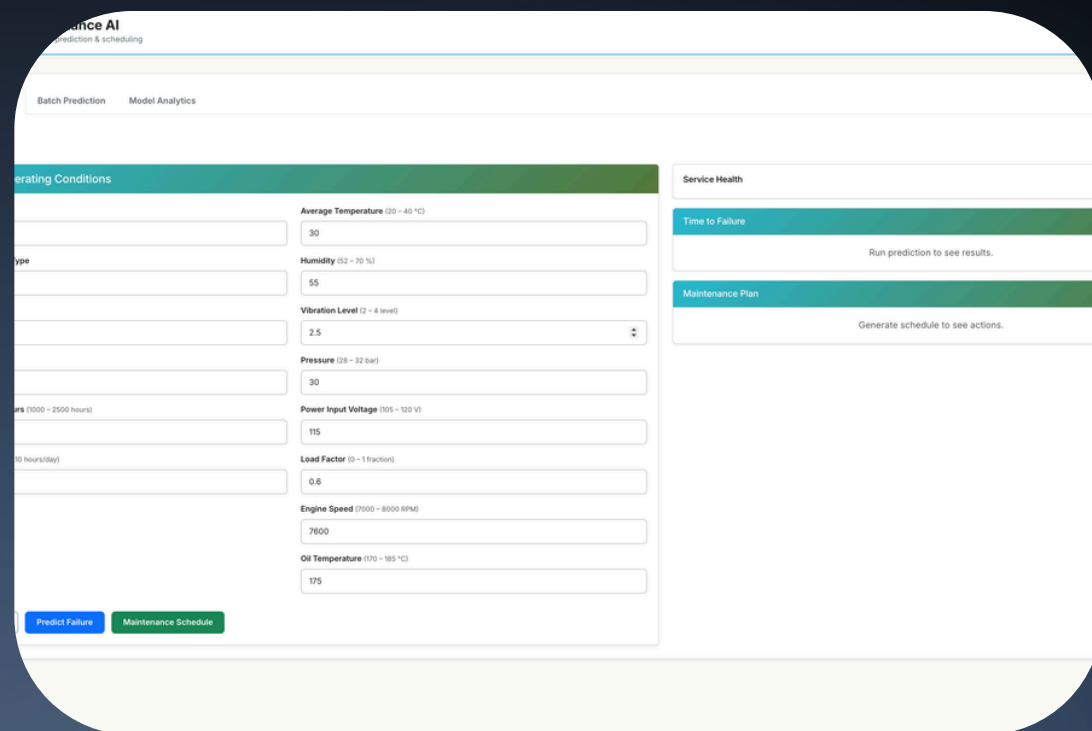
## Visualization

dashboards for monitoring asset health, risk levels, and maintenance schedules.

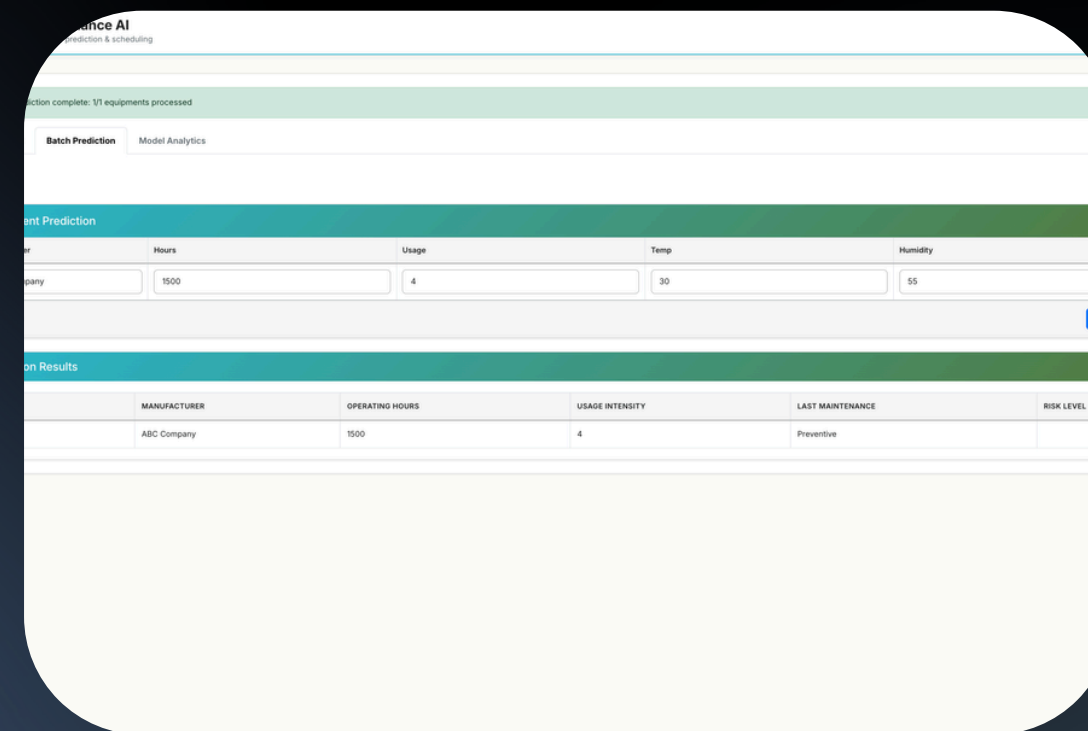


# Solution Glimpses

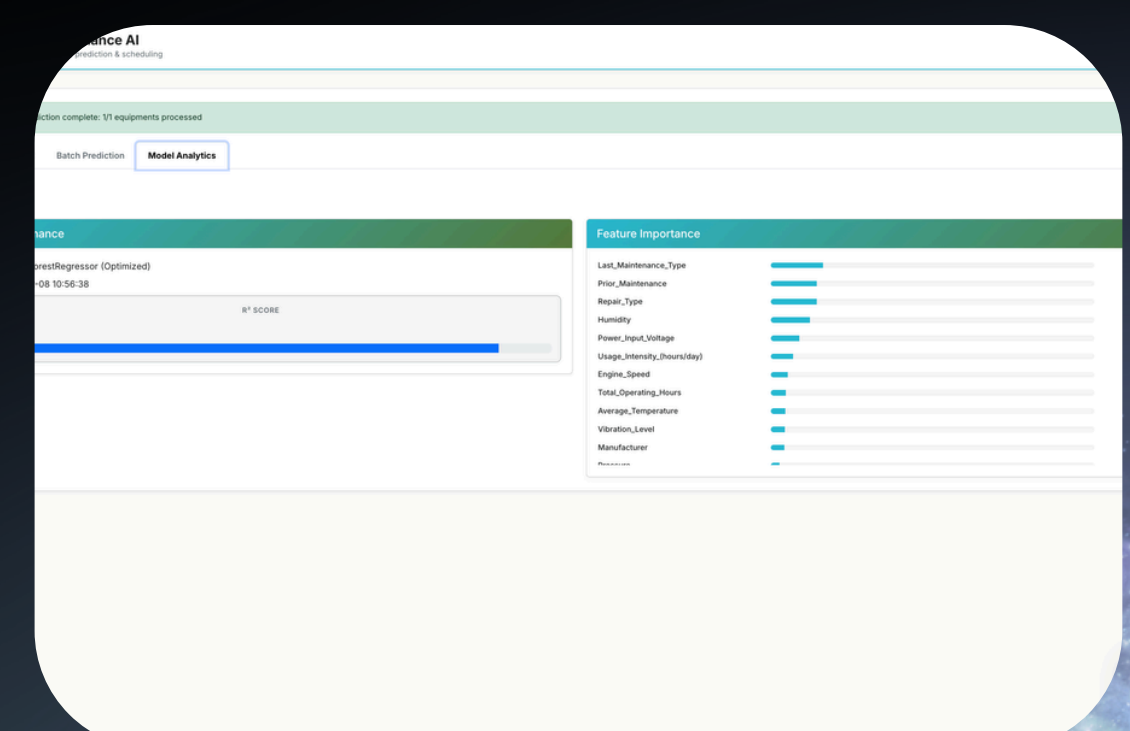
## Dashboard View



## Batch Prediction



## Model Analytics



Watch the full video on [Vimeo.com](https://vimeo.com) or scan here to watch:



# Request a Demo

If you find this solution relevant to your use case, please feel free to try this prototype or request a custom demo.



**Interact**

**[Visit democentral.ai](https://democentral.ai)**



**Scan to Try**



**Custom Demo**

**[Talk To Our Team](#)**