

Project Title	Industrial Anomaly Detection
Skills take away From This Project	Model building, Visualization
Domain	Industry

Problem Statement:

The primary goal of this project is to develop an anomaly detection system for industrial equipment. The system's objective is to identify unusual behavior in equipment data and thereby prevent equipment failure, reduce downtime, and improve operational efficiency.

Business Use Cases:

Potential Business Scenarios

Predictive maintenance: The system's objective is to identify unusual behavior in equipment data and thereby prevent equipment failure, reduce downtime, and improve operational efficiency.

Approach:

Methodology

1. **Data Generation/Preprocessing:** Depending on the availability of real-world data, you may either generate synthetic data to simulate industrial equipment behavior or preprocess real sensor data. Data preprocessing may involve handling missing values, noise reduction, and data scaling.
2. **Anomaly Detection Model:** Develop an anomaly detection model capable of identifying deviations from normal equipment behavior. Common techniques include statistical methods, machine
3. **Model Evaluation:** Assess the performance of the anomaly detection model using appropriate evaluation metrics. Metrics such as precision, recall, F1-score, and receiver operating characteristic (ROC) curves can be used to evaluate how well the model identifies anomalies.
4. **Visualization & Reporting:** Visualize the results of the anomaly detection system and create reports that provide insights into unusual behavior patterns. Clear visualization and reporting can help stakeholders understand and act upon the detected anomalies effectively.

Results:

- Model evaluation should include metrics like precision, recall, F1-score, ROC curve, and area under the ROC curve (AUC).
- Precision measures the proportion of true anomalies among the detected anomalies, while recall measures the proportion of true anomalies detected. F1-score combines both precision and recall into a single metric.

Project Evaluation metrics:

Success Criteria

Accuracy, Precision, Recall, F1 Score, ROC-AUC

All should be in high range.

Technical Tags:

Machine Learning

Data Preprocessing

Feature Engineering

Model Training

Model Evaluation

Hyperparameter Tuning

Outlier detection

Data Set:

Dataset is available in CSV format.

Dataset:

<https://drive.google.com/file/d/1K79ollwujih2iGsEQZKBkw4XKrfPJVXq/view?usp=sharing>

Data Set Explanation:

Content and Context

- The data used in this project will typically include sensor data collected from industrial equipment.
- This data include readings from various sensors such as temperature, pressure, voltage, current, and more.
- It also include timestamps and any other relevant information about the equipment's operation.
- **Project Deliverables:**

Submission Requirements

Source Code: The complete code used for data preprocessing, model training, and evaluation.

Documentation: A report detailing the methodology, analysis, results, and insights.

Presentation: A slide deck summarizing the project and key findings.

Model File: The trained model ready for deployment.

README: Instructions on how to run the code and reproduce the results.

Project Guidelines:

Best Practices

Coding Standards: Standard code standard for Python code.

Version Control: Use Git for version control and regularly commit changes.

Documentation: Comment your code and provide clear explanations for your logic.

Collaboration: Use collaborative tools like GitHub or GitLab for team projects.

Timeline:

Analyse data EDA Ploting ML Model Selection	2 weeks
Building Model	2 Days
Total	2 weeks 2 Days

PROJECT DOUBT CLARIFICATION SESSION (PROJECT AND CLASS DOUBTS)

About Session: The Project Doubt Clarification Session is a helpful resource for resolving questions and concerns about projects and class topics. It provides support in understanding project requirements, addressing code issues, and clarifying class concepts. The session aims to enhance comprehension and provide guidance to overcome challenges effectively.

Note: Book the slot at least before 12:00 Pm on the same day

Timing: Tuesday, Thursday, Saturday (5:00PM to 7:00PM)

Booking link : <https://forms.gle/XC553oSbMJ2Gcfug9>

LIVE EVALUATION SESSION (CAPSTONE AND FINAL PROJECT)

About Session: The Live Evaluation Session for Capstone and Final Projects allows participants to showcase their projects and receive real-time feedback for improvement. It assesses project quality and provides an opportunity for discussion and evaluation.

Note: This form will Open on Saturday and Sunday Only on Every Week

Timing: Monday-Saturday (11:30PM to 12:30PM)

Booking link : <https://forms.gle/1m2Gsro41fLtZurRA>