Mini Project: Steel Quality Prediction using Machine Learning

Project Description

In this mini project, you will develop a steel quality prediction system using machine learning techniques. The goal is to predict steel plate defects based on process parameters from steel manufacturing. You will work with a dataset containing various manufacturing measurements and use two different machine learning models of your choice.

Dataset

You will use the "Steel Plates Faults Dataset" from the UCI Machine Learning Repository.
https://archive.ics.uci.edu/dataset/198/steel+plates+faults

The dataset includes the 27 features, 1941 examples, and 7 different types of steel plate faults:

• Pastry • Z_Scratch • K_Scatch • Stains • Dirtiness • Bumps • Other_Faults

Task: Complete the following tasks (using two different models):

1. **Binary Classification**: Predict whether a steel plate has ANY defect (1) or NO defect (0)
2. **Multi-class Classification**: Predict the specific type of fault among the 7 categories

Deliverables

• A Jupyter notebook containing all the code, visualizations, and explanations for each task

• A brief summarization your approach, key findings, and recommendations in final report.

Evaluation Criteria

• Correctness and completeness of the implemented tasks

• Quality of code and adherence to best practices

• Depth of analysis and insights derived from the data and models

• Clarity of explanations and visualizations

• Criteria of model selection, model improvement strategies

• Justification for choices made throughout the project