PRODUCTION OUTPUT ESTIMATION PROGRAM USING MACHINE LEARNING

muRata

Author: Satika Tapin
Advisor: Asst. Prof. Dr.Chumphol Bunkhumpornpat
Mentor: Chaterm Kengkan

ABSTRACT

During the cooperative education internship at Murata Electronics (Thailand), Ltd., the main responsibility was to develop a production output estimation program using Machine Learning. The development utilized key technologies including the Python programming language, Oracle Database, and the XGBoost model, with the Randomized Search technique applied for parameter tuning. The results for both Product A and Product B were highly successful, as the models demonstrated high prediction accuracy, strong stability, and excellent data explanation capabilities with consistently low average error. The trained models were further developed into a small-scale application, and the forecasting results were visualized through a Power BI Dashboard. The system proved to be practically applicable, enabling users to evaluate whether the overall monthly production aligns with the set targets, thus supporting effective production planning and management.

INTRODUCTION

Currently, the Production Department relies on manual forecasting conducted by personnel. While this leverages individual experience and expertise, it faces significant limitations, such as being time-consuming and struggling to analyze complex correlations between various factors affecting yield.

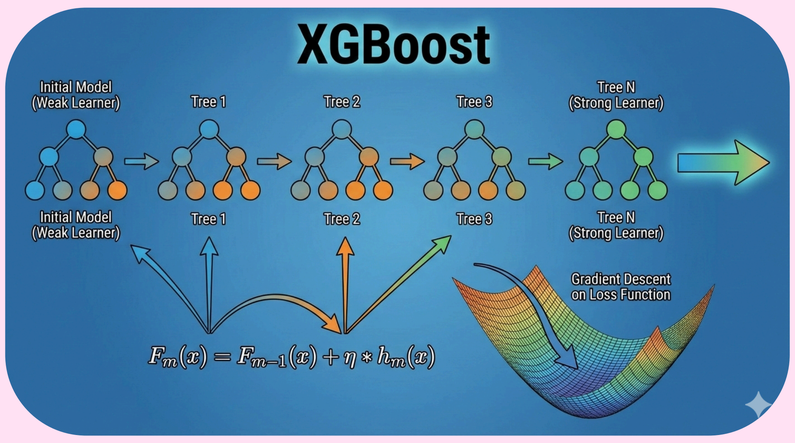
Consequently, the Production Department aims to develop an automated forecasting system by applying Machine Learning technology. This system will enable accurate monthly production predictions, allowing for more efficient planning and management to consistently meet production targets.

METHODOLOGY

Data preparation

↓

Train model



↓

Predictive model

↓

Deploy program & Data visualize

TECHNOLOGY

VS code

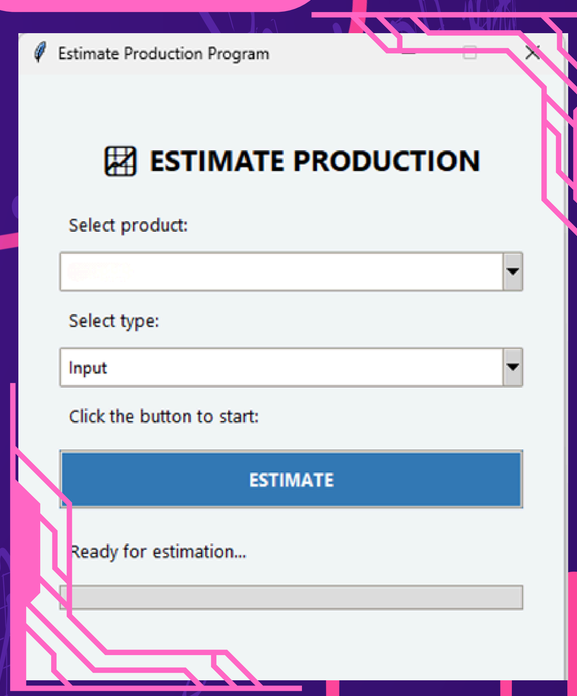
Python

Power BI

Oracle database

DBeaver database

PROGRAM



RESULT

Product	Type	R-Square	RMSE	MAE
Product A	Output	0.92	4826.35	2541.98
	Input	0.87	2054.56	1126.45
Product B	Output	0.98	5953.85	2946.23
	Input	0.85	2289.12	1079.54

CONCLUSION

The system is designed for practical implementation, allowing users to assess whether the total month-end yield remains aligned with set targets through a Power BI Dashboard. This visibility enables more efficient production planning and management, ensuring that output consistently meets planned objectives.

Co-operative Project, 204496 Department of Computer Science, 2025
Department of Computer Science, Faculty of Science, Chiang Mai University