# Predictive Maintanancé



Techline Industries

**MORINGA DSF-FT12** 

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### Outline

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### Introduction

• Techline Industries is investing into predictive maintenance to reduce operational costs, minimize unplanned downtime, and improve equipment reliability

 The project focuses on modelling a solution for timely preventive maintenance



# Objectives

- The main objective of this project is to develop a machine learning model that predicts whether a machine is likely to fail within the next 7 days, using sensor and operational data
- Modeling two machine learning classification algorithms and evaluate their performance



### Data Understanding

- Data sourced from Kaggle.
- Contains 22 machine operating conditions and 500,000 machine records
- Details cover synthetic sensor operational data of different machines in industrial setups





# Data Preprocessing

- Dropped missing and irrelevant data.
- Preprocessing is important for machine learning algorithms to better understand the data



## Modeling

1. First model - logistic regression



 Shows our model predicted all but 808 records correctly

#### Other metrics:

Accuracy: 0.9935

Precision: 0.9028

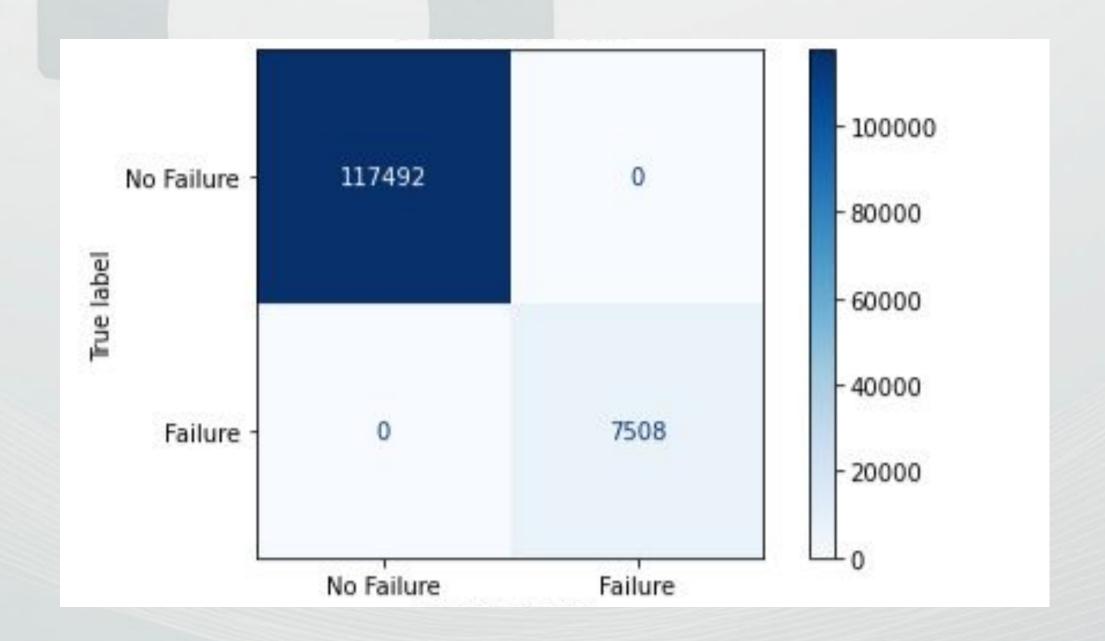
Recall: 1.0000

F1 Score: 0.9489



# Modeling

1. Second model - Decision Tree



 Shows our model predicted all correctly

#### Other metrics:

Accuracy: 1.0000

Precision: 1.0000

Recall: 1.0000

F1 Score: 1.0000



### Evaluation

- Both models demonstrated good performance but the second model yielded better results
- A high-performing model like this can significantly improve failure detection, especially for rare but critical failure events.
- •The perfect score may indicate overfitting on synthetic or oversampled data. Careful real-world testing and monitoring will be essential post-deployment.





### Recommendations

- Develop separate models tailored to specific machine types
- Explore advanced algorithms such as Random Forest or XGBoost for better generalization
- Consider implementing time-aware cross-validation if temporal features (e.g., timestamps or installation year) are available



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