Predictive Model Comparison Report

This report presents a comparative analysis of several predictive models trained to estimate production time.

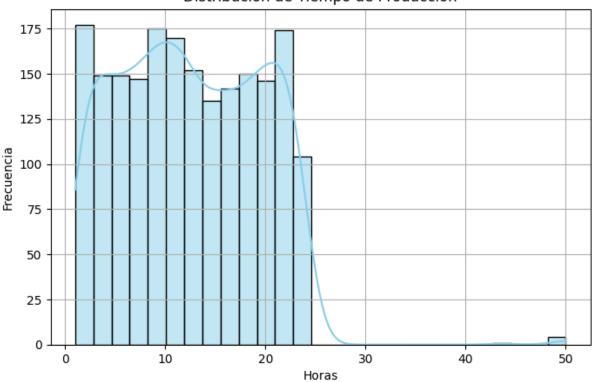## Machine Specifications

CPU: Intel Core i7-11800H @ 2.30GHz
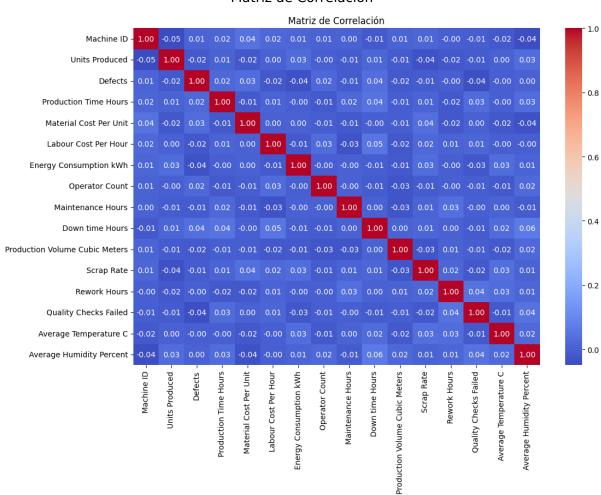
RAM: 16 GB DDR4

GPU: NVIDIA RTX 3060

Exploratory Data Analysis (EDA) Visualizations

Histograma de Producción

Distribución de Tiempo de Producción

Matriz de Correlación

Matriz de Correlación
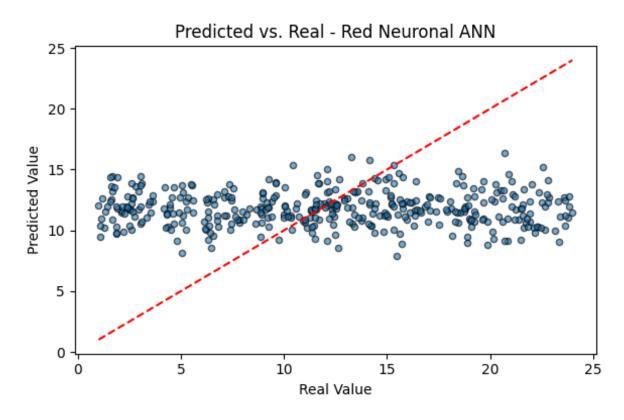
⚙ Data Preprocessing

Cleaning, categorical variable encoding (One-Hot Encoding), and feature scaling (StandardScaler) techniques were applied to prepare the data before model training.
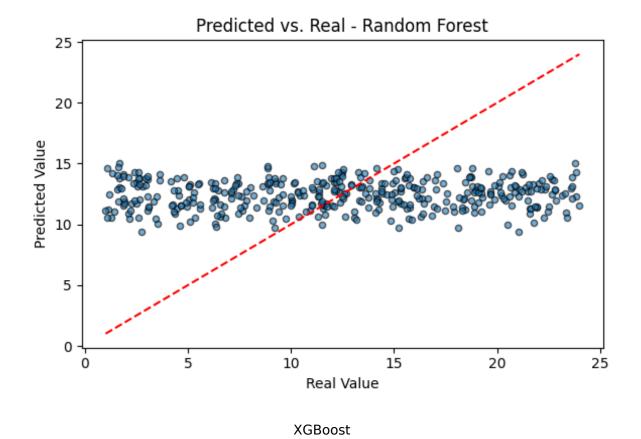
Model Evaluation Metrics

Model	MAE	MSE	R²	Time (s)
Red Neuronal ANN	5.625	44.995	-0.052	15.20
Random Forest	5.561	43.346	-0.013	3.10
XGBoost	5.761	47.924	-0.120	2.50
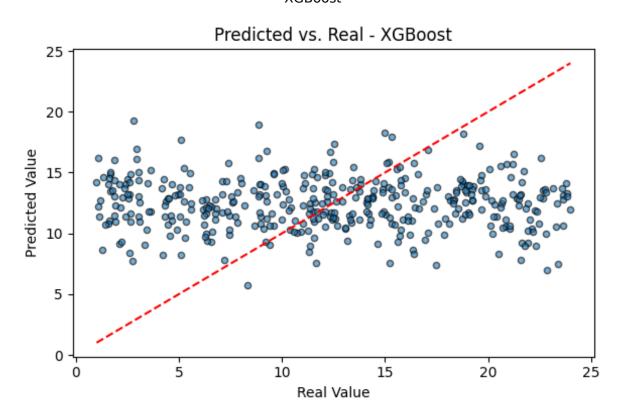
Predictions vs. Real Values

Red Neuronal ANN

Predicted vs. Real - Red Neuronal ANN

Random Forest

Predicted vs. Real - Random Forest

XGBoost

Predicted vs. Real - XGBoost

Theil's U Coefficient

Red Neuronal ANN: U = 0.2601

Random Forest: U = 0.2496

XGBoost: U = 0.2610

Diebold-Mariano Test

Comparison	DM Statistic	p-value
ANN vs RF	-1.441	0.150
ANN vs XGB	1.720	0.086
RF vs XGB	3.682	0.000

Conclusion

After analyzing performance metrics, statistical tests, and training times, the model with the best overall performance, considering the balance between accuracy and efficiency, was: Random Forest.