Brandenburg
University of Technology
Cottbus - Senftenberg

Wind Energy Forecasting Project
Prediction & Performance Report

Executive Summary

This report presents the prediction results and performance metrics for all trained models. Each model was evaluated on a held-out test set using multiple metrics including RMSE, MAE, MAPE, and R² score. The report also includes analysis of prediction accuracy and model comparison.

Model Performance Metrics

Model	MSE	RMSE	MAE	MAPE	R2	Mean Error	Std Error
LightGBM	433,975,758.94	20,832.08	15,229.27	4.93%	0.9884	-14973.10	14,483.85
LSTM	2,274,024,558.73	47,686.73	35,268.54	15.93%	0.9434	-13476.37	45,742.89
Prophet	28,411,286,343.86	168,556.48	135,301.16	72.49%	0.2427	15300.33	167,860.62
Transformer	33,845,291,046.17	183,970.90	145,997.14	78.71%	0.1579	1617.76	183,963.78
XGBoost	567,648,682.80	23,825.38	17,172.11	6.00%	0.9849	-14197.96	19,132.87

Best Model Analysis

Metric	Best Model	Value
Lowest RMSE	LightGBM	20,832.08
Lowest MAE	LightGBM	15,229.27
Highest R²	LightGBM	0.9884

Prediction Outputs

Model	File	Records
Future	future_predictions.csv	30
Lightgbm	lightgbm_predictions.csv	213
Lstm	lstm_predictions.csv	184
Prophet	prophet_predictions.csv	213
Transformer	transformer_predictions.csv	184
Xgboost	xgboost_predictions.csv	213

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