

Wind LSTM + SHAP Report

Wind Speed Prediction LSTM + SHAP Report

Model Summary

- **Model Type:** LSTM Encoder-Decoder
- **Encoder Steps (n_past):** 24
- **Decoder Steps (n_future):** 7
- **Number of Features (n_features):** 8
- **Latent Dimension:** 128

Training Performance

- **Epochs:** 10
- **Final Training Loss:** 0.0245
- **Final Validation Loss:** 0.0204

Evaluation Metrics (WIND prediction)

- **RMSE per horizon:**
 - Horizon 1: 4.32
 - Horizon 2: 4.60
 - Horizon 3: 4.71
 - Horizon 4: 4.79
 - Horizon 5: 4.73
 - Horizon 6: 4.79
 - Horizon 7: 4.77
- **MAE per horizon:**
 - Horizon 1: 3.43
 - Horizon 2: 3.62
 - Horizon 3: 3.70
 - Horizon 4: 3.76
 - Horizon 5: 3.74
 - Horizon 6: 3.78
 - Horizon 7: 3.77
- **MAPE per horizon:**
 - Horizon 1: 57.60%
 - Horizon 2: 58.85%
 - Horizon 3: 59.01%
 - Horizon 4: 59.88%
 - Horizon 5: 63.14%
 - Horizon 6: 63.02%
 - Horizon 7: 63.64%

SHAP Feature Importance (for first prediction horizon)

Top features by Mean Absolute SHAP Value (KernelExplainer):

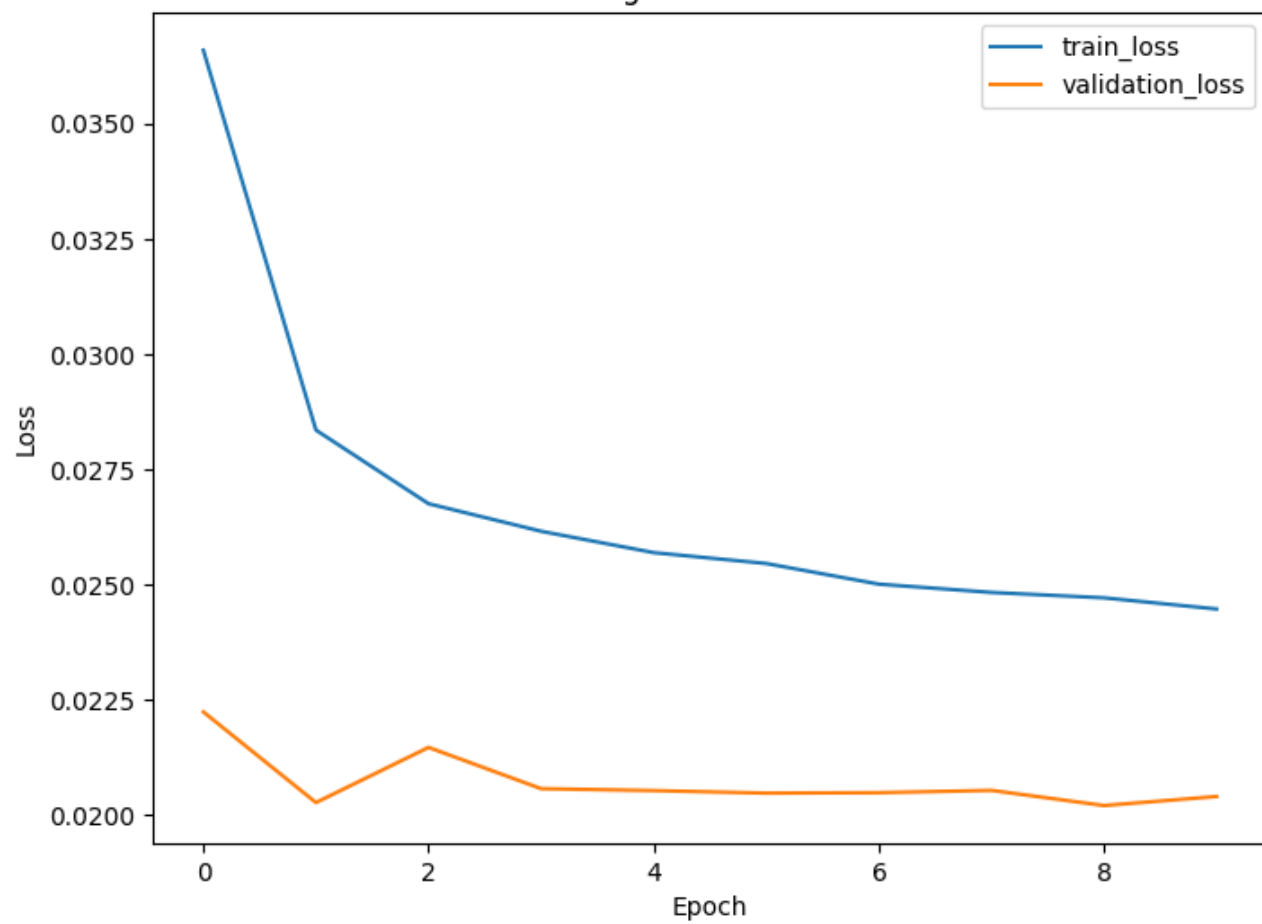
- WIND: 0.0018
- IND: 0.0003
- IND.2: 0.0001

- T.MAX: 0.0001
- T.MIN.G: 0.0001

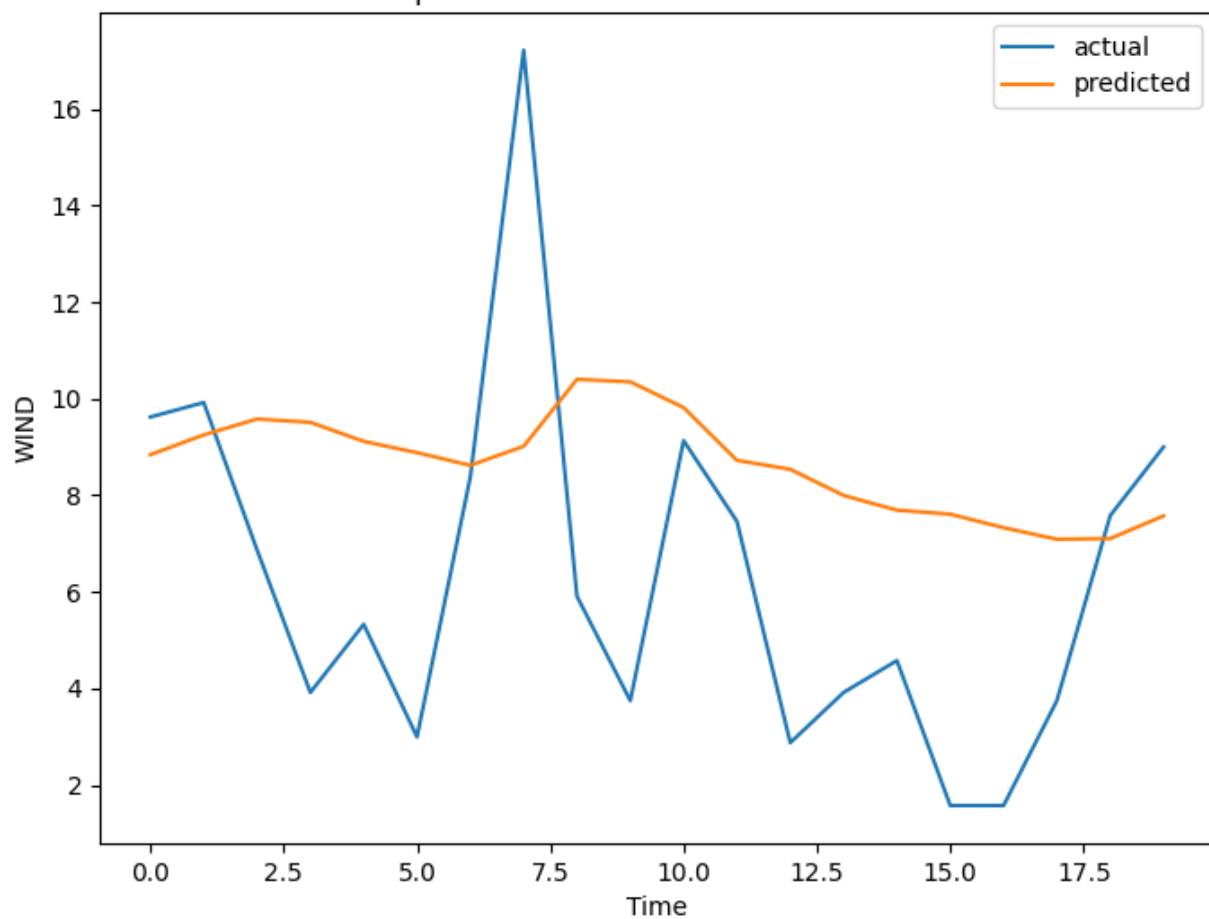
Visualizations

- Training & Validation Loss Plot: `training_validation_loss.png`
- Predicted vs Actual for first 3 horizons: `pred_vs_actual_h1.png`, `pred_vs_actual_h2.png`, `pred_vs_actual_h3.png`
- SHAP Feature Importance Plot: `shap_feature_importance_kernel.png`

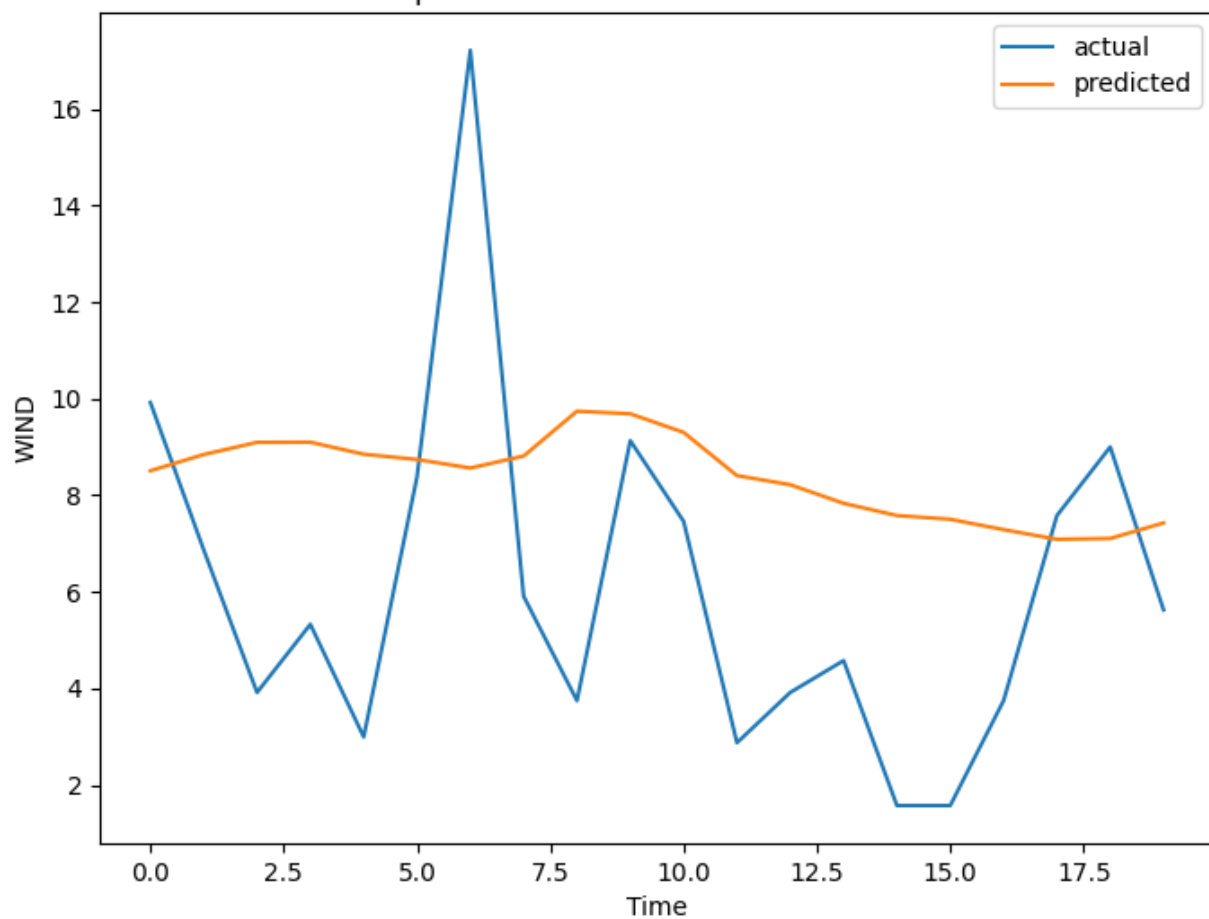
Training & Validation Loss



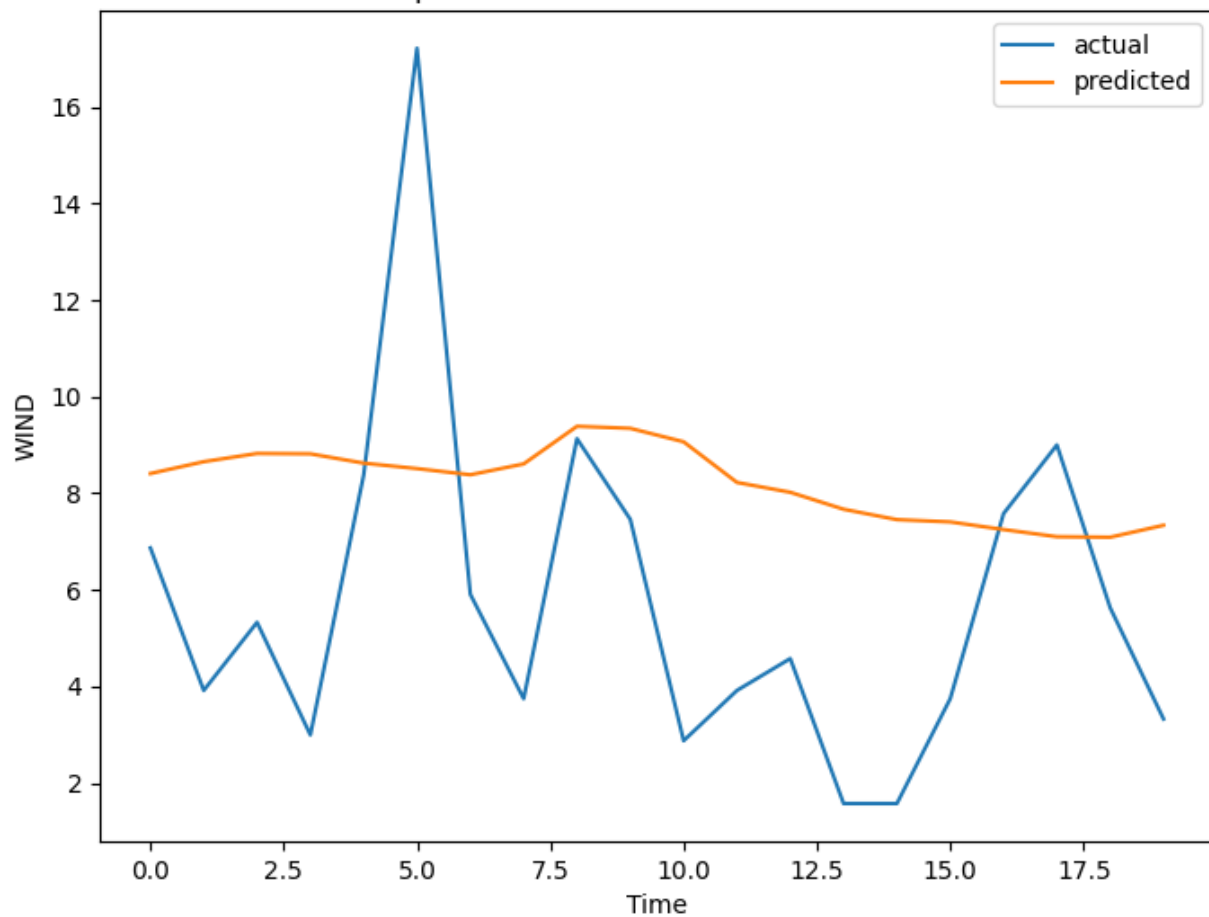
predicted vs Actual for horizon 1



predicted vs Actual for horizon 2



predicted vs Actual for horizon 3



Top Feature Importance (KernelExplainer for first prediction horizon)

