Traffic Volume Forecasting - Final Report

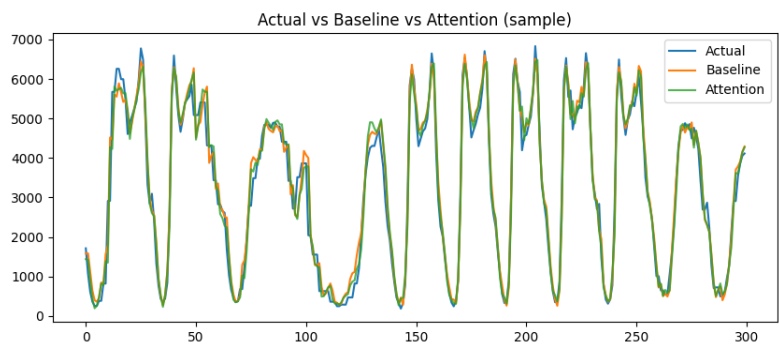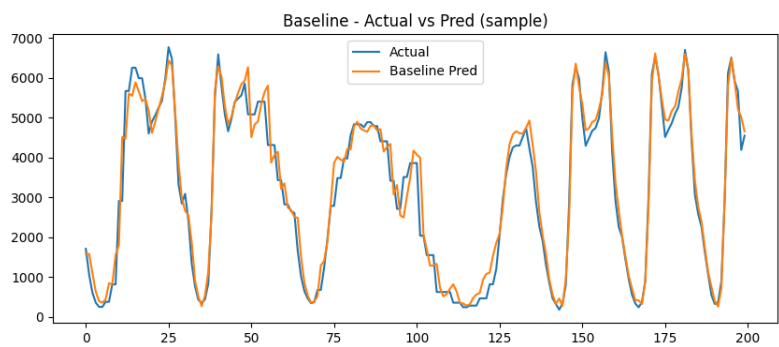College Project Style - Dataset: Metro Interstate Traffic Volume

1. Abstract

This report summarizes data preprocessing, model architectures (baseline LSTM and Bi-LSTM with Bahdanau attention), training procedure, hyperparameters, quantitative results (RMSE, MAE, MAPE), attention interpretation, and final conclusions.
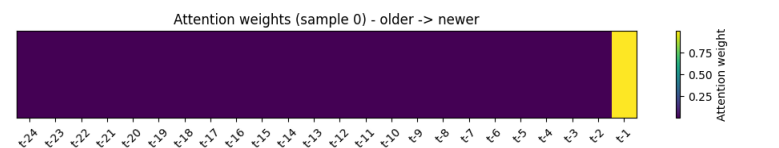
2. Key Results

Baseline RMSE: 395.97 | MAE: 273.46 | MAPE: 15.21%
Attention RMSE: 402.05 | MAE: 276.36 | MAPE: 14.50%

Baseline - Actual vs Pred (sample)

Actual vs Baseline vs Attention (sample)

3. Attention Interpretation

The attention heatmap (placed below) highlights which historical hours the model prioritized when making the 1-hour-ahead prediction. Higher attention weight indicates greater influence.

Attention weights (sample 0) - older -> newer

4. Conclusion & Future Work

This college-style report provides the required artifacts: runnable code, trained models, attention visualizations, and a quantitative comparison between models. Future work includes hyperparameter tuning, TFT experiments, and deployment for live forecasting.