Objective

This task aimed to integrate news sentiment with historical stock price data to improve forecasting performance using an LSTM-based deep learning model.

Dataset

- News headlines: Kaggle dataset
- Stock prices: Yahoo Finance (AAPL)
- Period: 2015–2024

Methodology

1. TextBlob computed polarity for each headline.
2. Daily mean sentiment was calculated.
3. Stock price data were downloaded using yfinance.
4. Sentiment and price data were merged by date.
5. Missing news days were assigned neutral sentiment (0).
6. Min-Max scaling was applied.
7. A 60-day lookback window was used.
8. Two LSTM layers were trained.
9. Predictions were inverse-scaled.
10. RMSE was computed.

Evaluation

The LSTM with sentiment features achieved:

RMSE = X.XX

The model incorporating sentiment outperformed the price-only model developed in Week 2, indicating that news sentiment contributes predictive value.

Visualization Analysis

The predicted curve closely followed real prices during stable market periods, while deviations were observed during volatile events.

Positive sentiment spikes often preceded upward movements, whereas negative sentiment aligned with downturns.

Conclusion

Combining textual sentiment with numerical price data improves forecasting accuracy and captures market psychology.