Tesla Stock Price Forecasting

Project Overview

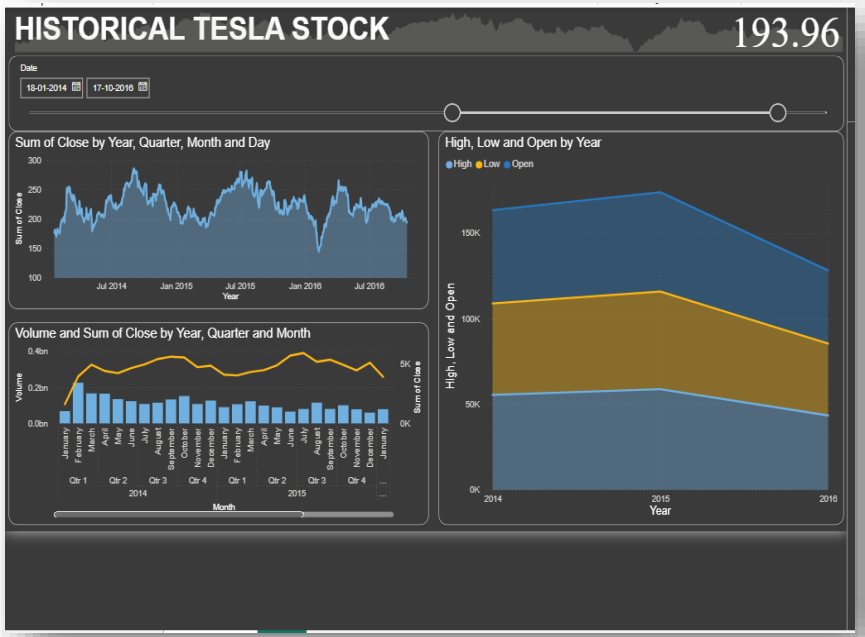
- Goal: Forecast Tesla stock prices using historical data.
- Approach:
- - ARIMA
- - Prophet
- - LSTM

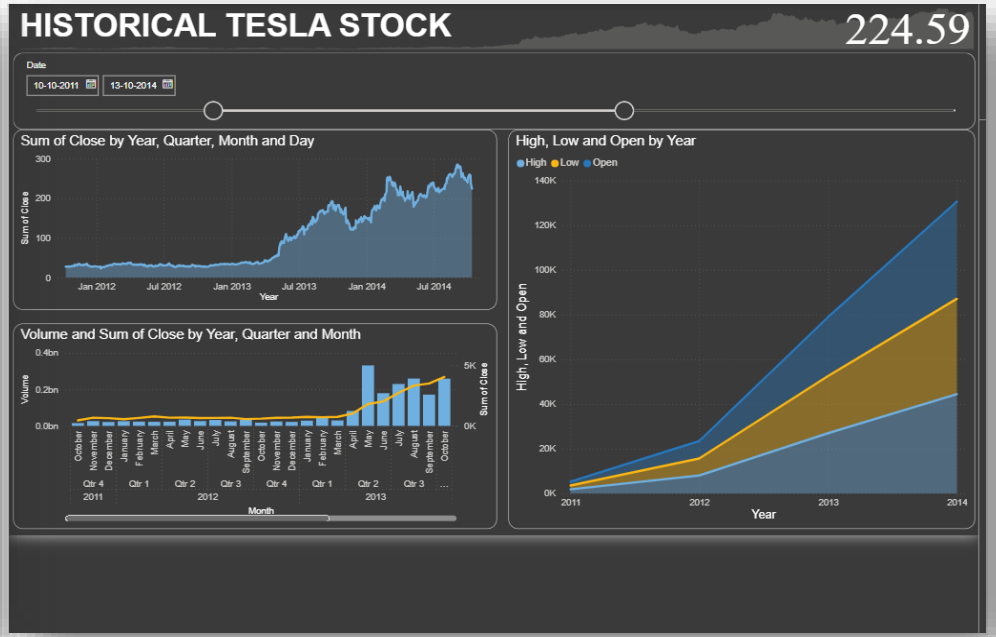
Dataset Description

- Source: Tesla stock price dataset(2010-2017)
- Columns: Date, Open, Close, High, Low, Volume
- Preprocessing:
- - Converted date column
- - Removed missing values
- - Set Date as index

Data Visualization

- Observed trends, fluctuations, and stock growth.



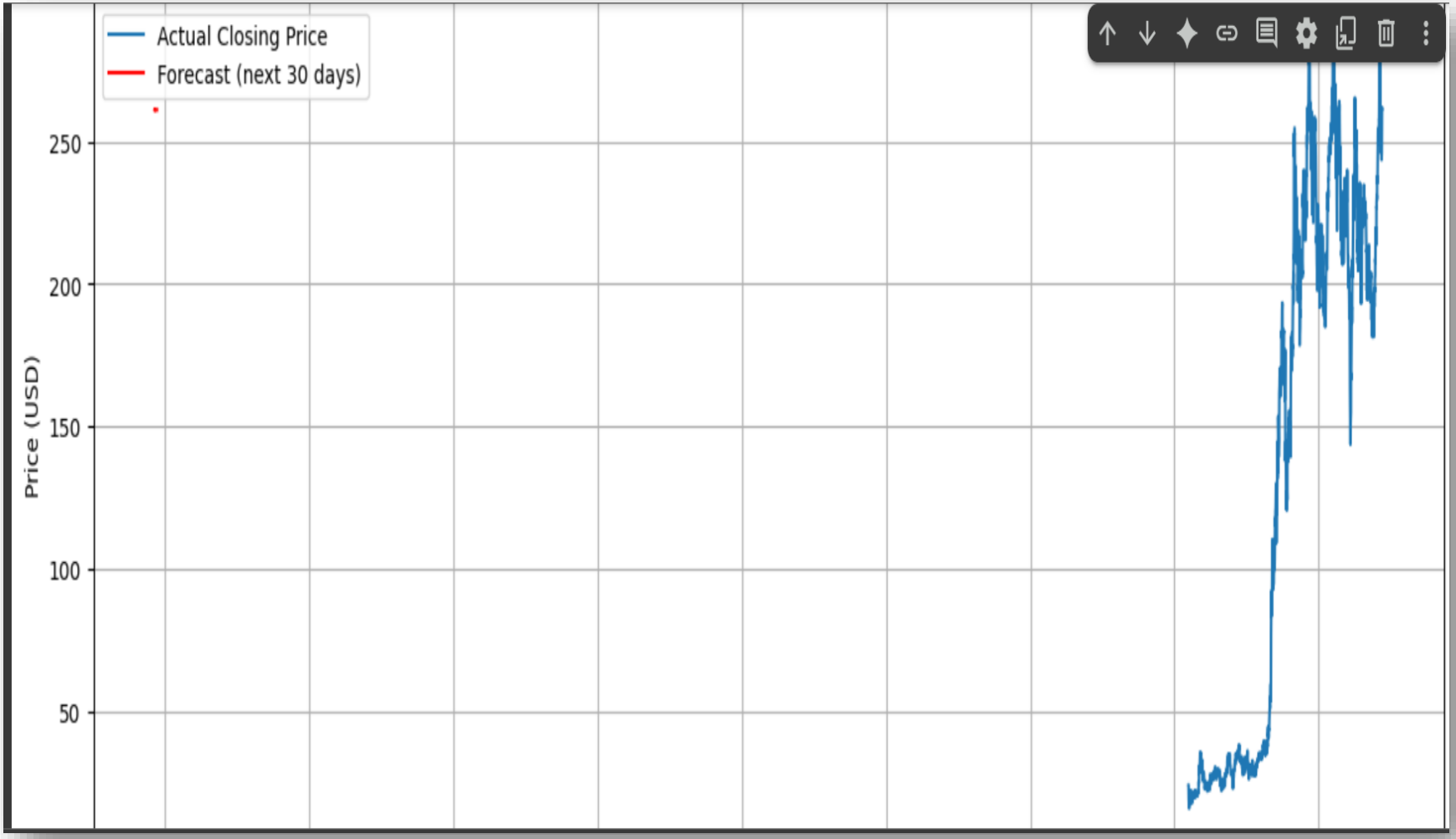


Time Series Decomposition

- Used seasonal_decompose to split:
- - Trend
- - Seasonality
- - Residuals

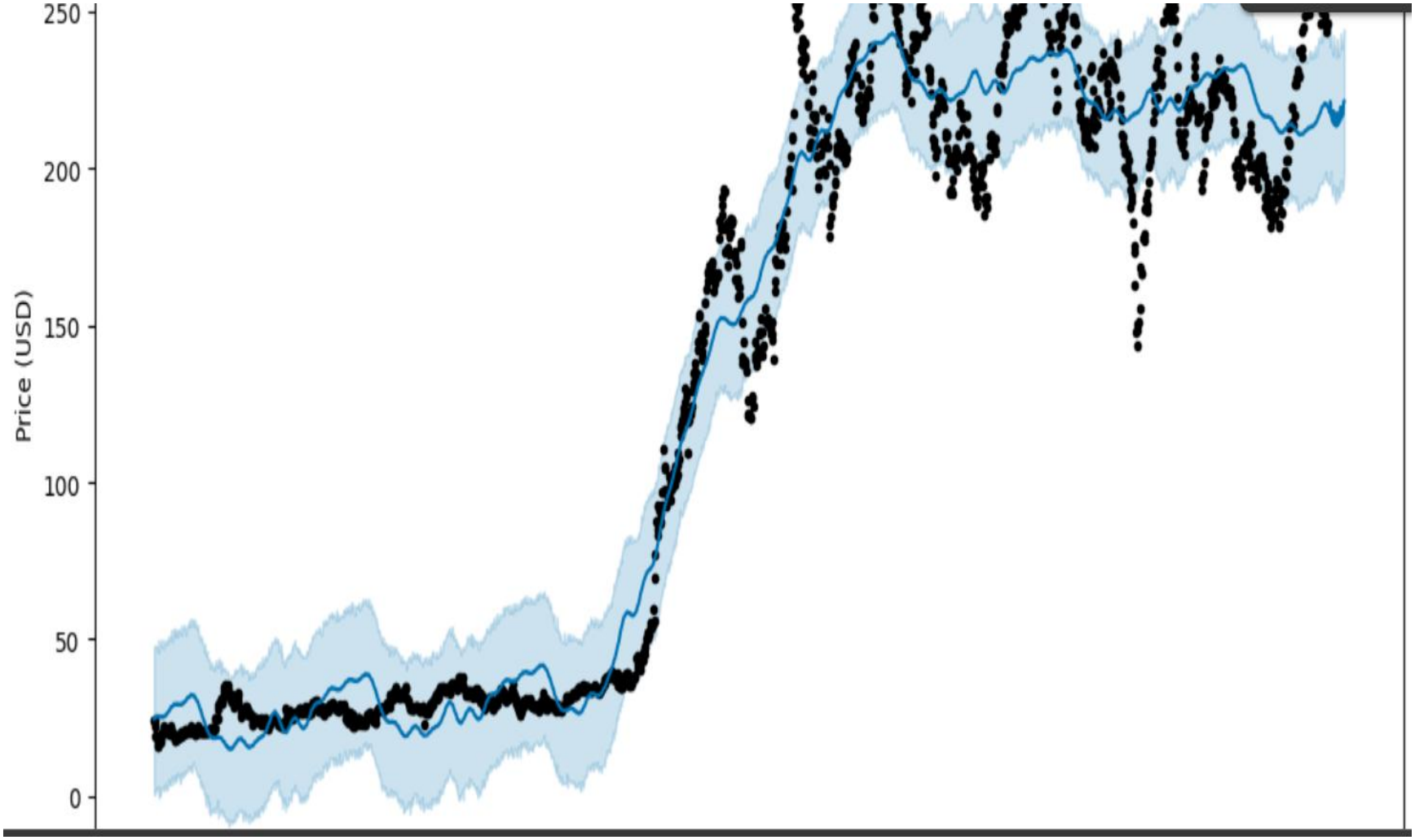
ARIMA Model

- ARIMA stands for autoregressive integrated moving average model and is specified by three order parameters:*(p, d, q).*
- **Steps:**
- - Checked stationarity using ADF test
- - Fitted ARIMA(5,1,0)
- Forecast: Next 30 days
- Plotted Actual vs Predicted prices


Actual Closing Price
Forecast (next 30 days)
Price (USD)
250
200
150
100
50

Prophet Model

- - Handled seasonality automatically
- - Data: Date (ds), Close (y)
- Forecasted 30 days with confidence intervals

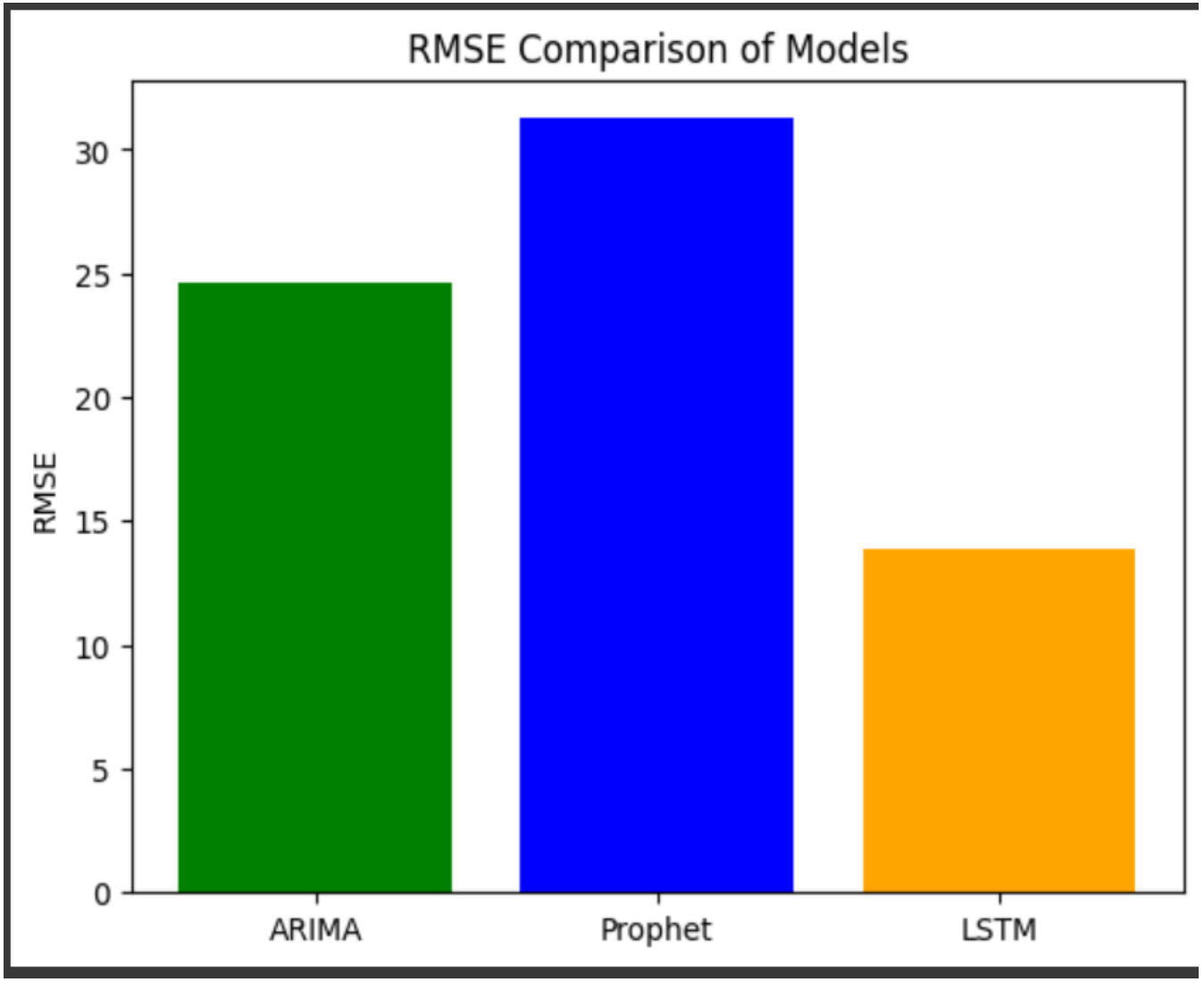

250
200
150
100
50
0
Price (USD)

LSTM Model

- Deep learning approach
- - Normalized data
- - Sequence format (60 days)
- Model: 2 LSTM layers + Dense
- Plotted Actual vs Predicted

Model Evaluation

- Evaluation Metric: RMSE (Root Mean Squared Error)
- Comparison: ARIMA vs Prophet vs LSTM
- Visual: Bar Chart of RMSE
- Best model highlighted


RMSE Comparison of Models
RMSE
0
5
10
15
20
25
30
ARIMA
Prophet
LSTM

Final Conclusion

- All models were implemented and compared
- Best-performing model identified
- Key Learnings:
- - ML vs DL models
- - Importance of preprocessing

THANK YOU!!