Data-Driven Investment Insights

Analyzing 20 Years of Google Stock Data to Uncover Trends, Volatility, and Predictions

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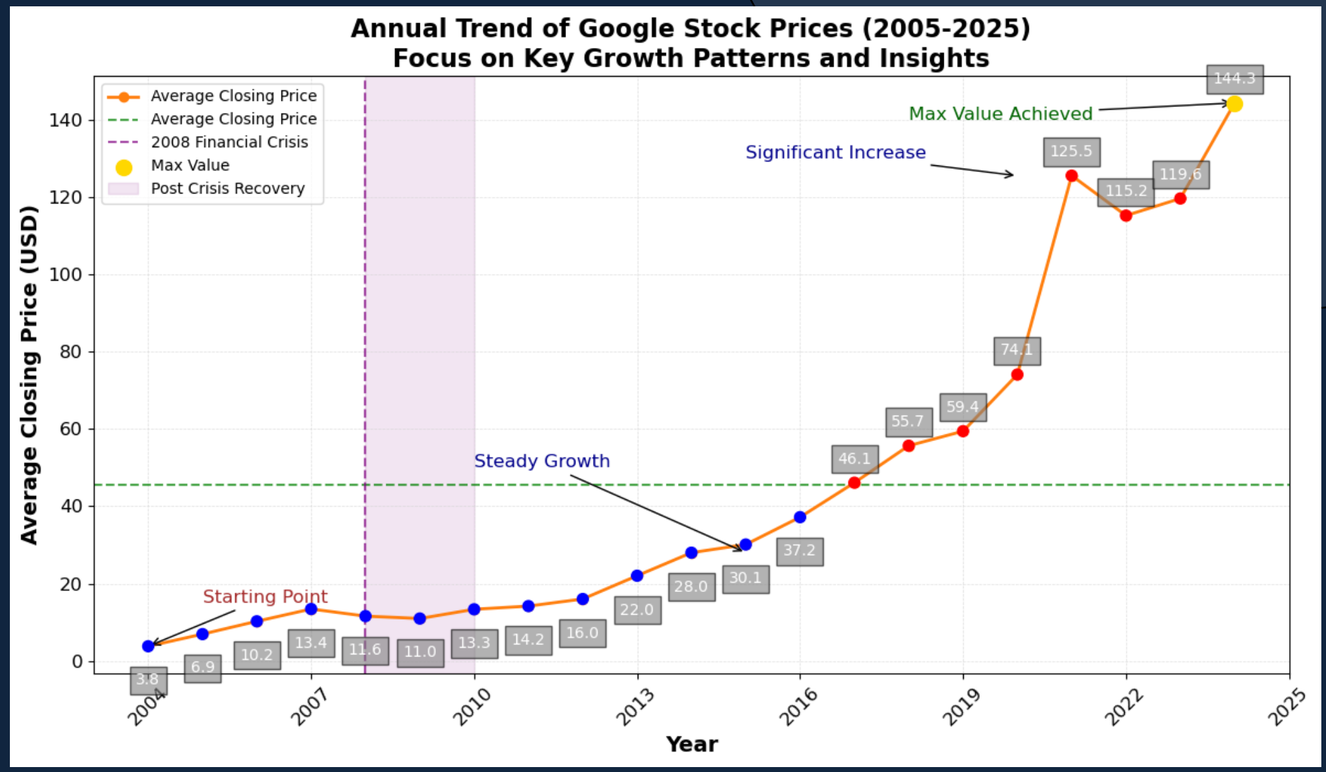
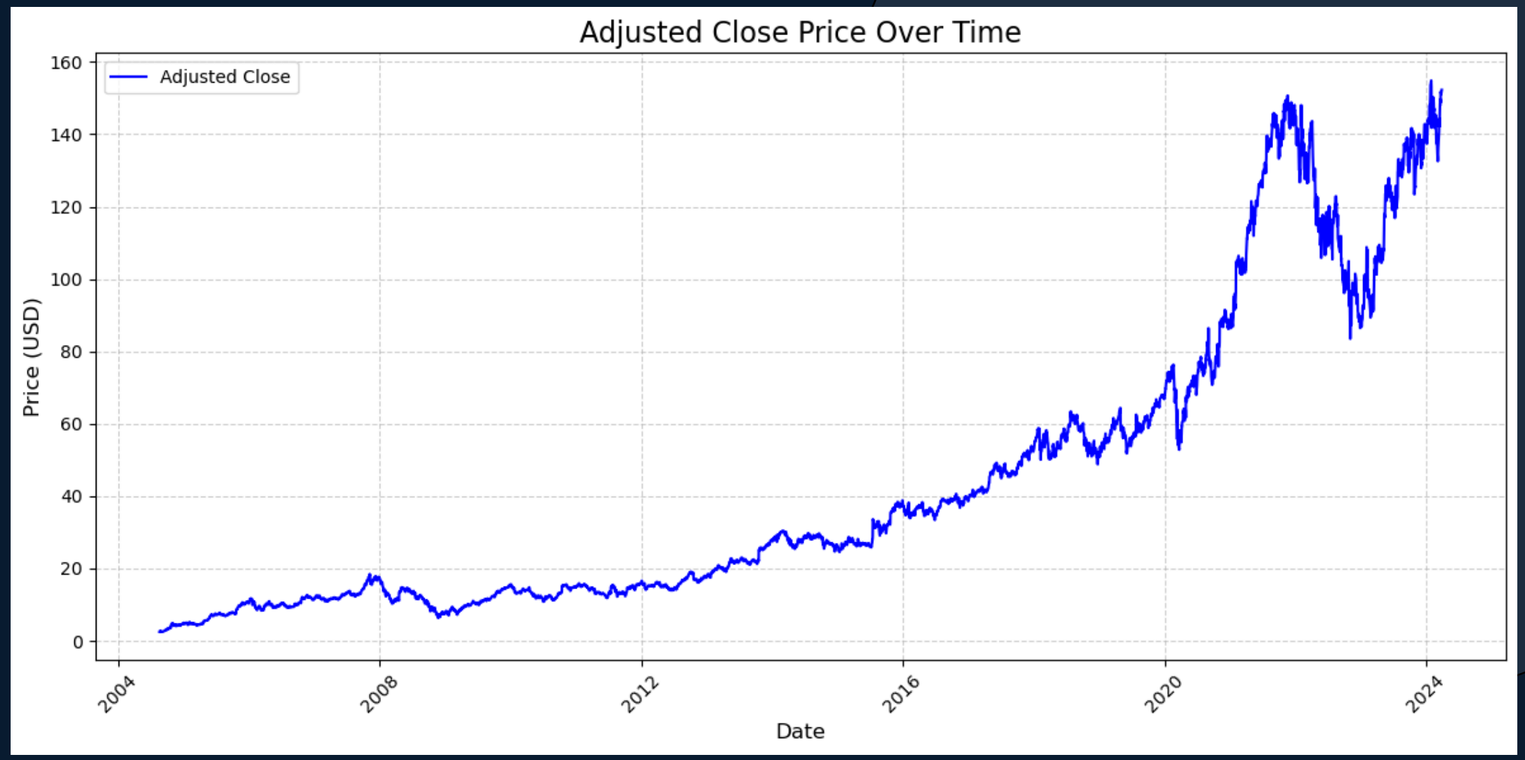
Key Growth Patterns in Google Stock Prices (2005–2025)



The chart highlights the significant growth trends of Google's annual average prices over 20 years.

The effects of the 2008 financial crisis are clearly visible, followed by recovery and growth.

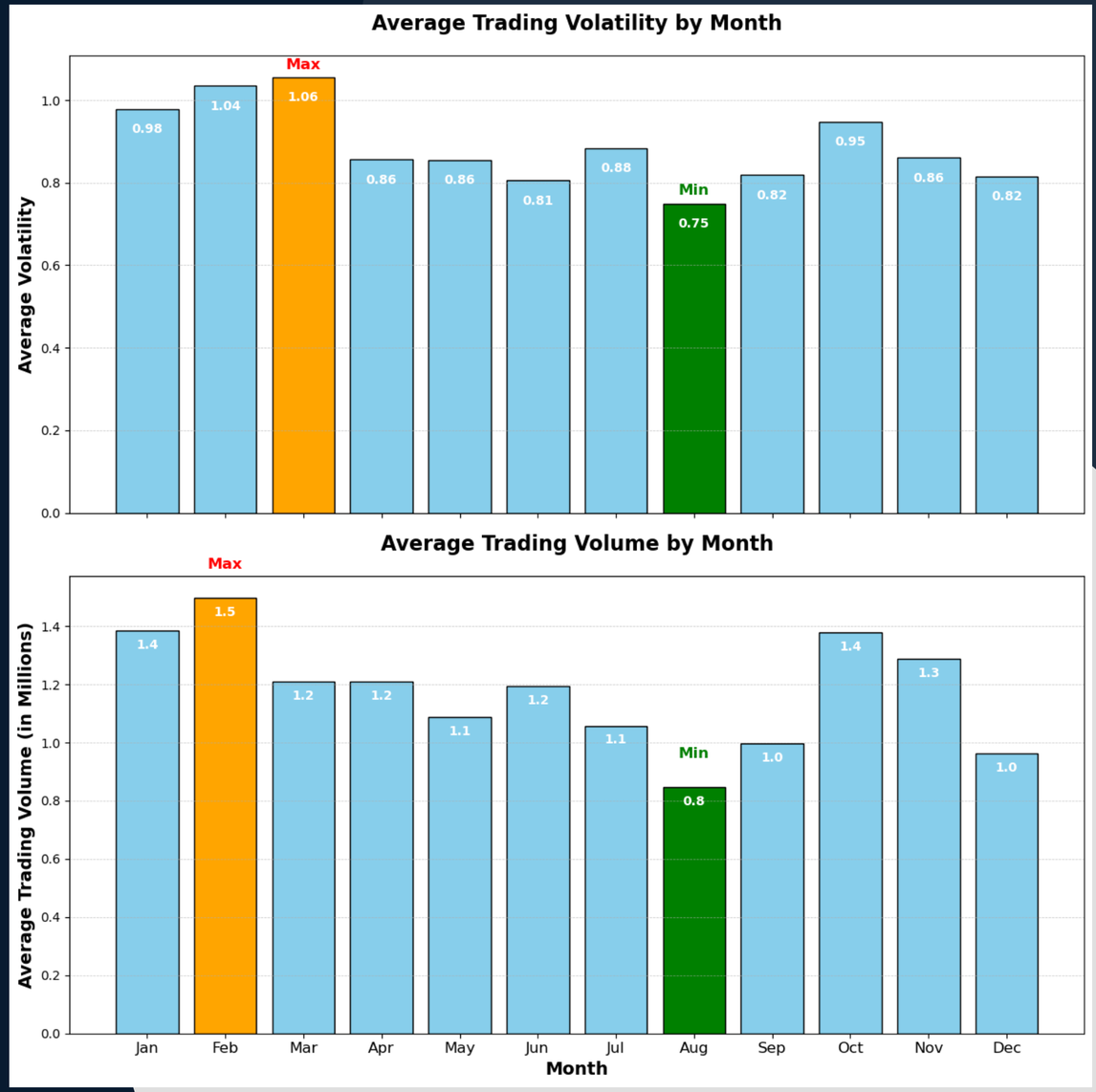


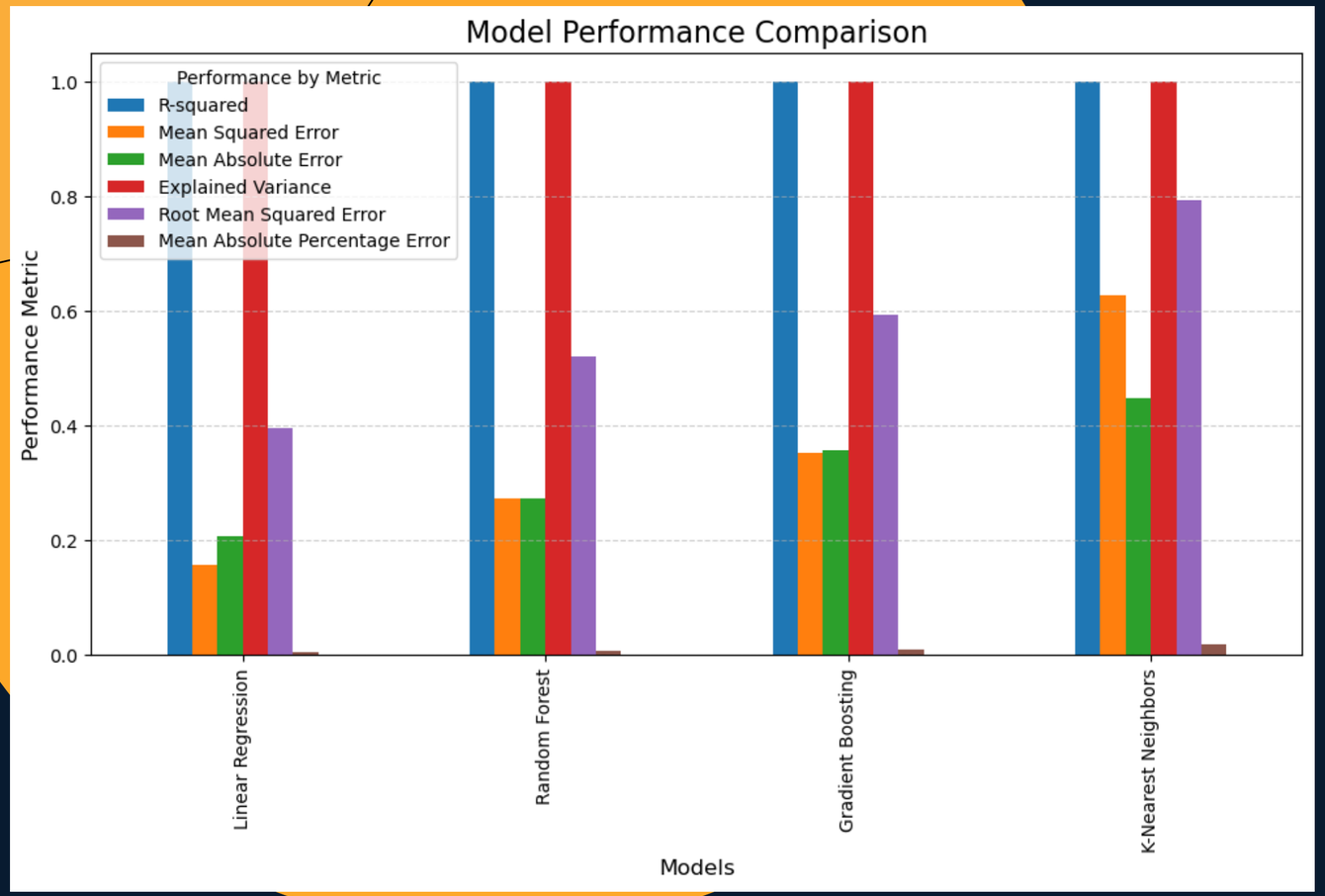
Provide insights to help investors make data-driven decisions by analyzing 20 years of historical Google stock data.

- Identify trends and patterns.
- Measure volatility and its triggers.
- Predict future price movements to minimize risk and enhance strategy.

Inferential Outcomes Summary

- February exhibits the highest average trading volatility (1.06), ideal for short-term trading.
- August has the lowest trading volatility (0.75), suitable for long-term investments.
- February also has the highest average trading volume (1.5M), while August is the lowest (0.8M).

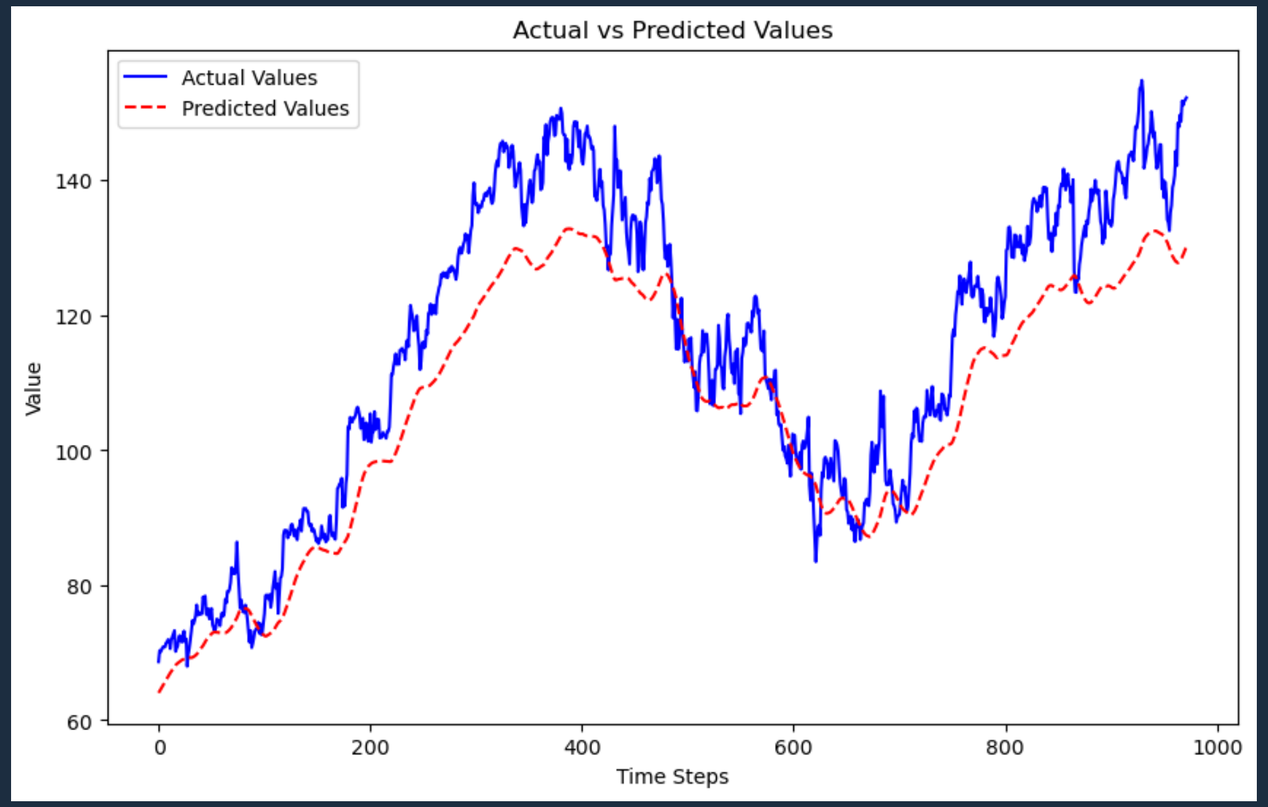




Classical ML Performance

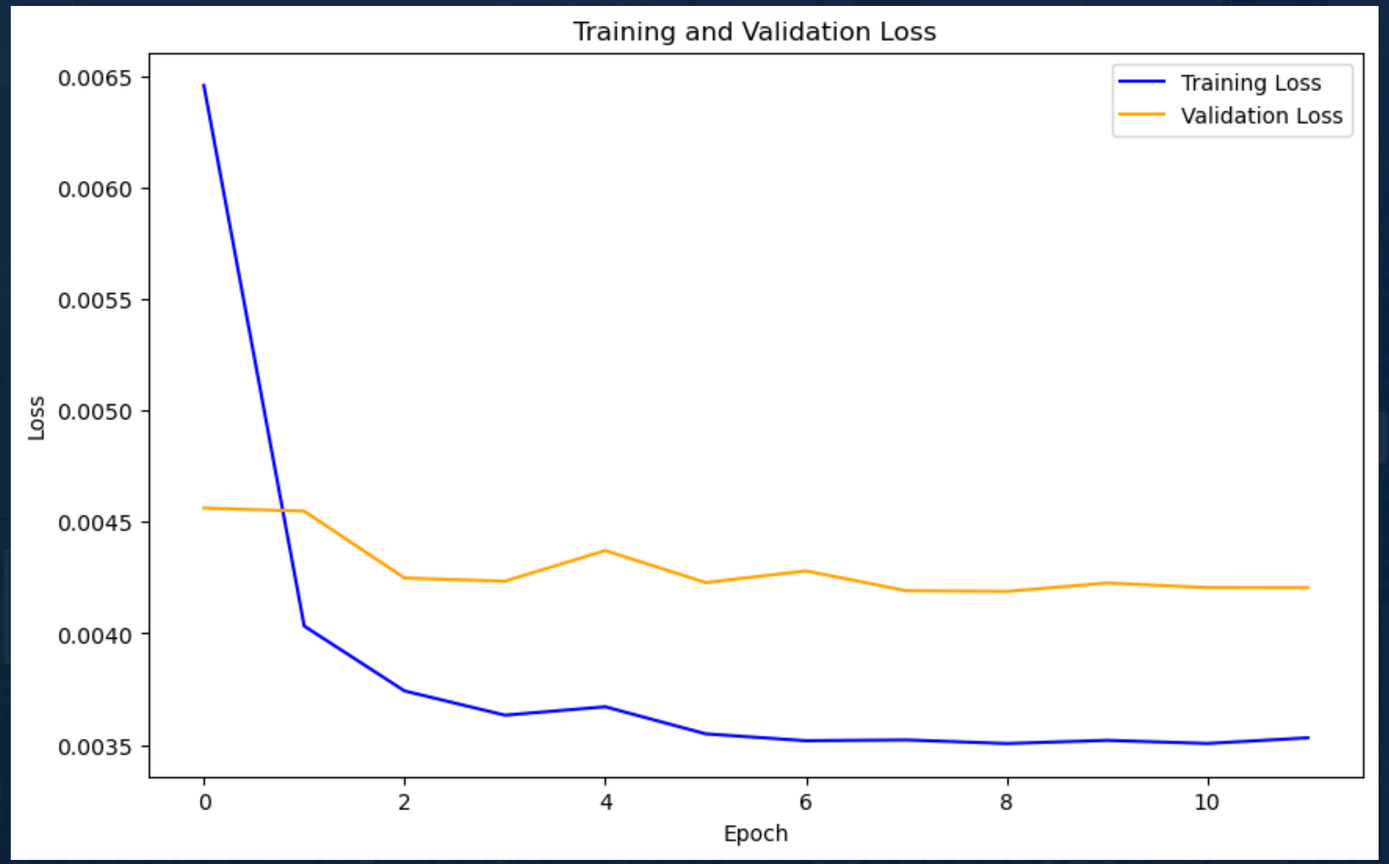
- Linear Regression outperforms with the highest R^2 and lowest errors.
- Random Forest and Gradient Boosting are competitive but computationally intensive.
- K-Nearest Neighbors shows higher error rates and lower effectiveness.

DL Model Visualization



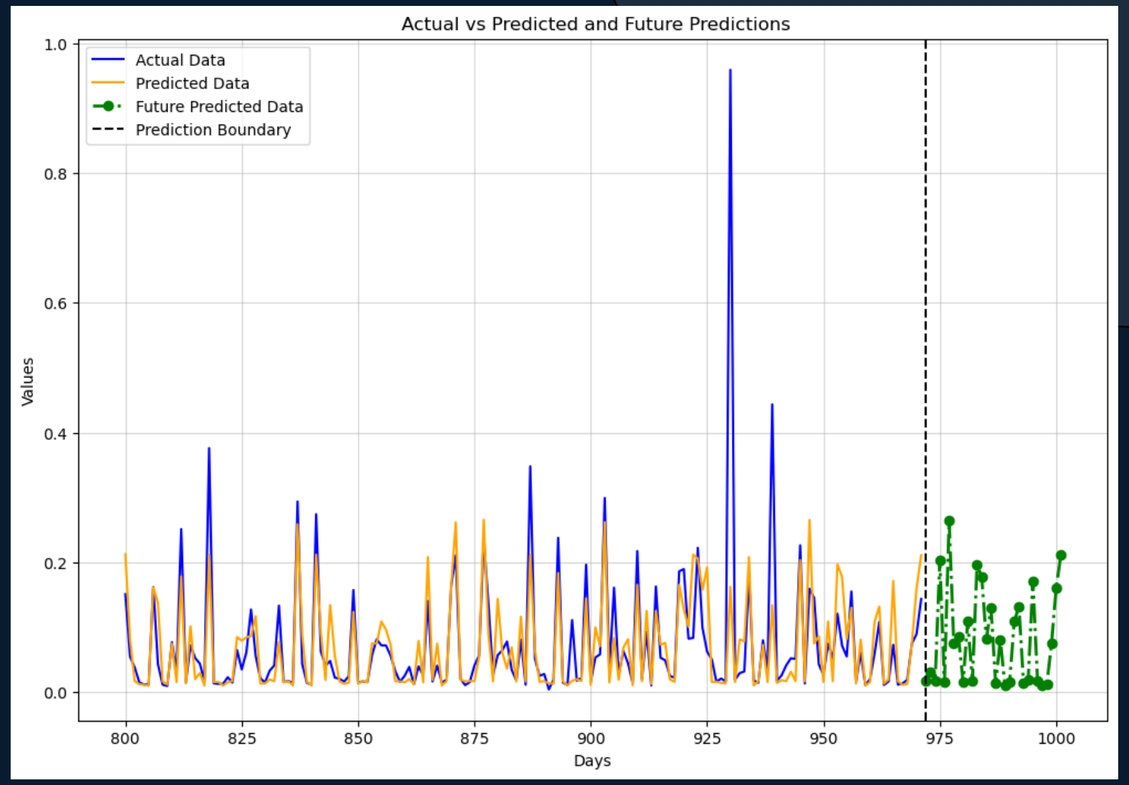
- LSTM closely follows actual stock values, highlighting its ability to predict trends.
- Minor deviations suggest room for further optimization.
- Excellent predictive accuracy ensures better risk assessment and strategy planning.

Training and Validation Loss



- The training and validation loss demonstrate a well-trained model with no significant overfitting.
- The gradual decrease in loss highlights the effectiveness of early stopping and learning rate adjustments.
- Low validation loss indicates strong generalization capability for unseen data.

Actual vs Predicted and Future Predictions



Future predictions show that the model has the potential to be used in investment decisions.

Strategic Do's and Don'ts for Data-Driven Investment Decisions

DO:

- Use historical trends for strategic investments, leveraging Google's long-term growth.
- Monitor volatility (e.g., February) for short-term trading opportunities.
- Apply LSTM predictions to improve risk management and market forecasts.
- Customize models for specific business needs or datasets.

DON'T:

- Rely solely on predictions; consider external factors like economic events.
- Assume the model's accuracy applies universally without validation.
- Make financial decisions without expert advice or additional analysis.
- Neglect updating models and data to stay relevant in changing markets.

THANK YOU