APPLE STOCK PREDICTIONS

FOR BRITAM ASSET MANAGERS

TABLE OF CONTENT:

BUSINESS UNDERSTANDING:

Britam Asset Managers is a leading asset management firm in Kenya

- offers portfolio management
- equity investment
- financial advisory services

Challenges:

1.the accuracy of the forecasting model

2.model must be adaptable to varying market conditions and economic events that influence stock prices.

Therefore:

a time series forecasting model will be developed using historical Apple stock price data from the Alpha Vantage API to counter this

MAIN OBJECTIVE:

develop a time series forecasting model to predict apple stocks prices using historical data.

METRICS OF SUCCESS

- RMSE
- Accuracy

SPECIFIC OBJECTIVE:

The specific objectives are:

1. To analyze stock price trends on a weekly, monthly, and yearly basis to identify patterns and seasonal effects that influence Apple stock prices.

2. To investigate how significant events, such as earnings reports, product launches, or macroeconomic changes, affect Apple stock prices and incorporate these insights into the forecasting model.

DATA UNDERSTANDING

this project analysis uses the historical stock price data for apple Inc.,

.

the major dataset(apple_stock_and_interest_rates.csv) was created between January 02, 2009 and august 02, 2024.

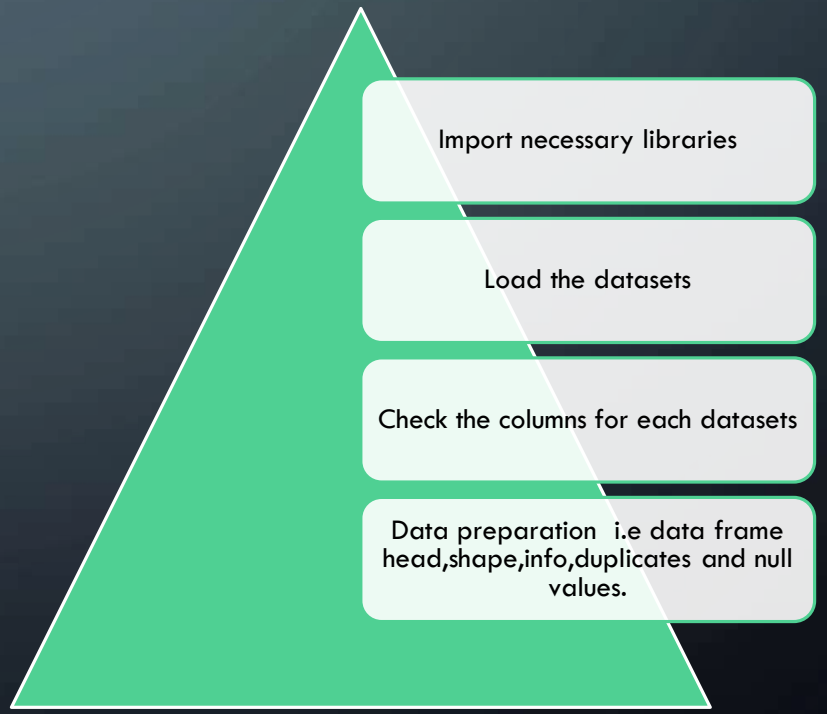
DATASETS

- data/apple_products_2009_to_2024.xlsx
- data/apple_stock_and_interest_rates.csv
- data/competition.csv

Conclusions:

- There were no duplicates and null values

PROCESS:



EXPLORATORY DATA ANALYSIS

- **Univariate analysis**

Apple Stock Closing Prices over time.

- **Conclusion:**

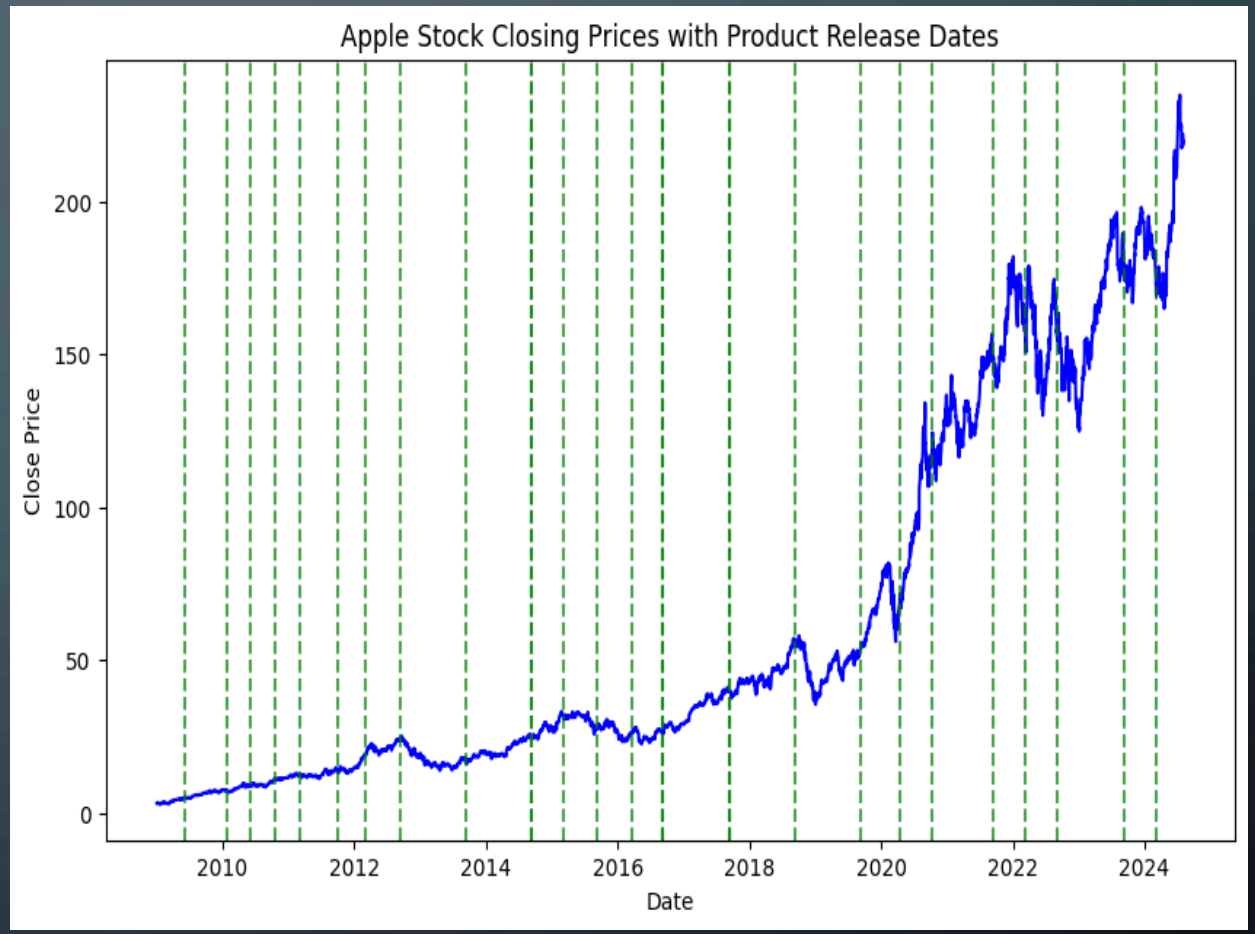
Apple's stock exhibits a long-term upward trend, with significant growth phases after 2018.

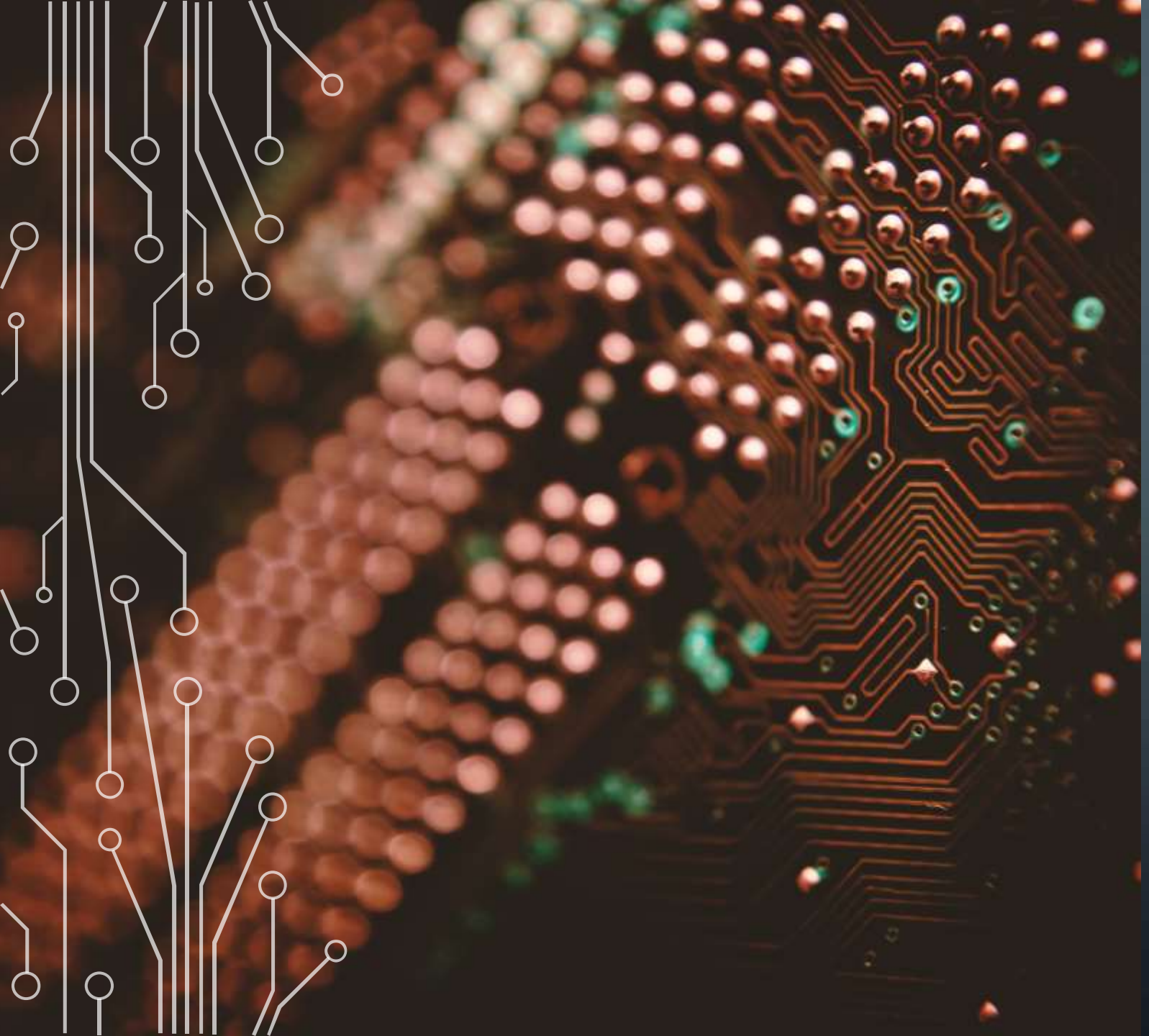
BIVARIATE ANALYSIS

Apple Stock Closing Prices with Product Release Dates.

Conclusion:

Apple's stock price consistently trended upward despite frequent product launches,





MODELLING

- Random forest
- Random forest with Grid Search CV
- Facebook Prophet
- Facebook prophet with regressor
- LSTM Model

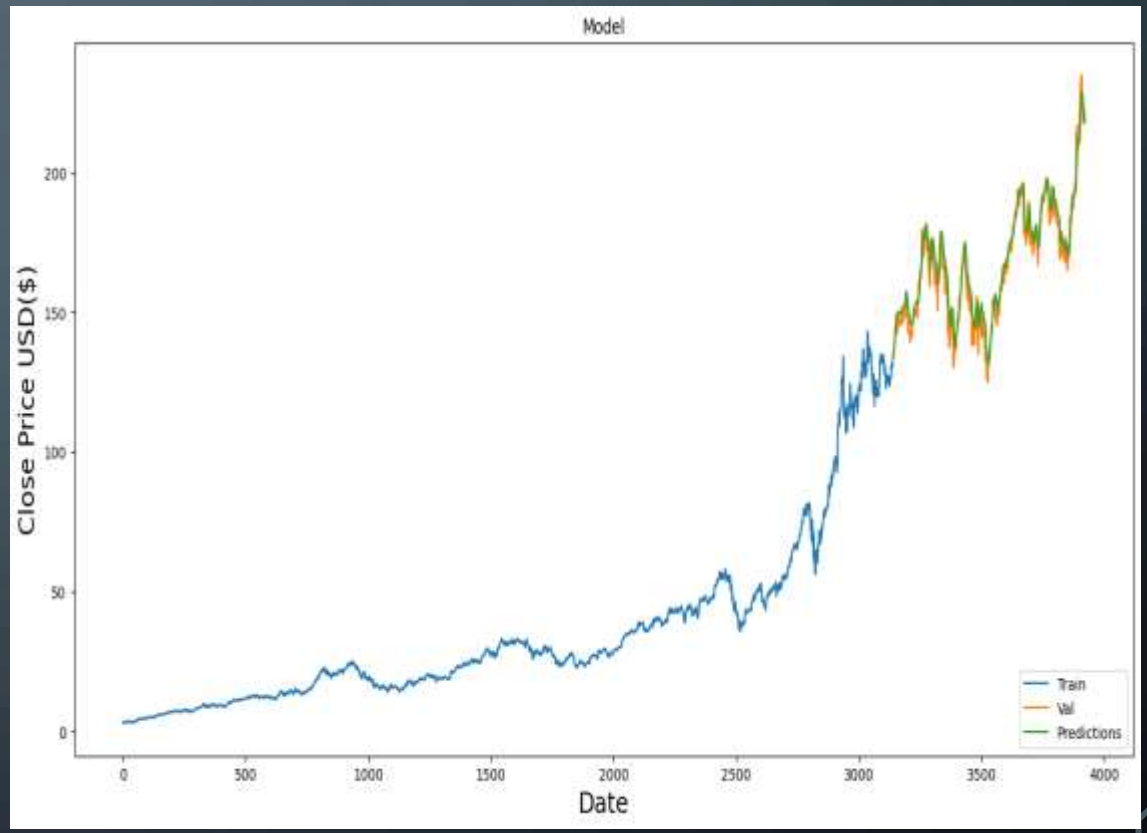
MODEL EVALUATION

- **checking the rmse in different models**

- ✓ Baseline Model(Random Forest)= 0.4789808917197452
- ✓ Random Forest with GridsearchCV = 0.4789808917197452
- ✓ Facebook Prophet= 7.496051447151834
- ✓ Facebook Prophet with regressors = 7.490949400727919
- ✓ Long Short-Term Memory (LSTM)= 2.2216187788515676

LONG SHORT-TERM MEMORY MODEL

- Low RMSE shows model predictions are quite close to the actual values. Making lstm best performing model



CONCLUSION

EDA Insights:

- Apple's stock prices show seasonal patterns, particularly around product launches and major events.

- Interest rates have a complex relationship with stock prices, indicating the influence of macroeconomic factors.

Modeling Results:

- **Random Forest:** The initial classification model was inadequate, with an accuracy of 48%.

- **Prophet Model:** Time series forecasting with Prophet effectively captured seasonal trends and holiday impacts, with moderate accuracy.

- **Prophet with Regressors:** Incorporating interest rates and product launches slightly improved the model's performance.

- **LSTM Model:** The LSTM model demonstrated potential in capturing temporal dependencies, suggesting a more robust approach for future predictions.

Key Takeaways:

- External factors like interest rates and product launches influence stock prices but are not sole determinants.

- Time series models, particularly LSTM, are better suited for stock price prediction.

Overall, the project provides a solid foundation for further improvement, particularly in refining the LSTM model with advanced feature engineering and tuning.

RECOMMENDATIONS

Model Enhancement:

Regular Model Updates

Expanding to Other Stock

Further Research:

FUTURE WORK.

- Initiate a research project comparing different deep learning architectures

-integrate (NLP) techniques to analyze sentiment from financial news or social media platforms and assess their impact on market trends.

CONTACT DETAILS

emukami206@gmail.com

kelseymaina8541@gmail.com

annbellahn@gmail.com

simonmakumi5@gmail.com