

AMAZON STOCK PRICE PREDICTIONS

18 OCTOBER 2023

BY BULLS AND BEARS



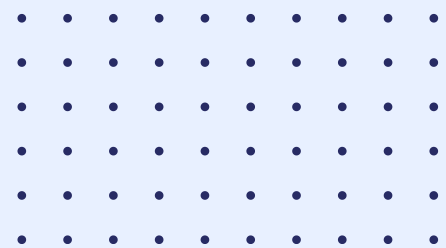
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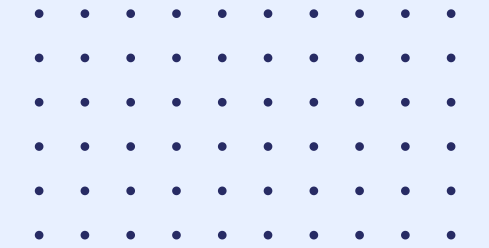


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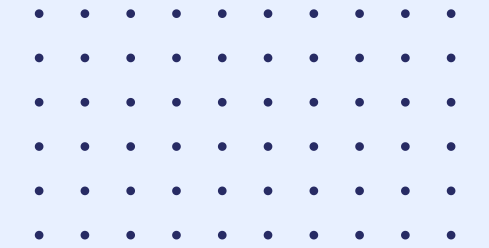
OVERVIEW



Stock price prediction and analysis are important for investors and financial institutions. It involves forecasting future prices using various techniques.

Accurate stock price forecasts can have positive implications for investors and financial institutions. Stock price analysis helps investors and financial institutions make decisions about when to buy and sell shares.

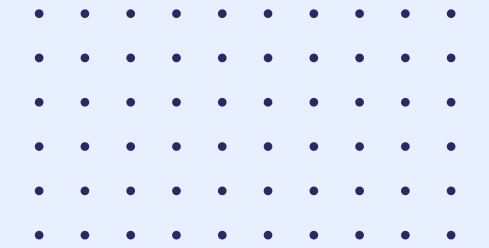
BUSINESS PROBLEM



Stock price prediction, especially short-term, is difficult due to market volatility. Investors require precise forecasts for Amazon stock decisions.

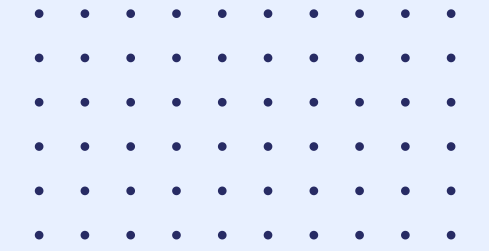
Creating dependable models for Amazon stock prediction aids informed investor decisions. Developing accurate models and their practical application is the challenge.

OBJECTIVES



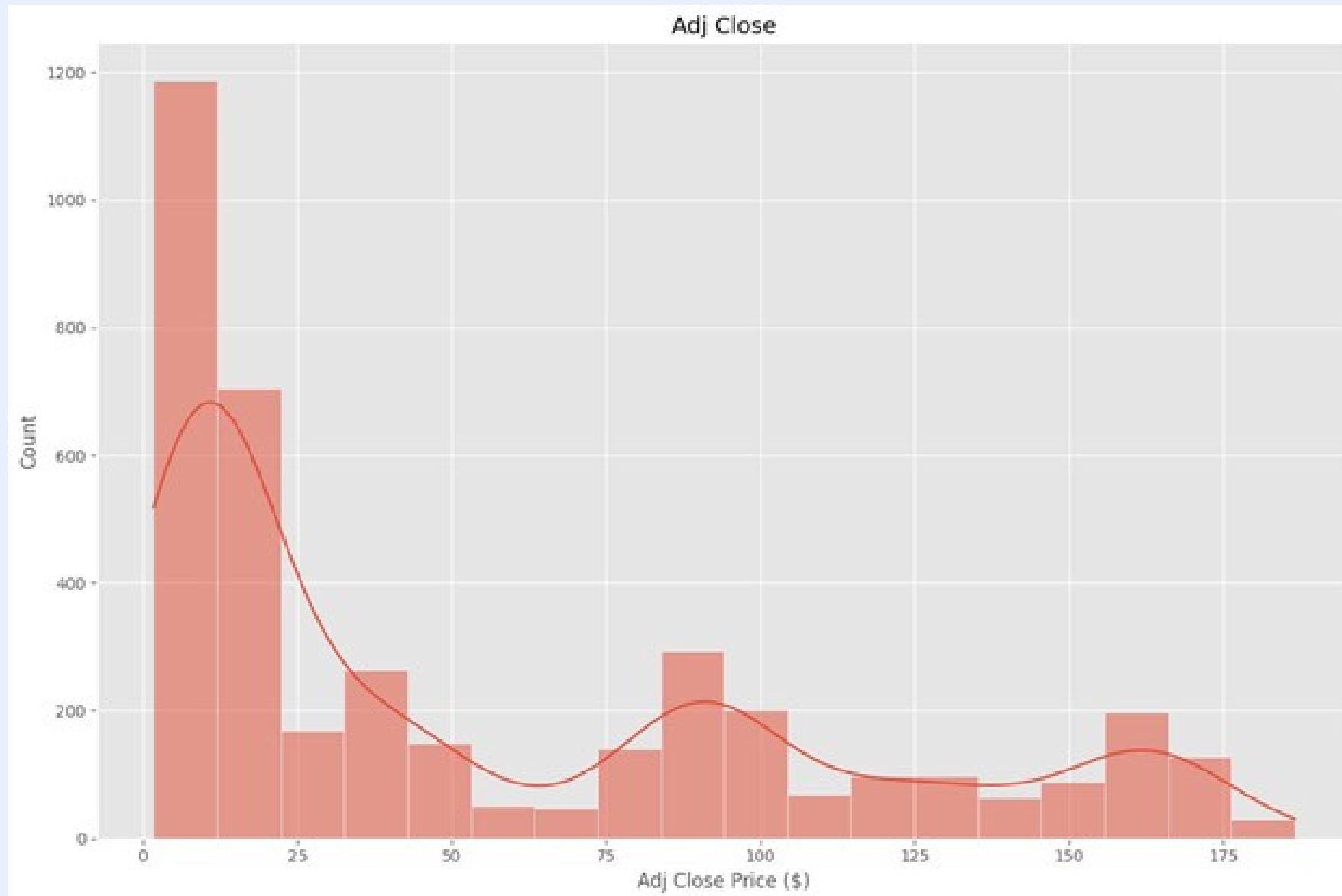
- To build and implement different models for Amazon stock price prediction.
- To evaluate the performance and accuracy of the models using MSE, RMSE, and R2 Score.
- To use the best performing model to forecast Amazon stock prices.
- To create a user-friendly dashboard/application for stakeholders to access predictions.

DATA UNDERSTANDING

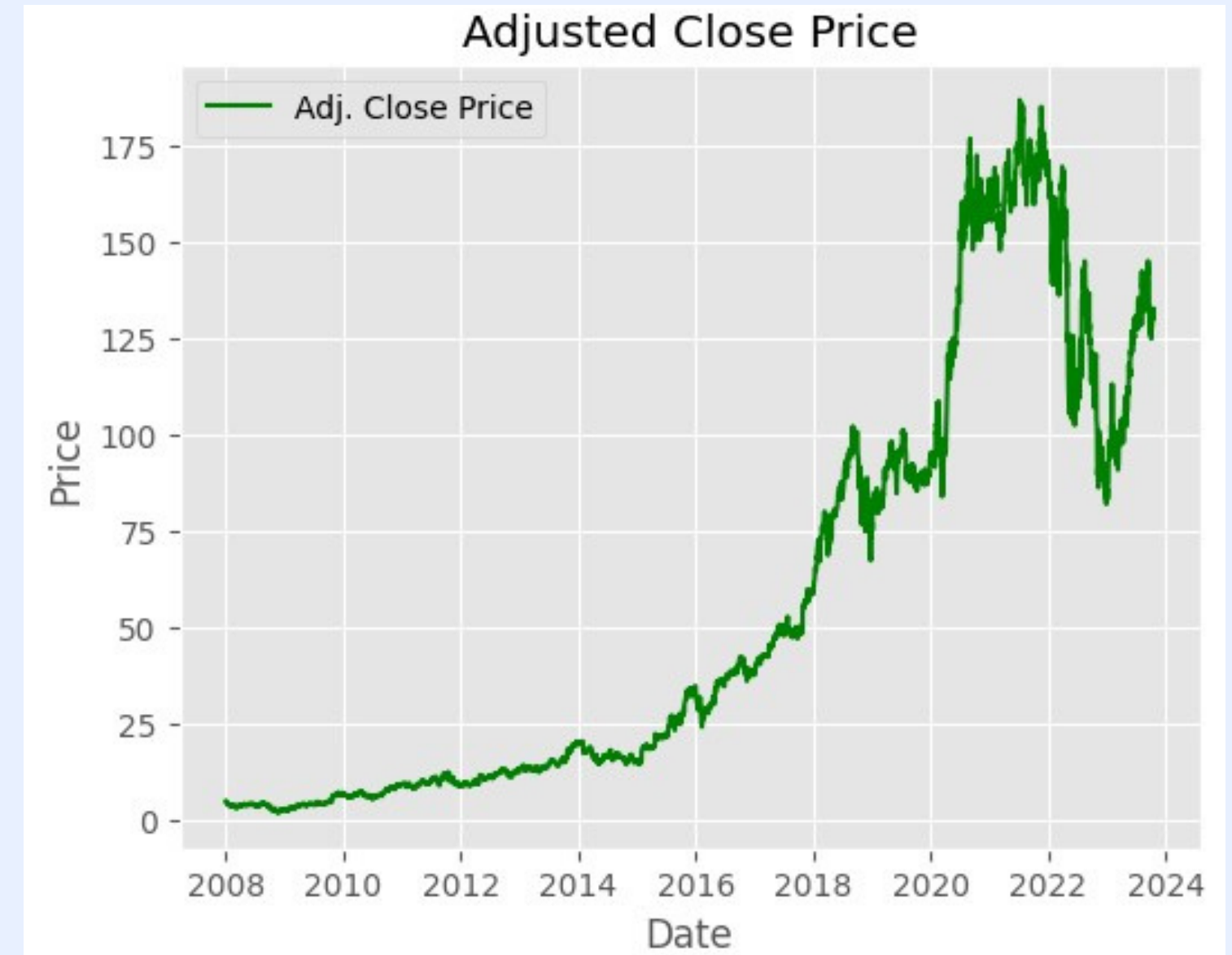


- The data's features are Date, Open price, High price, Low price, Close price, Adjusted Close price, and Volume.
- 3,960 rows and 5 columns.
- All data is numerical.
- No missing values.
- No duplicates.
- The Date column is in DateTime format.
- The data extracted ranged between 2008 and 2023.

EDA

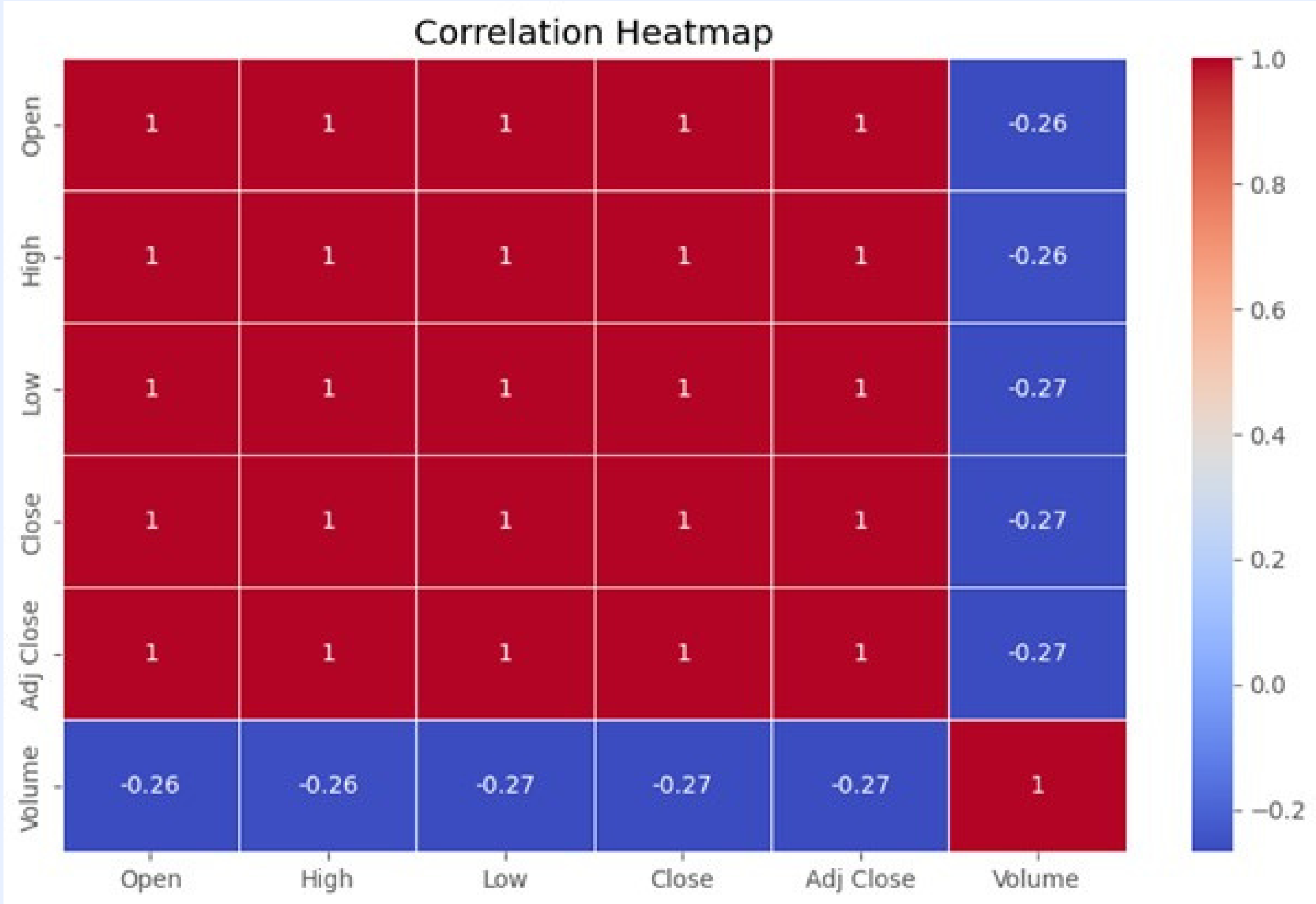


The Amazon stock price was mostly distributed 0-25 US dollars.



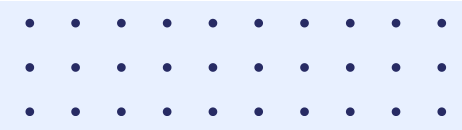
Amazon stock price has shown a gradual increase over the years, with a significant surge between 2018 and 2022, followed by a decline in early 2023 and a renewed increase towards the end of the year.

EDA (cont.)

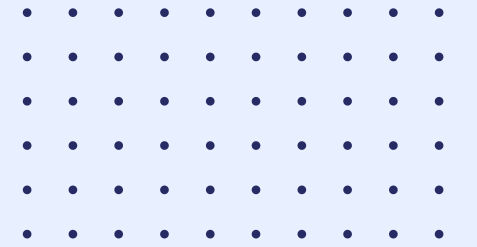


Amazon stock price is driven by the company's performance and the overall stock market.

When the company is doing well and the stock market is up, Amazon's stock price tends to go up.



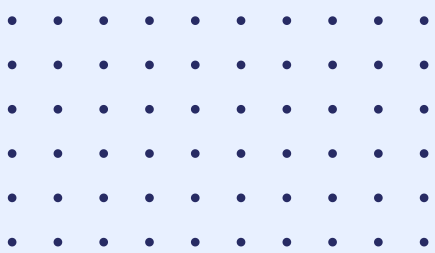
MODELING



Models Used

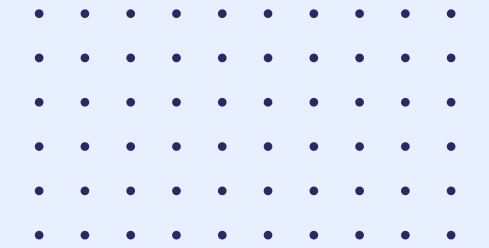
- **Baseline Model - SARIMA-1**
- **Tuned model - SARIMA-2**
- **FB Prophet**
- **Simple Recurrent Neural Network**
- **Long Short Term Memory(LSTM) - Original Features**
- **LSTM - Important features**

MODEL EVALUATION



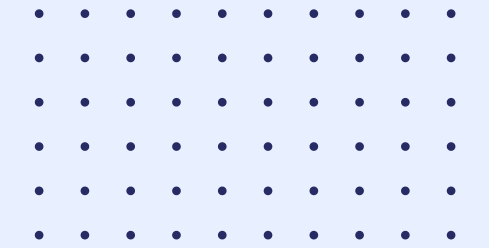
Model	MAE	MSE	RMSE	MAPE	R2-Score
Baseline - SARIMA 1	0.0506	0.0047	0.0683	9.6815	0.0016
SARIMA 2	0.0506	0.0047	0.0683	9.6815	0.0025
FB Prophet	0.0551	0.0058	0.0760	10.5142	-0.0138
Simple RNN	0.0779	0.0107	0.1033	14.7780	-0.0471
LSTM - Original Features	0.0779	0.0133	0.1153	23.1175	-0.0025
LSTM - Important Features	0.0779	0.0103	0.1013	14.9543	-0.0036

CONCLUSIONS



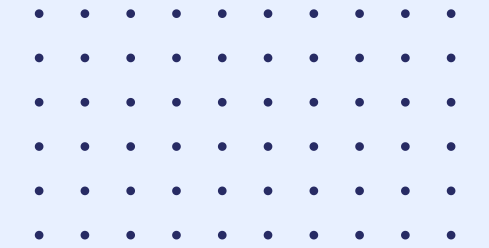
- The SARIMA-2 model performed the best for short-term Amazon stock price prediction.
- The top 8 features that highly influenced the price predictions are Close, High, Returns, Rolling_Std, Volume, Open, ROC, and RSI.
- Long-term predictions with SARIMA-2 brought wide variations.

RECOMMENDATIONS



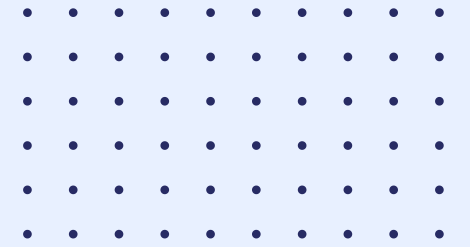
- Investors and financial institutions can use the model for short-term prediction of Amazon stock prices to determine the general trend.
- Our deployment models can also be improved and used for predicting other stock markets.
- More data is required for better performance of the LSTM model.
- Carry out sentimental analysis alongside the model to factor in the impact of news and public sentiment on stock prices changes.

LIMITATIONS



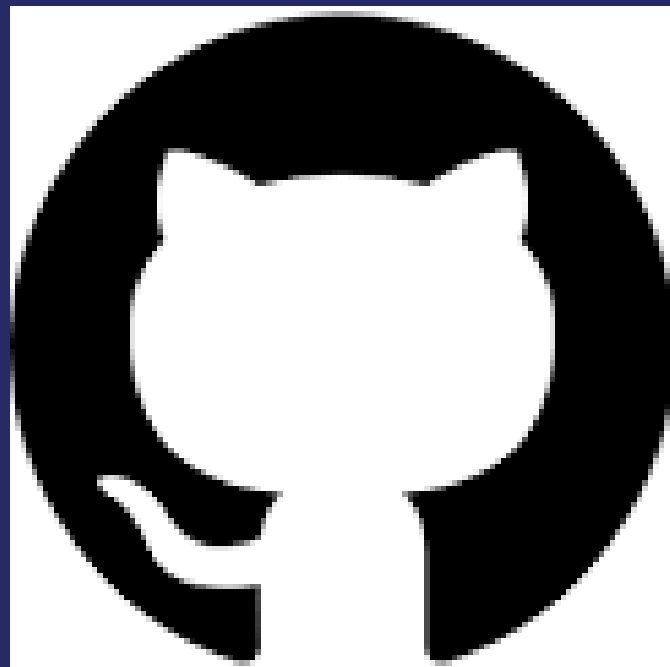
- **Time series machine learning models are computationally expensive and require time to optimize.**
- **Stock prices are also affected by external factors such as war and disease, which are difficult to predict.**

FUTURE WORK



- Incorporate external factors into models
- Collect and integrate more data sources
- Develop multi-market predictive models

Thank You!



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