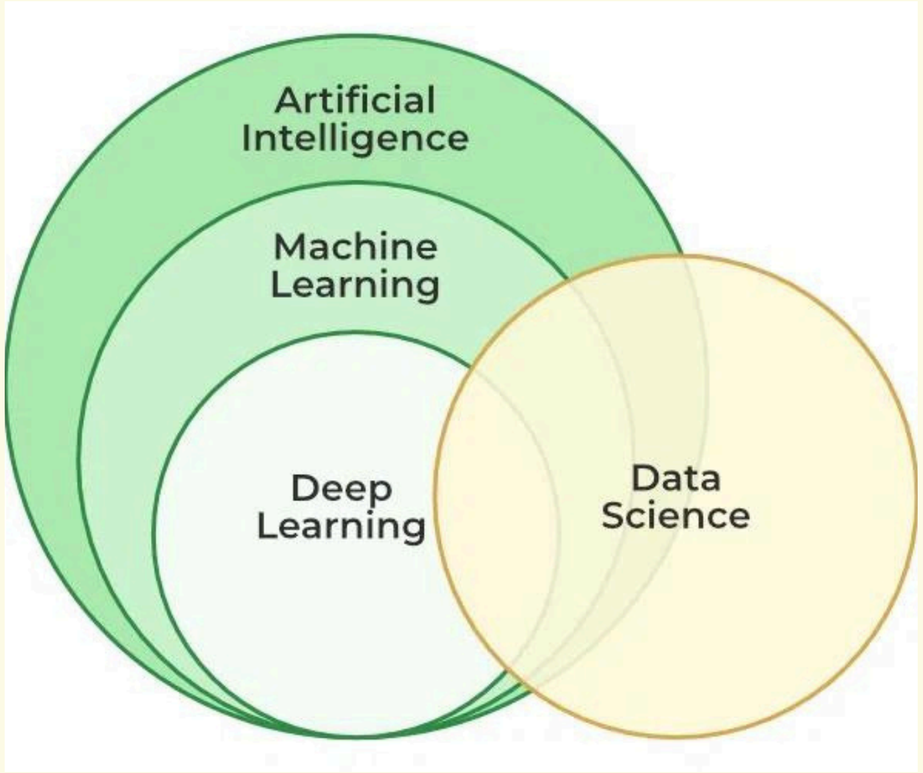
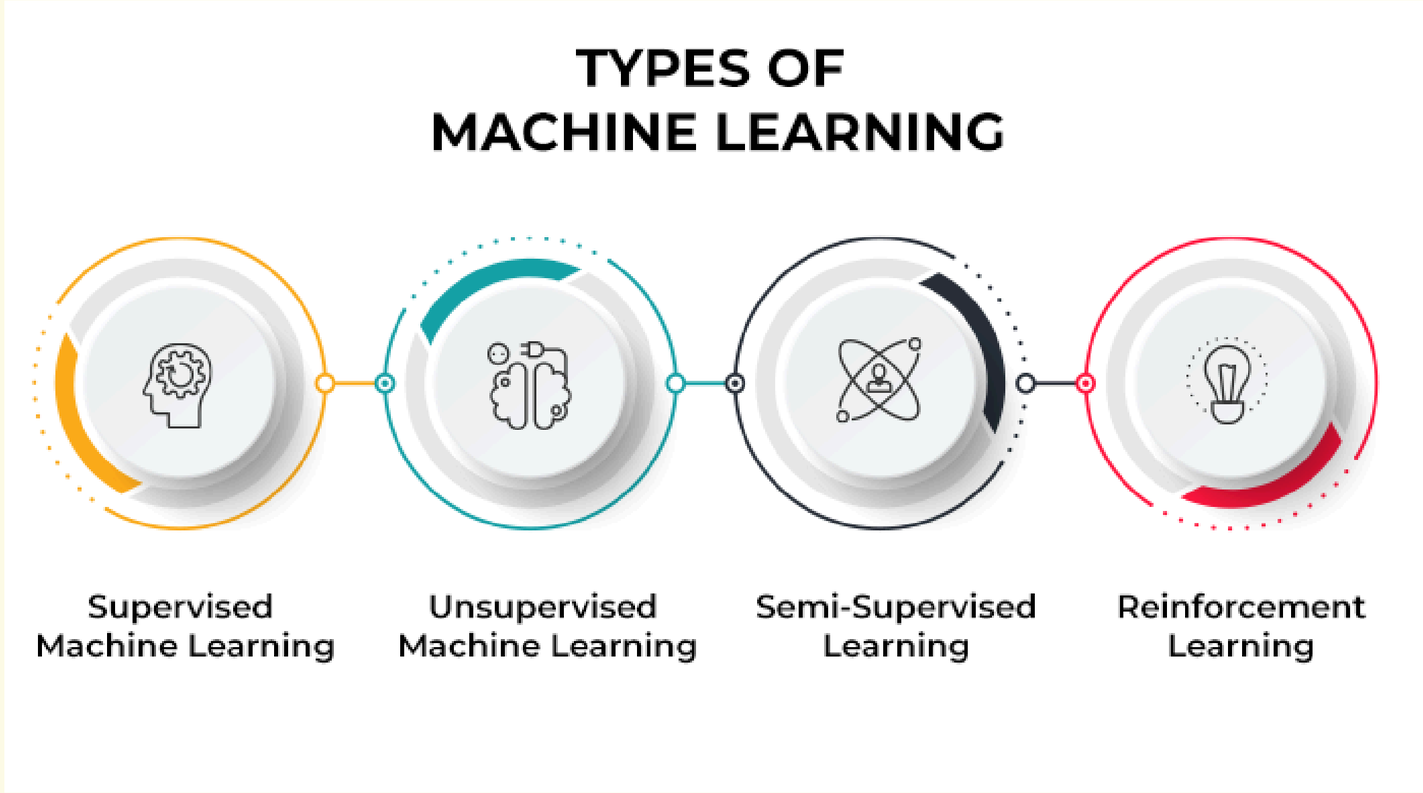
STOCK PRICE PREDICTION

Machine Learning

Machine learning (ML) is a branch of artificial intelligence (AI) and computer science that focuses on the using data and algorithms to enable AI to imitate the way that humans learn, gradually improving its accuracy.

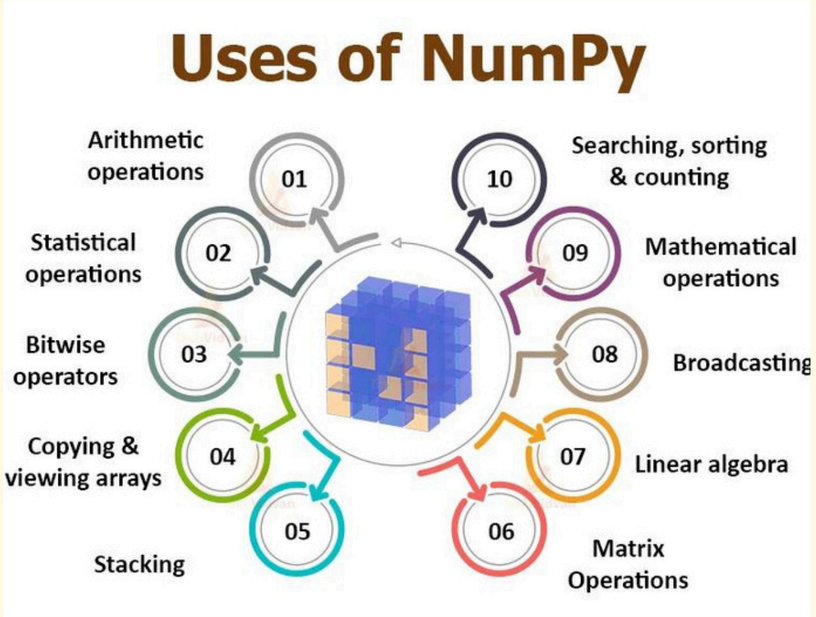




Libraries used

Numpy

NumPy stands for Numerical Python, is an open-source Python library that provides support for large, multi-dimensional arrays and matrices.

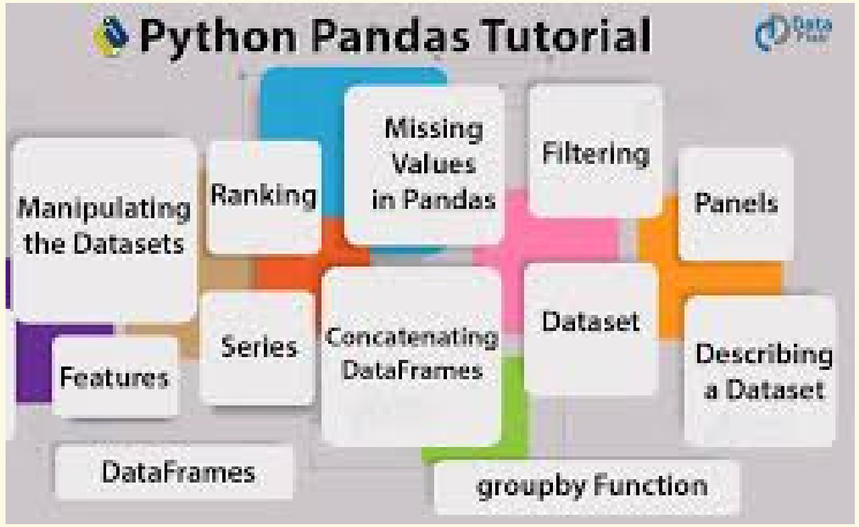


Matplotlib

Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python. Matplotlib makes easy things easy and hard things possible.

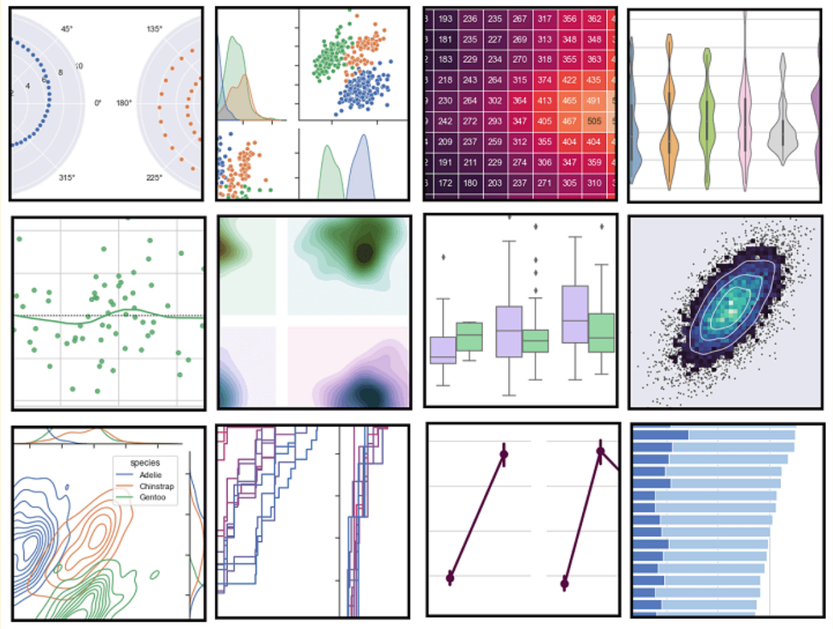
Pandas

Pandas is a Python library used for working with data sets. It has functions for analyzing, cleaning, exploring, and manipulating data.



Seaborn

Seaborn is an amazing visualization library for statistical graphics plotting in Python. It provides beautiful default styles and color palettes to make statistical plots more attractive.



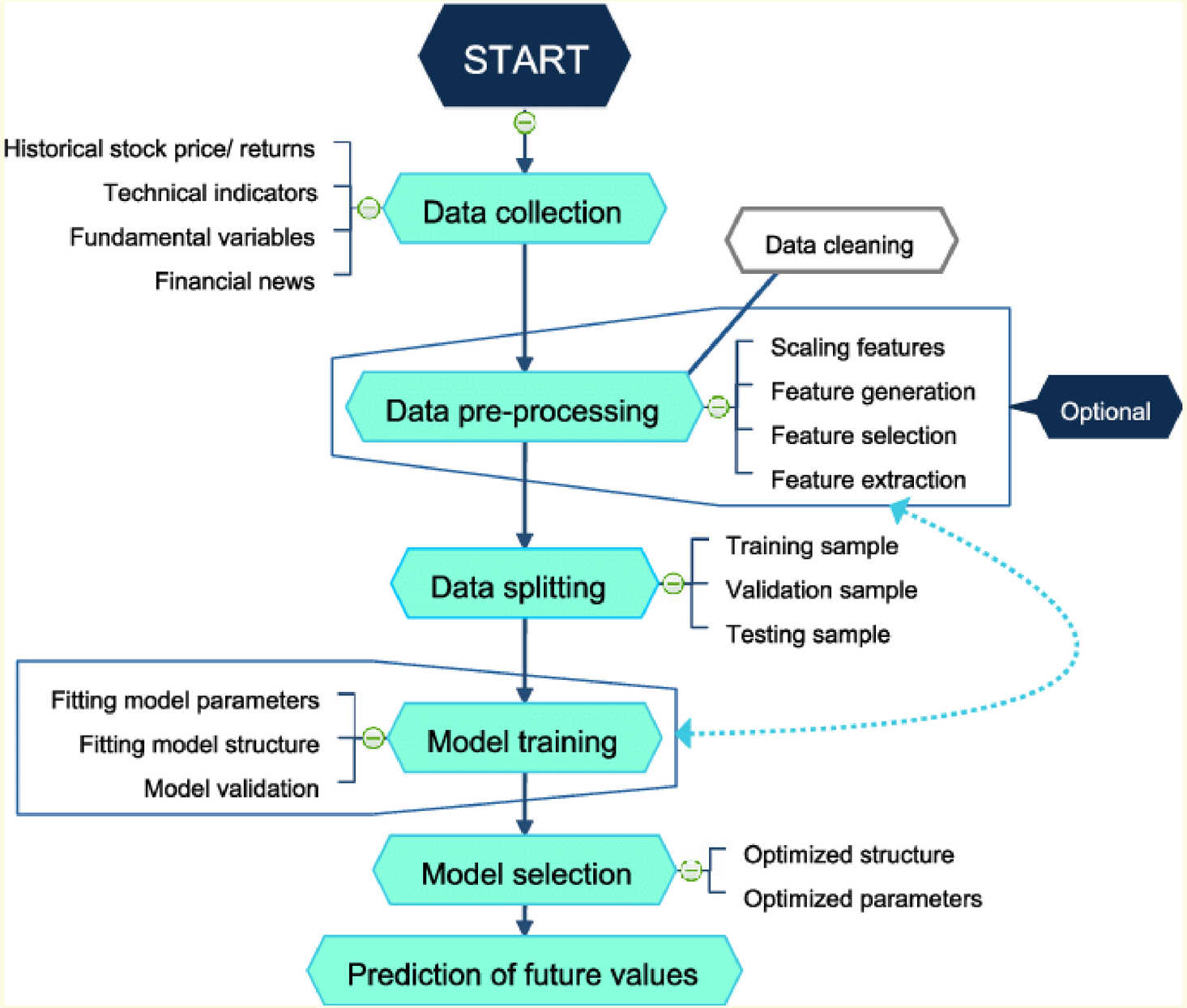
What is the Stock Market?

A stock market is a public market where you can buy and sell shares for publicly listed companies. The stocks, also known as equities, represent ownership in the company. The stock exchange is the mediator that allows the buying and selling of shares.

Importance of Stock Market?

- Stock markets help companies to raise capital.
- It helps generate personal wealth.
- Stock markets serve as an indicator of the state of the economy.
- It is a widely used source for people to invest money in companies with high growth potential.

Workflow of the Stock price prediction



Data Collection

Data collection allows you to capture a record of past events so that we can use data analysis to find recurring patterns.

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[**********100%%**********]  1 of 1 completed
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Date	Open	High	Low	Close	Adj Close	Volume
2010-01-04	7.622500	7.660714	7.585000	7.643214	6.461977	493729600
2010-01-05	7.664286	7.699643	7.616071	7.656429	6.473148	601904800
2010-01-06	7.656429	7.686786	7.526786	7.534643	6.370185	552160000
2010-01-07	7.562500	7.571429	7.466071	7.520714	6.358409	477131200
2010-01-08	7.510714	7.571429	7.466429	7.570714	6.400681	447610800

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[**********100%%**********]  1 of 1 completed
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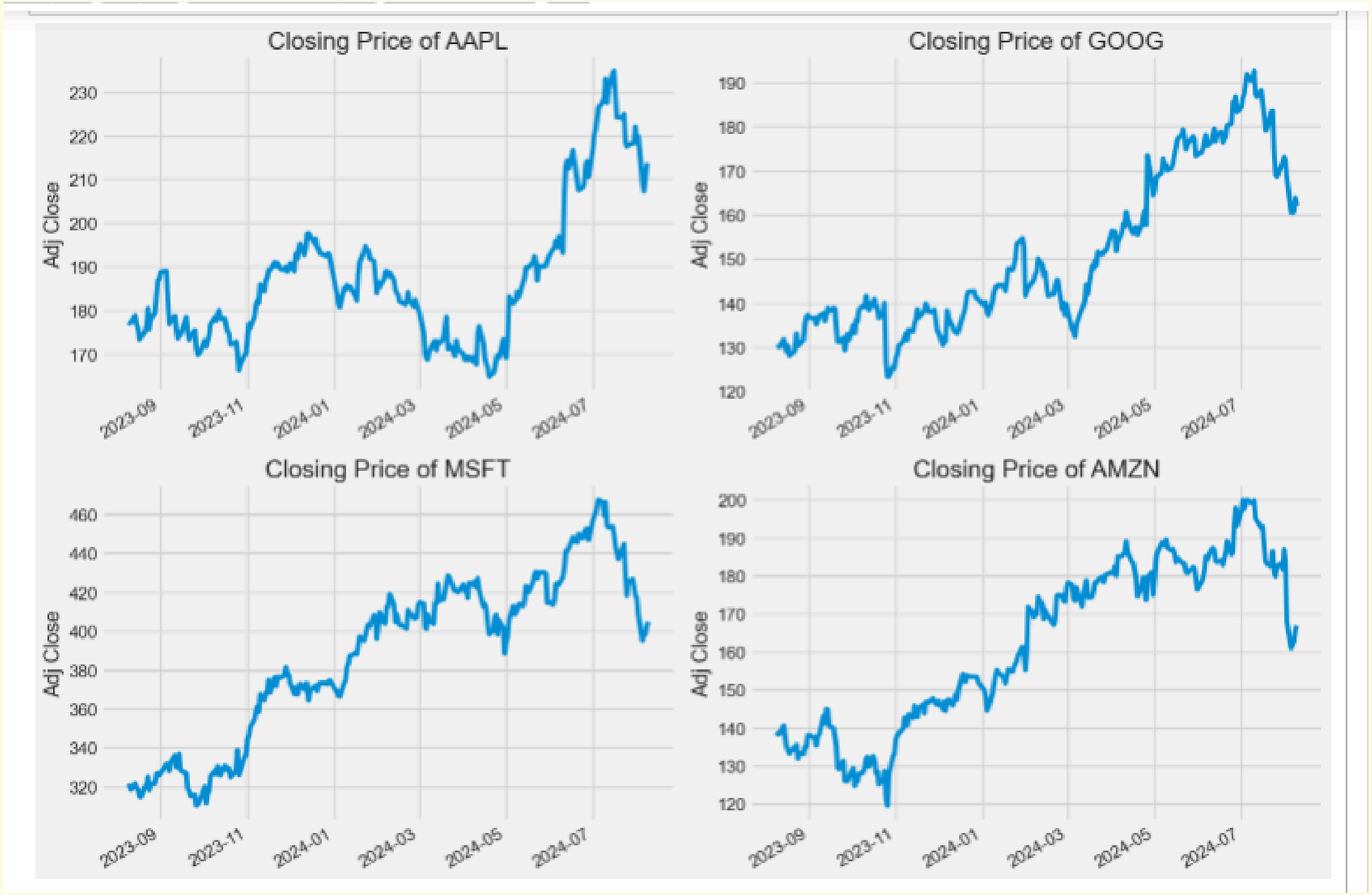
```

Date	Open	High	Low	Close	Adj Close	Volume	company_name
2024-07-29	183.839996	184.750000	182.380005	183.199997	183.199997	33270100	AMAZON
2024-07-30	184.720001	185.860001	179.380005	181.710007	181.710007	39508600	AMAZON
2024-07-31	185.050003	187.940002	184.460007	186.979996	186.979996	41667300	AMAZON
2024-08-01	189.289993	190.600006	181.869995	184.070007	184.070007	70435600	AMAZON
2024-08-02	166.750000	168.770004	160.550003	167.899994	167.899994	141448400	AMAZON
2024-08-05	154.210007	162.960007	151.610001	161.020004	161.020004	83149400	AMAZON
2024-08-06	161.710007	165.080002	158.539993	161.929993	161.929993	59950800	AMAZON
2024-08-07	166.550003	167.580002	161.429993	162.770004	162.770004	48408200	AMAZON
2024-08-08	165.169998	166.690002	162.550003	165.800003	165.800003	44518900	AMAZON
2024-08-09	166.399994	167.470001	165.889999	166.869995	166.869995	5822024	AMAZON

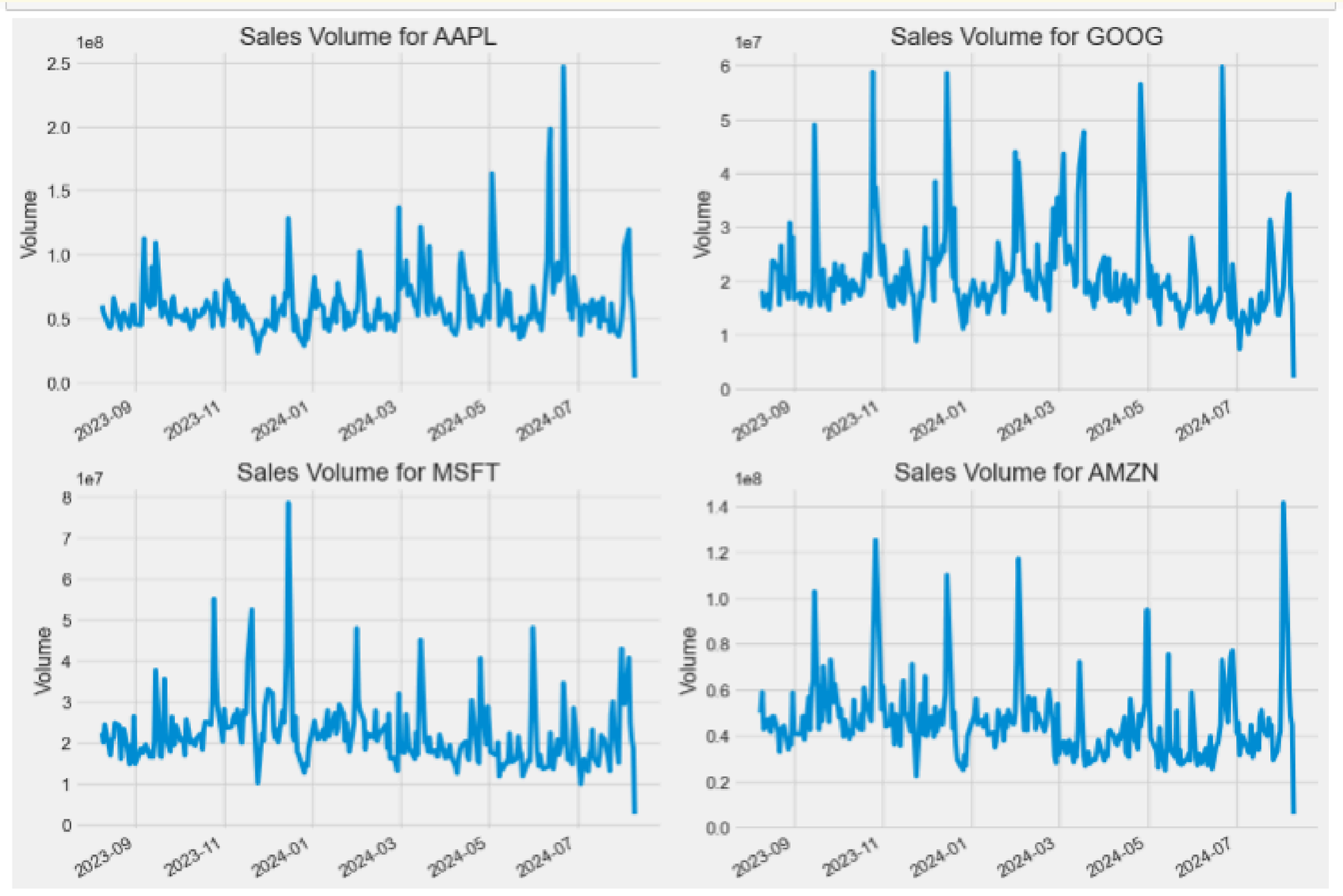
Closing Price Analysis

The closing price is the last price at which the stock is traded during the regular trading day. A stock's closing price is the standard benchmark used by investors to track its performance over time.



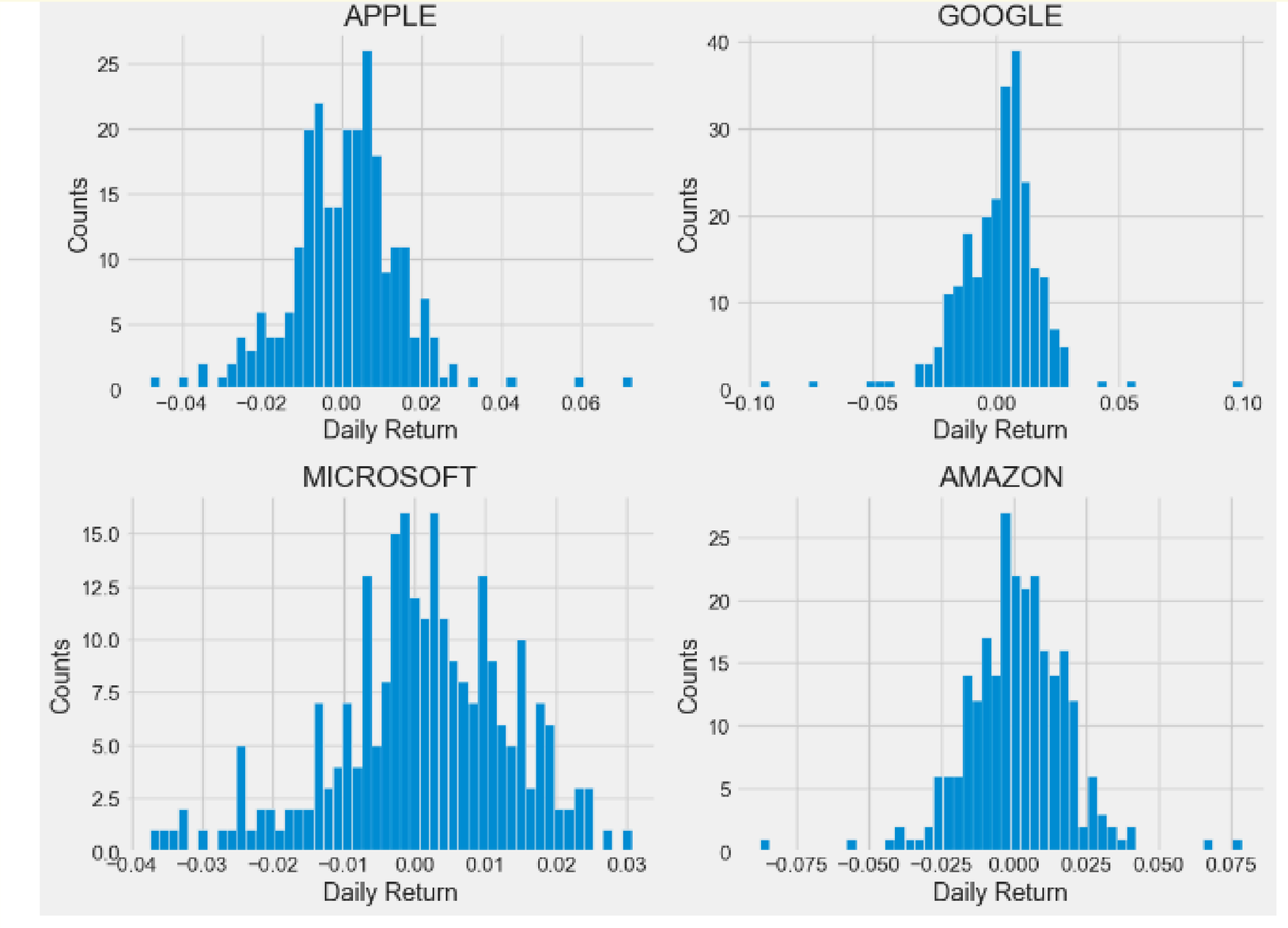
Stocks Traded Each day in diff companies

Volume is the amount of an asset or security that changes hands over some period of time, often over the course of a day. For instance, the stock trading volume would refer to the number of shares of security traded between its daily open and close. Trading volume, and changes to volume over the course of time, are important inputs for technical traders.



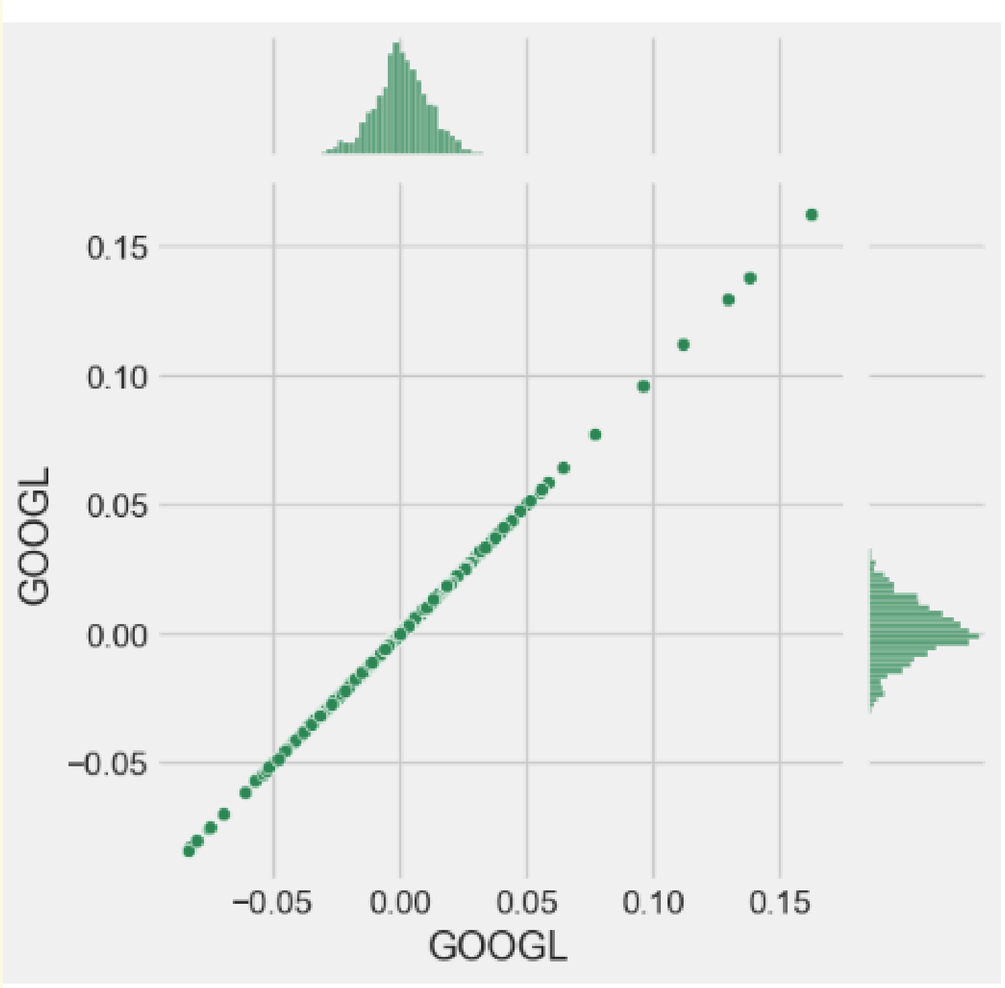
Average Daily Return

The moving average (MA) is a simple technical analysis tool that smooths out price data by creating a constantly updated average price. The average is taken over a specific period of time, like 10 days, 20 minutes, 30 weeks, or any time period the trader chooses.



Linear Relationship of google with itself

```
# Comparing Google to itself should show a perfectly linear relationship
sns.jointplot(x='GOOG', y='GOOG', data=tech_rets, kind='scatter', color='seagreen')
```



Correlation of stock return and stock closing price

Correlation is a statistic that measures the degree to which two variables move in relation to each other which has a value that must fall between -1.0 and +1.0. Correlation measures association, but doesn't show if x causes y or vice versa — or if the association is caused by a third factor[1].

```
plt.figure(figsize=(12, 10))

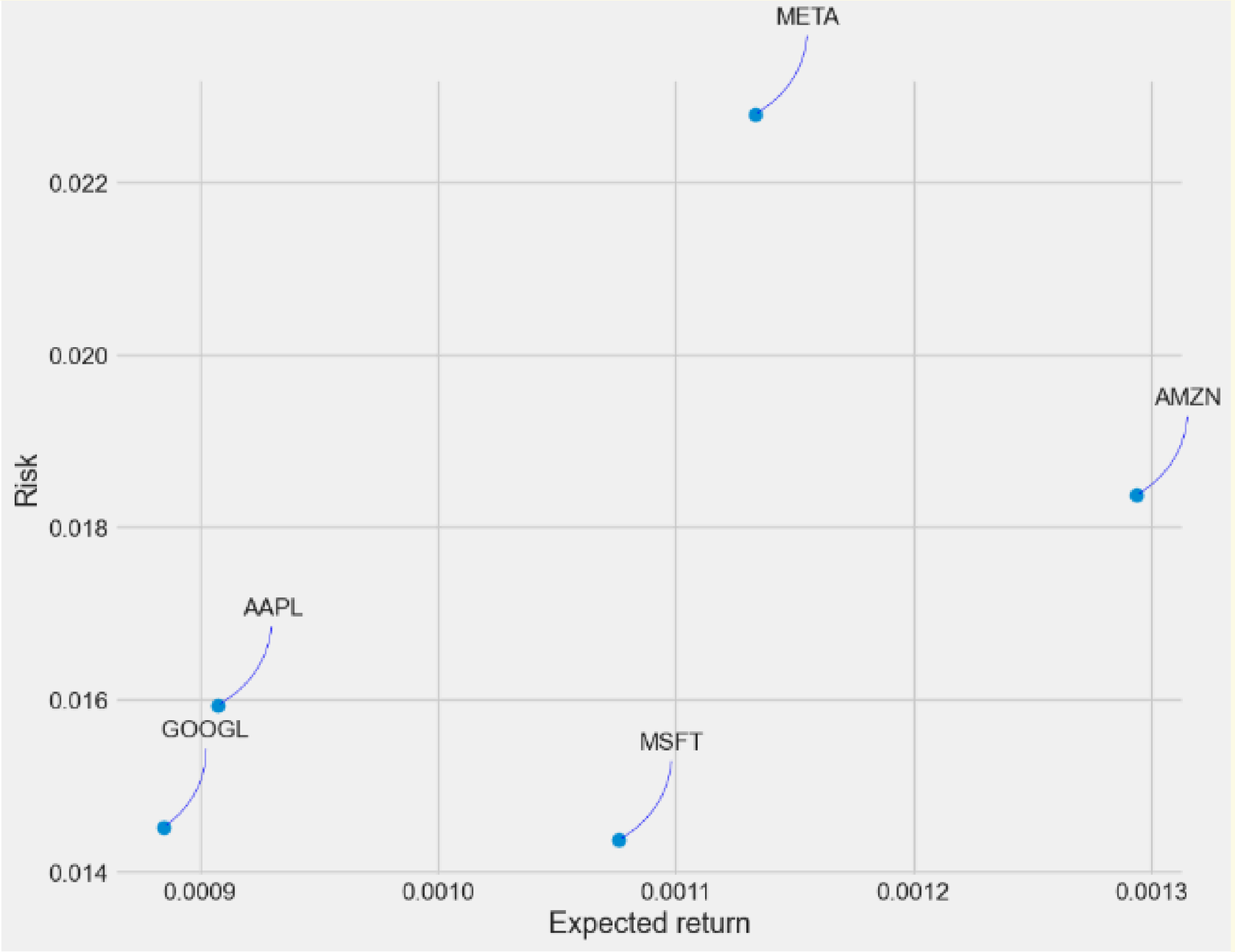
plt.subplot(2, 2, 1)
sns.heatmap(tech_rets.corr(), annot=True, cmap='summer')
plt.title('Correlation of stock return')

plt.subplot(2, 2, 2)
sns.heatmap(closing_df.corr(), annot=True, cmap='summer')
plt.title('Correlation of stock closing price')
```

```
Text(0.5, 1.0, 'Correlation of stock closing price')
```

Quantifying risk

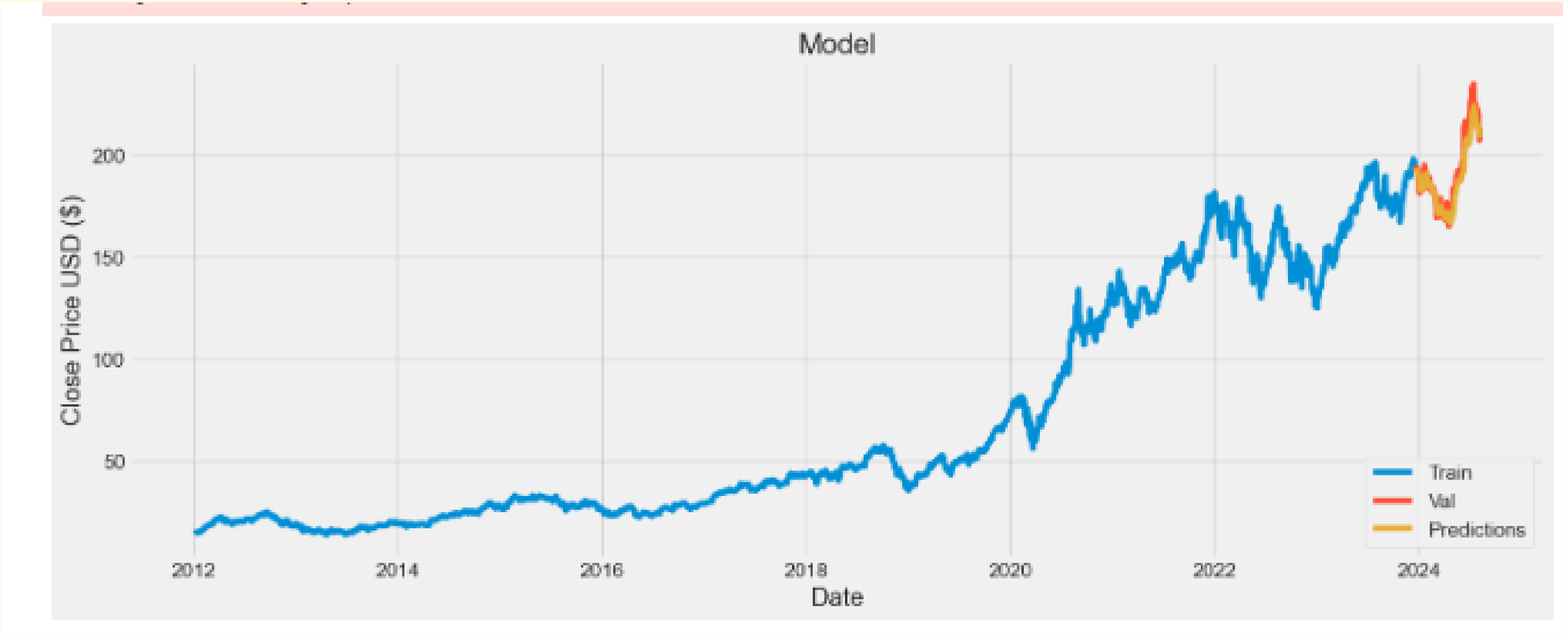
There are many ways we can quantify risk, one of the most basic ways using the information we've gathered on daily percentage returns is by comparing the expected return with the standard deviation of the daily returns.



Closing price prediction based on history

Stock Price Prediction is the task of forecasting future stock prices based on historical data and various market indicators. It involves using statistical models and machine learning algorithms to analyze financial data and make predictions about the future performance of a stock.

Model



Testing data is used to determine the performance of the trained model, whereas training data is used to train the machine learning model. Training data is the power that supplies the model in machine learning, it is larger than testing data. Because more data helps to more effective predictive models. When a machine learning algorithm receives data from our records, it recognizes patterns and creates a decision-making model.

Predictions

Predictive modeling is a mathematical process used to predict future events or outcomes by analyzing patterns in a given set of input data. It is a crucial component of predictive analytics, a type of data analytics which uses current and historical data to forecast activity, behavior and trends.

t[26]:

Date	Close	Predictions
2023-12-21	194.679993	193.544510
2023-12-22	193.600006	193.089142
2023-12-26	193.050003	192.482788
2023-12-27	193.149994	191.843887
2023-12-28	193.580002	191.336533
...	...	...
2024-08-02	219.860001	213.820267
2024-08-05	209.270004	214.047577
2024-08-06	207.229996	212.479965
2024-08-07	209.820007	210.160858
2024-08-08	213.309998	208.359619

158 rows × 2 columns