

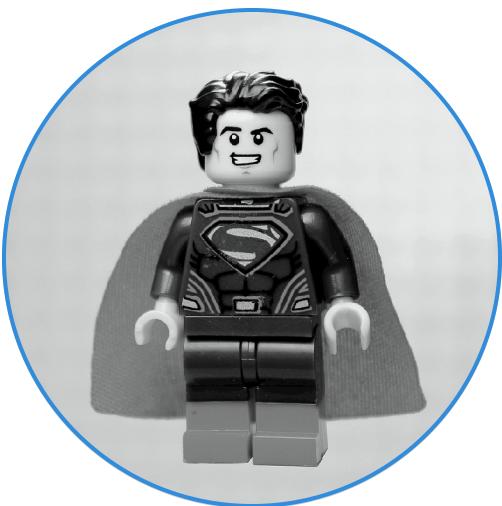
THE WOLF OF WALL STREET



Stock Market Analysis and Forecasting: Multivariate Time Series prediction using LSTM (RNN) and Algorithmic Trading using Momentum Trading Strategies.

March 31st, 2022

Our Team



Yoni Kornblau

Physics / Math, founder of a robotics company



Jose Cuan

IT Engineer: Information Technologies and
Communication

**This presentation is not financial
advice**

Agenda

1

Business Case
The Scenario

2

EDA
Analysis and
Feature
Engineering

3

Forecasting
Prediction model

4

Algorithmic
Trading
AlgoTrade

5

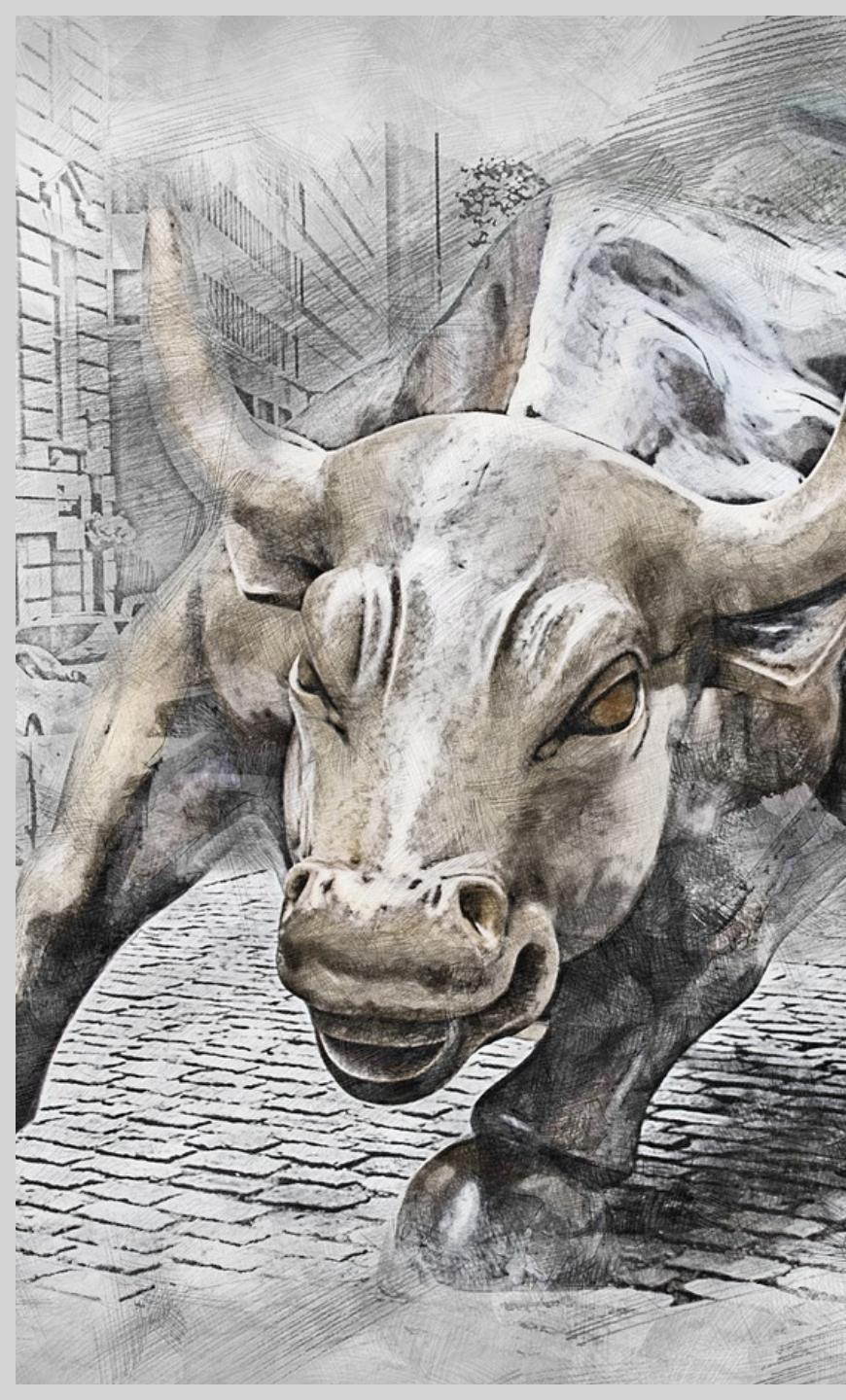
Conclusion /
Feature work
Recommendations



Business Case: When the Stock Market meets ML/AI

A dense word cloud composed of various terms related to algorithmic trading, stock market analysis, and machine learning. The words are rendered in different sizes and shades of blue and white, creating a visually complex and abstract representation of the subject matter.

Key visible words include: INFORMATION, ALGORITHMIC, USING STRATEGIES, SERIES, MARKET AND STOCK, FORECASTING, ANALYSIS, TRADING, TIME, MULTIVARIATE, PREDICT, and UNDERSTANDING.

A detailed black and white illustration of a bronze bull statue, known as the Charging Bull, standing on a cobblestone street. The statue is highly reflective, with strong highlights and shadows that emphasize its metallic texture and muscular form. It is positioned in front of a building with large windows and a balcony. The background shows a blurred cityscape with other buildings and possibly some foliage.

Introduction

This analysis aimed to provide an understanding of ML and AI's scope in the stock market field and the common research methods, ML techniques, common challenges, and potential solutions to those challenges.

Motivation

To predict what will be the price of the stock to make smarter investment decisions



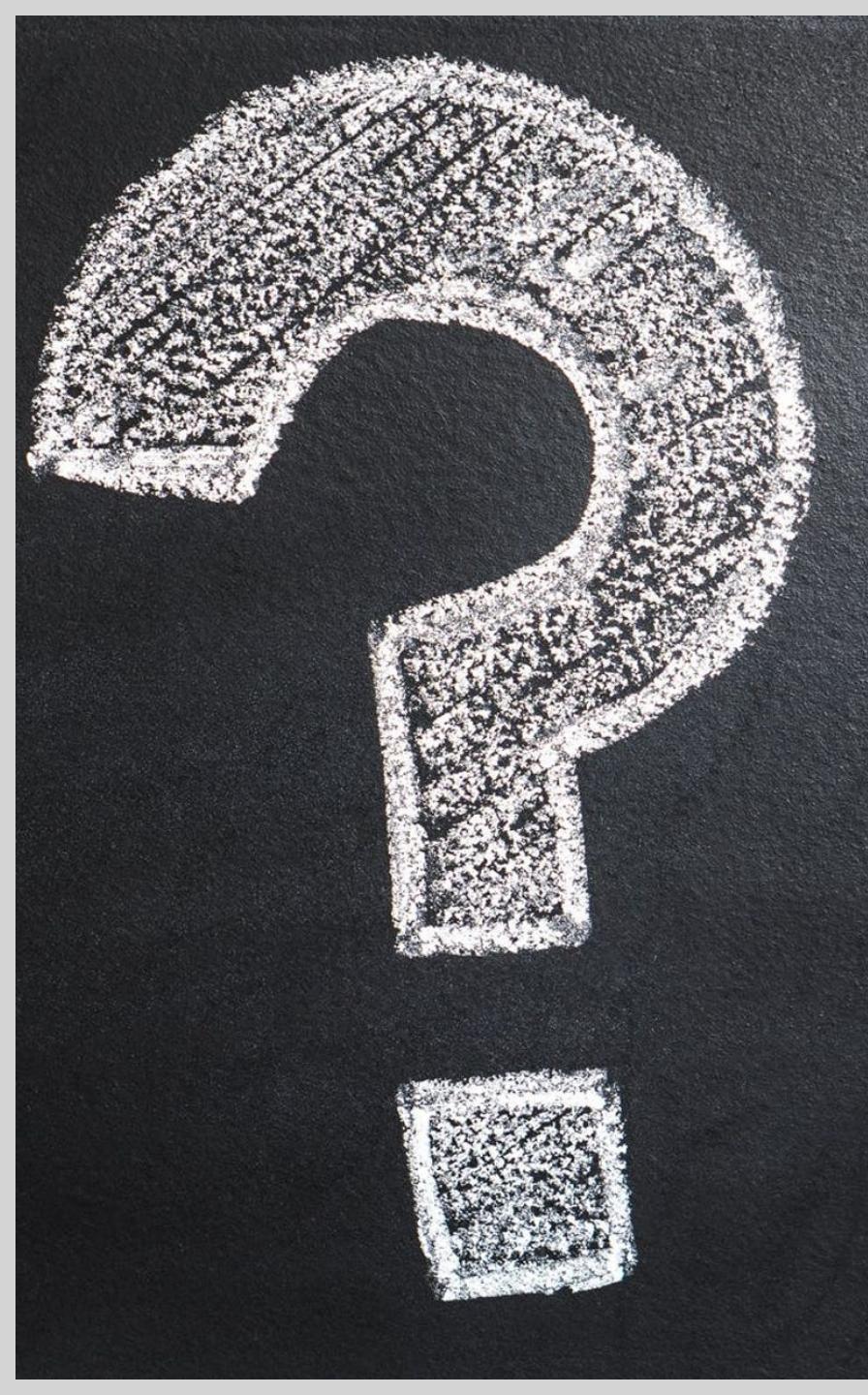
Case Scenario

With an understanding of what stock and the stock market is, let's understand why people fascinate by a Machine Learning model that can predict the stock price. A Machine Learning model predicts the value of an observation based on several inputs that are predictors. The stock market is working similarly, i.e., based on several inputs, the stock price fluctuates.

Anything, any event in the outside world, can influence the price of the stock. These include political events, economic news, competitors or related stock movements, and other challenging to capture concepts such as rumor, anxiety, and other psychological factors. Capturing all these inputs makes stock market prediction challenging and Machine Learning a potential candidate for it. It can take a large number of inputs and assess the patterns and their relation to a dependent variable (the stock price).

Thus with the premise set and the potential gold mine that investors think such stock predicting models can be, we can now start our journey into the world of stock price prediction, its techniques, methods, challenging solutions, etc.





Research Questions

Is it possible to use ML/AI to predict stock market prices?

Prediction of stock prices is considered one of the most challenging problems in applied AI and machine learning. Still, the answer is that yes, AI can predict stock prices. Advanced AI techniques based on fundamental and technical research can predict stock prices often up to 90% accuracy. The majority of the short-term trade profits are booked by the institution using AI-based models.

How can We predict tomorrow's stock market price?

Looking at the historical data of the stock in question, this will include the similar time of the day, previous day closing, market situation, the market's mood, etc., and based on it, predict the price. Similarly, a model can also be created by feeding past data to predict or forecast future prices. Creating such a model can be time-consuming. However, if it is appropriately trained for a particular stock, the ML model can understand the behavior of this stock and can assess its price.

Is AI trading profitable?

AI trading is highly profitable if done correctly. Institutions especially have mastered the use of AI trading and predicting the price of a stock over a short-term period. Though limited in resources, individuals can try to do the same on their own first by first looking at some stock market predictions using machine learning projects.

EDA
Analysis
and Feature
Engineering



QQQ ETF

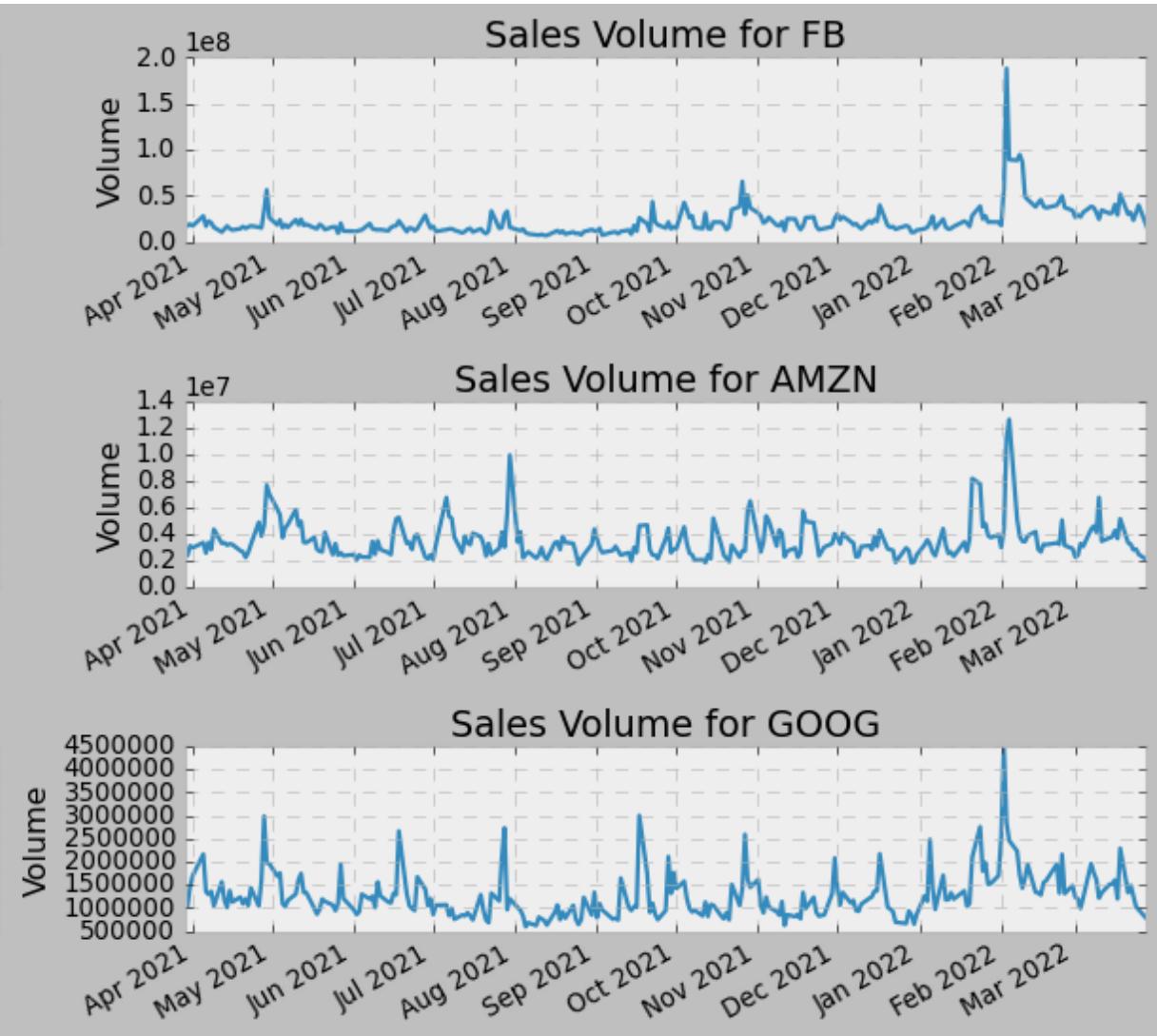
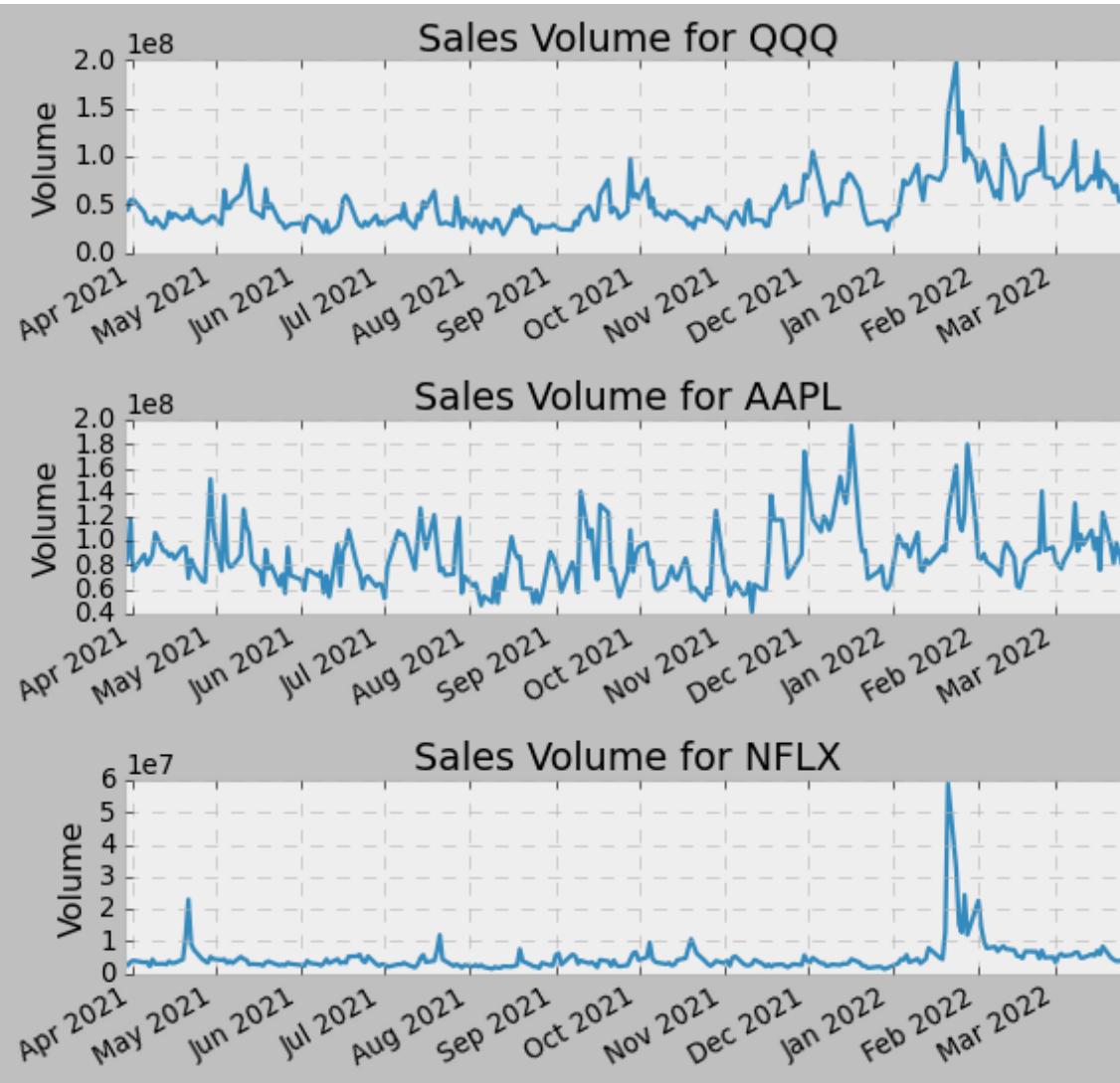
Invesco QQQ Trust is a popular exchange-traded fund that tracks the Nasdaq 100 index. QQQ stock holdings are dominated by big technology-related companies such FAANG

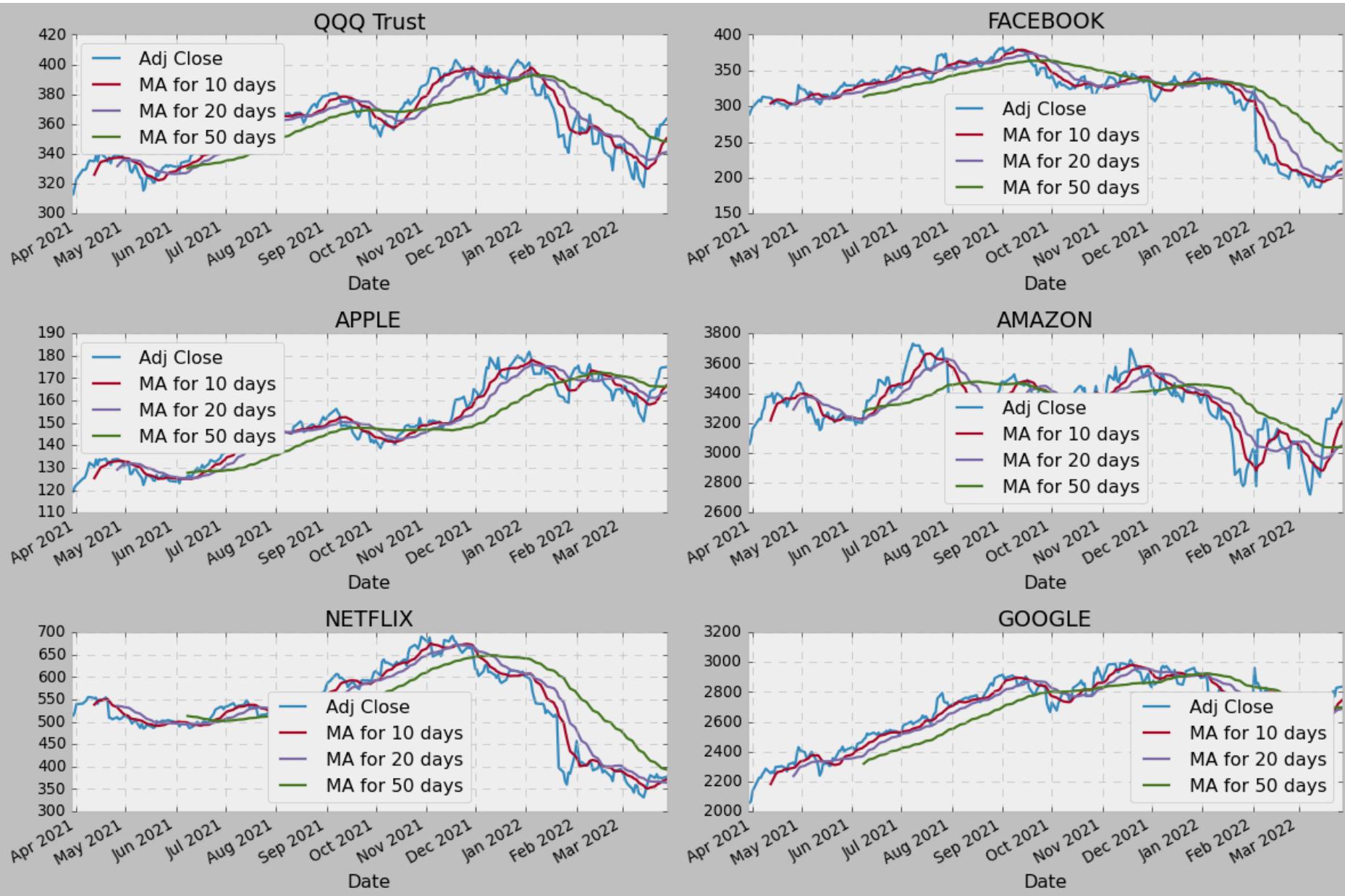


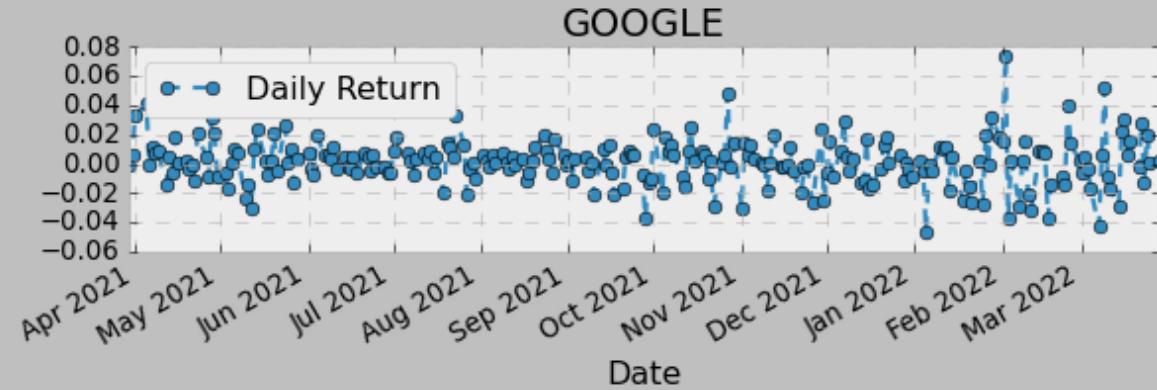
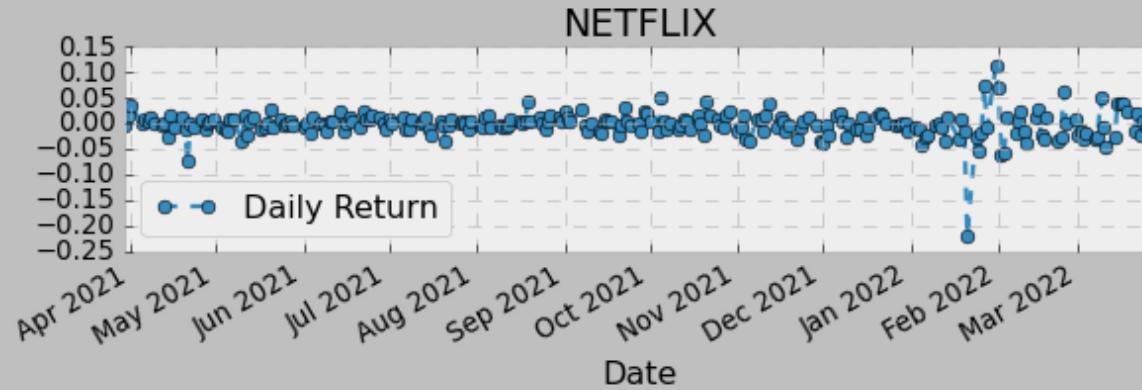
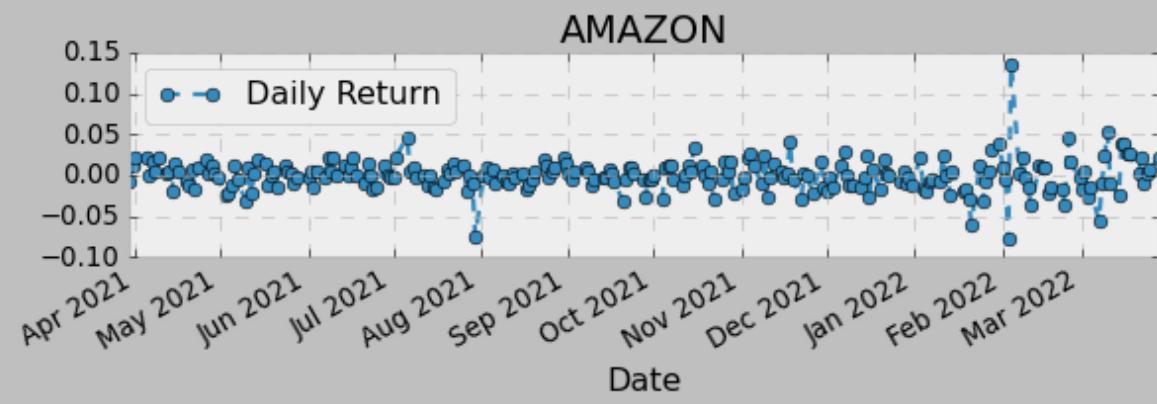
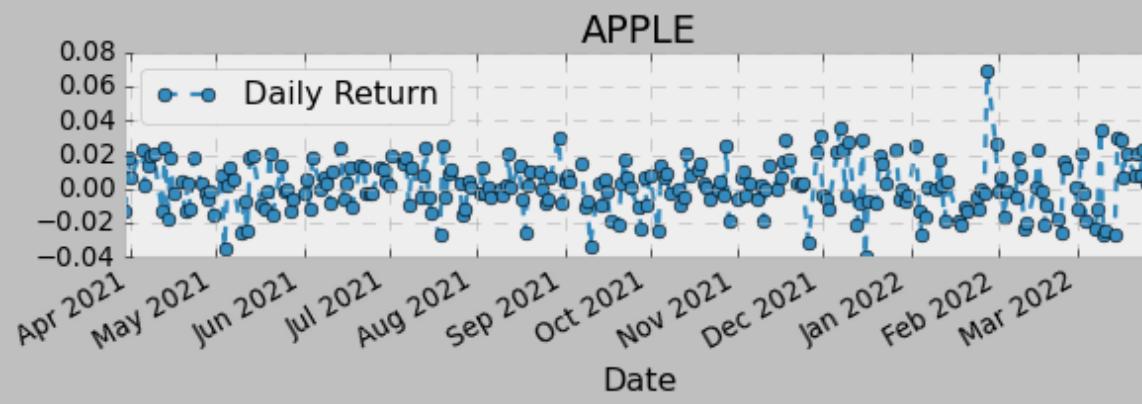
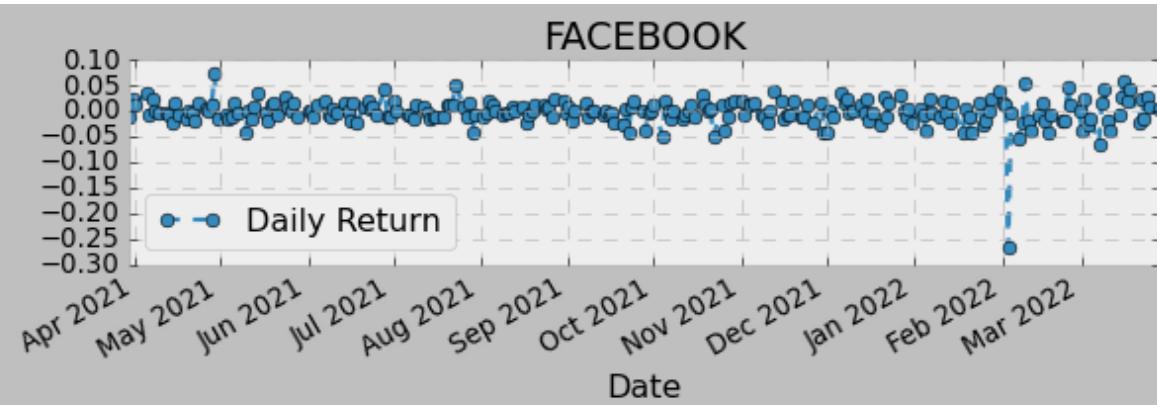
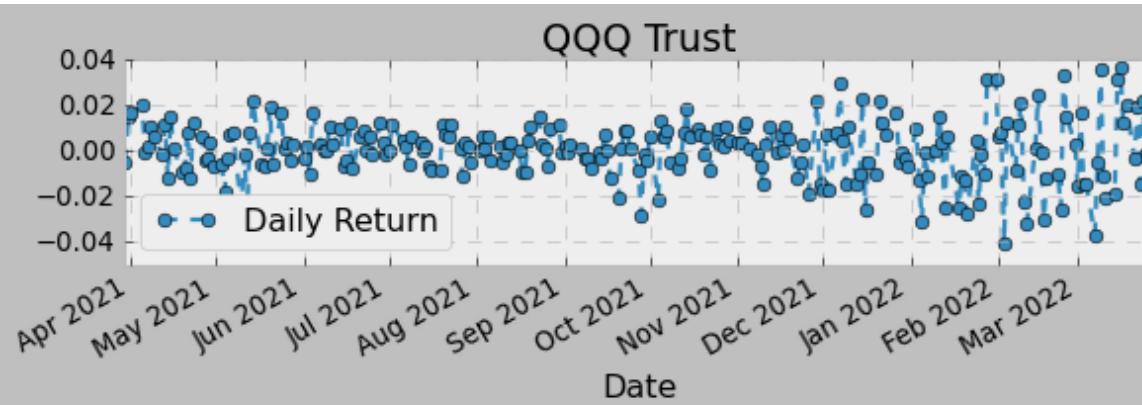
Designed by Turner Duckworth

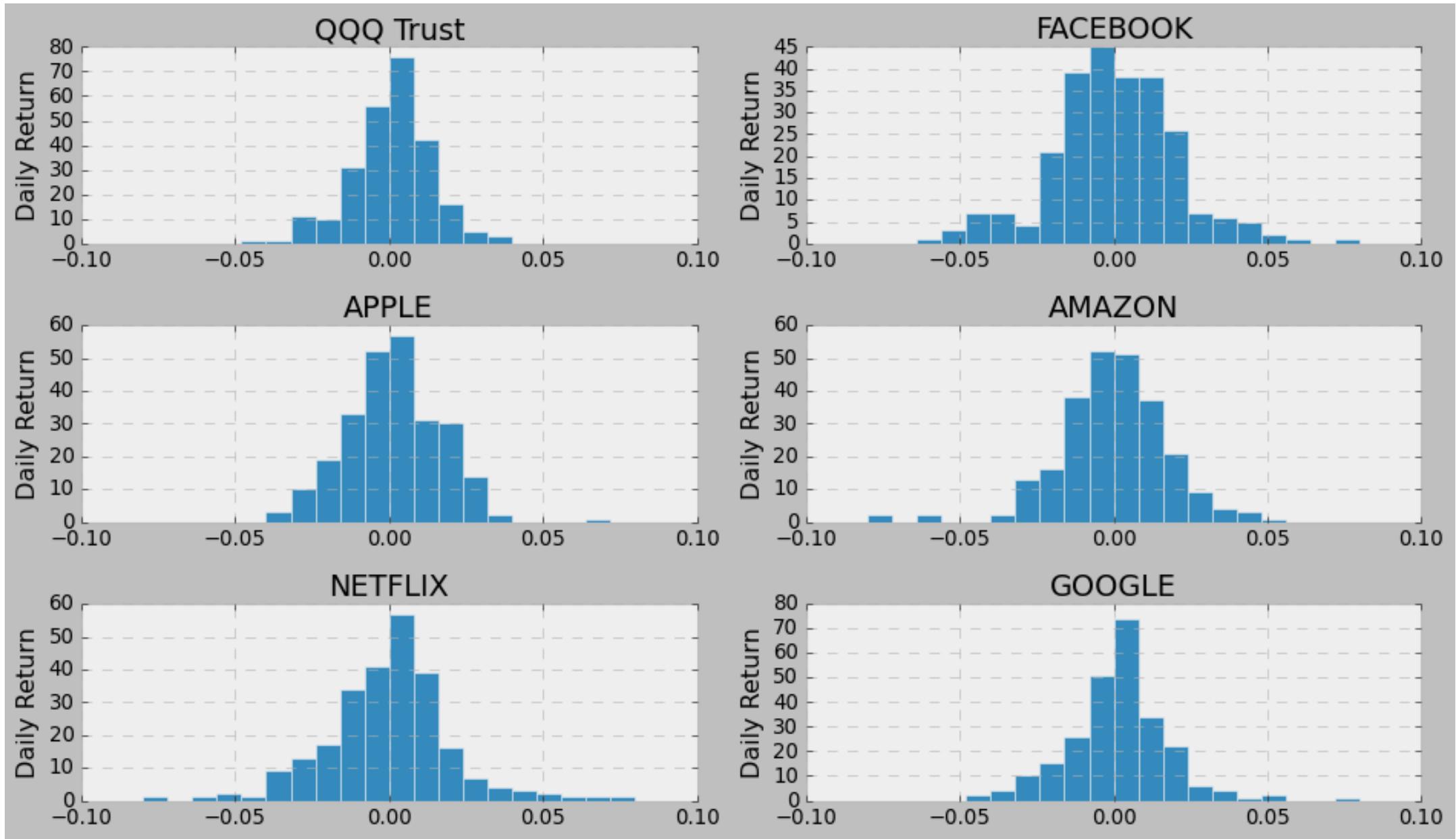




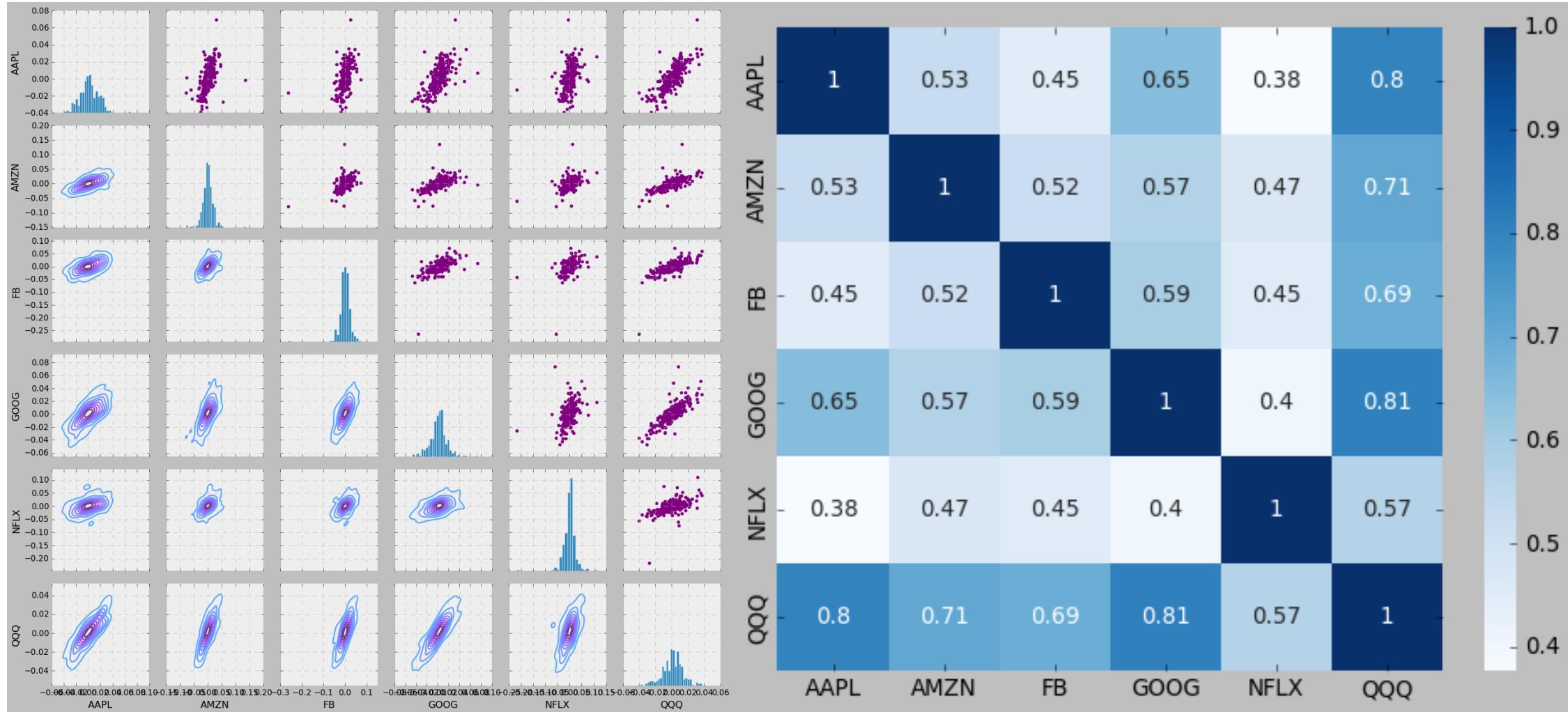




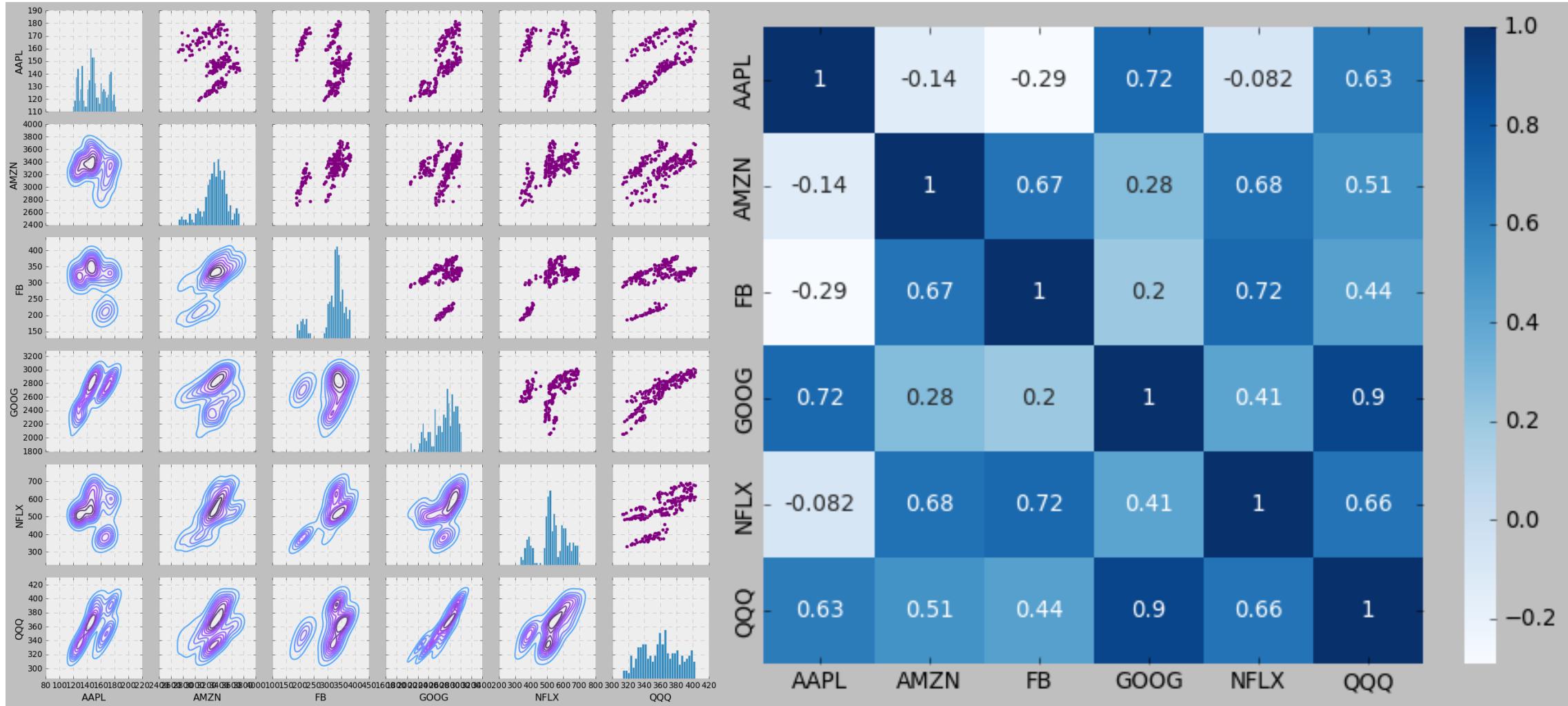




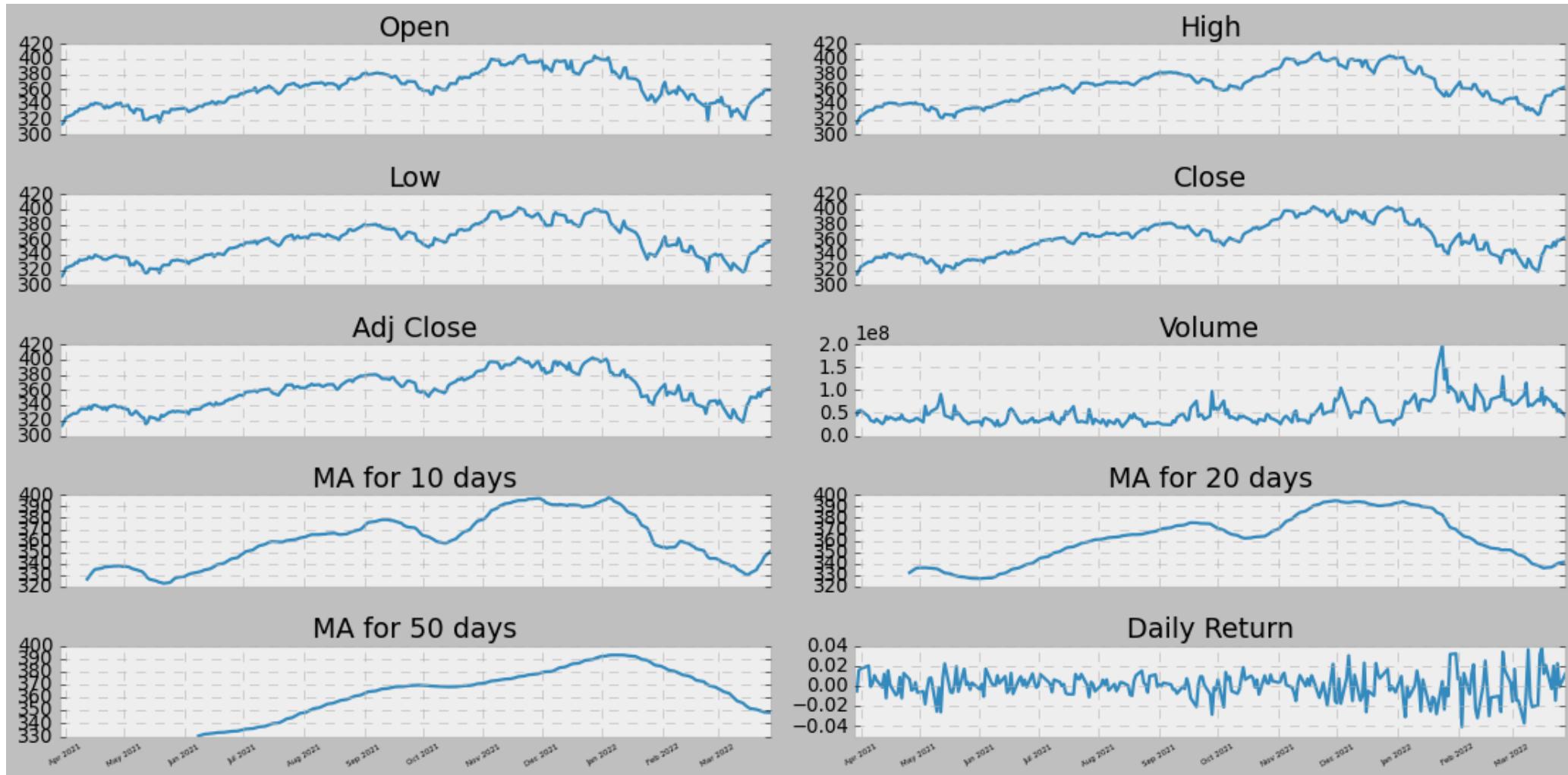
Daily Return: QQQ+FAANG



Closing Price: QQQ+FAANG



QQQ: Analysis

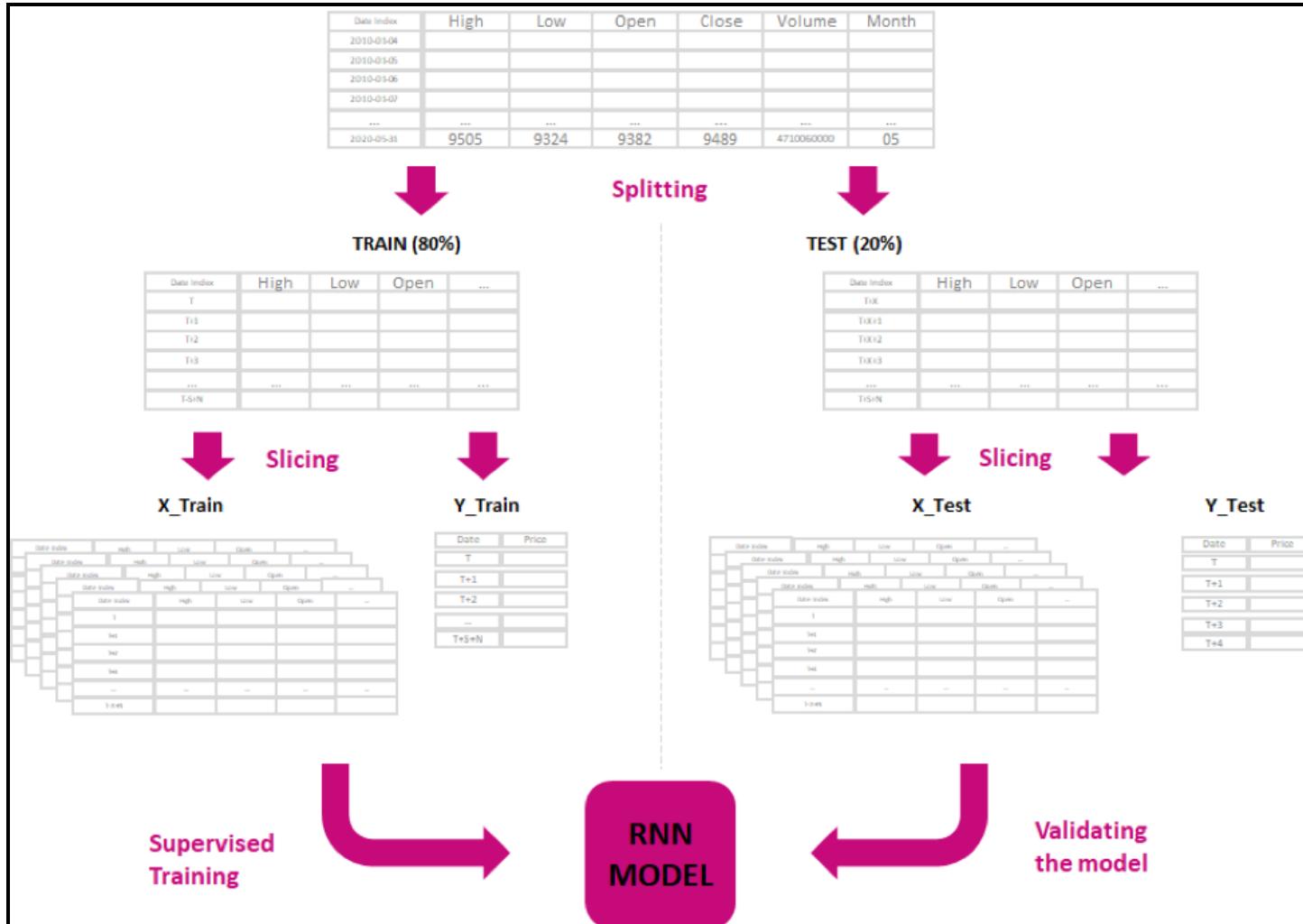


Forecasting

LSTM Model



LSTM Model

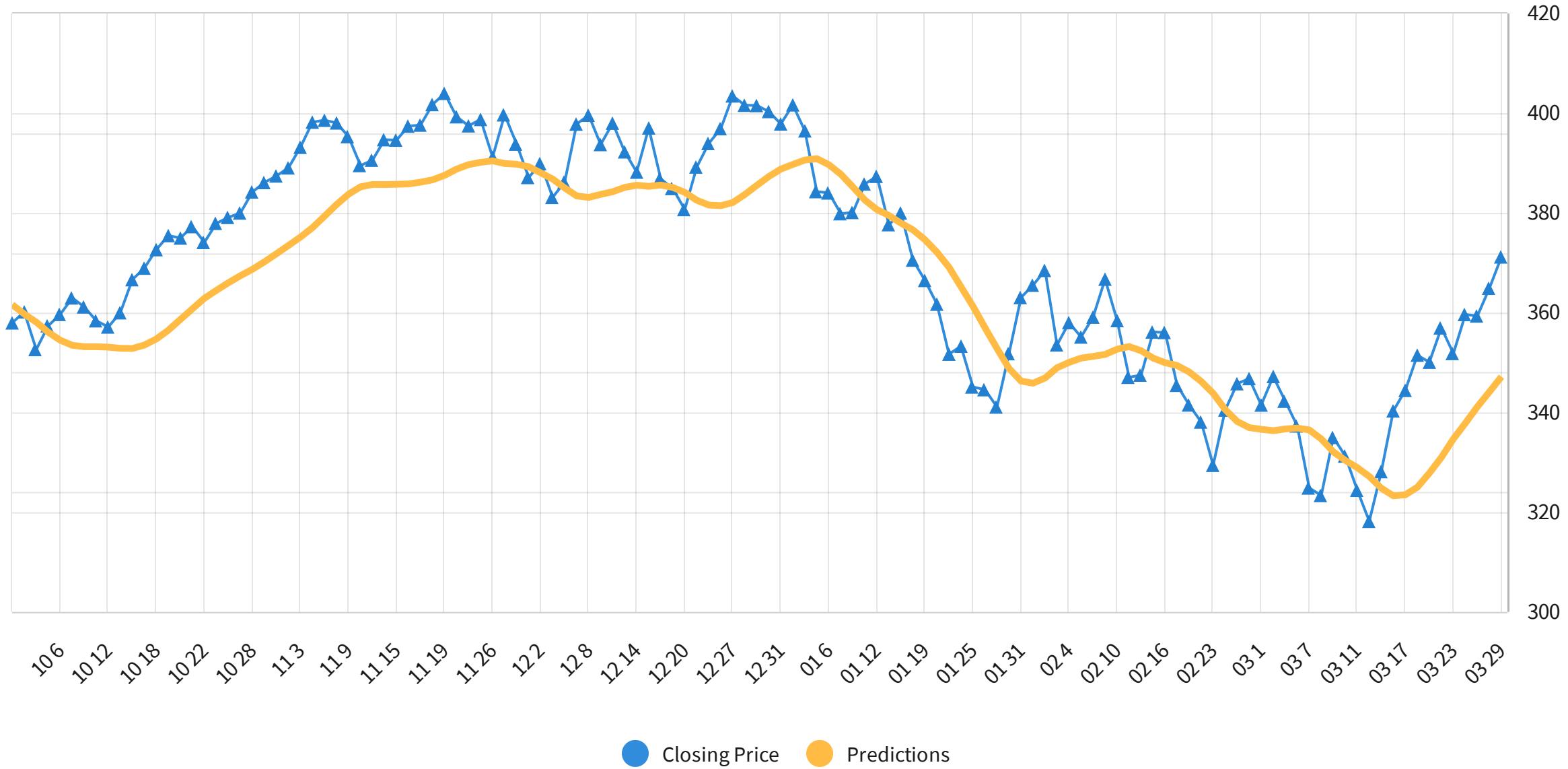


LSTM (RNN) Model

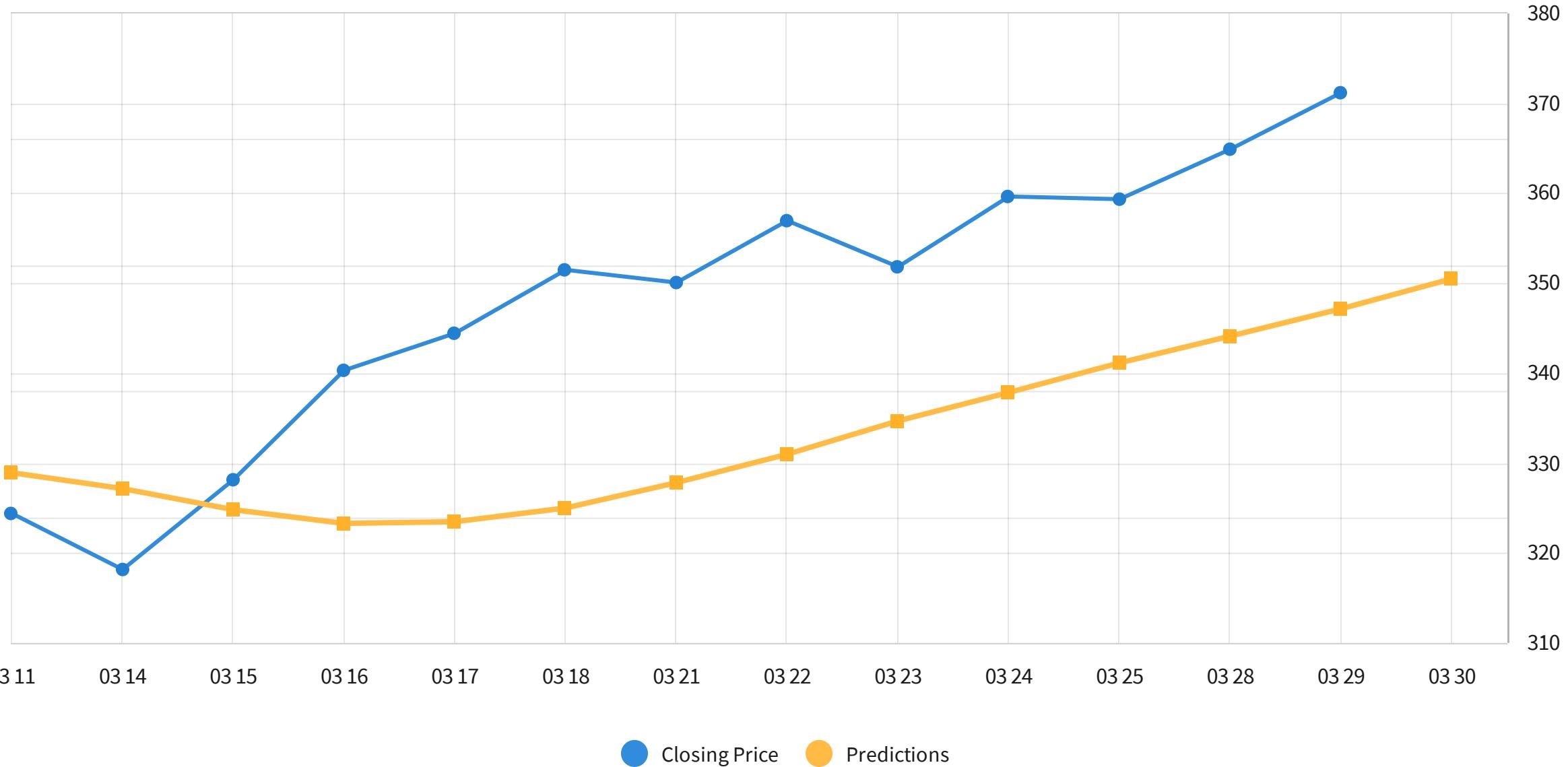
LSTM Model - RMSE = 10.18



Closing Price vs Prediction for the last 127 days

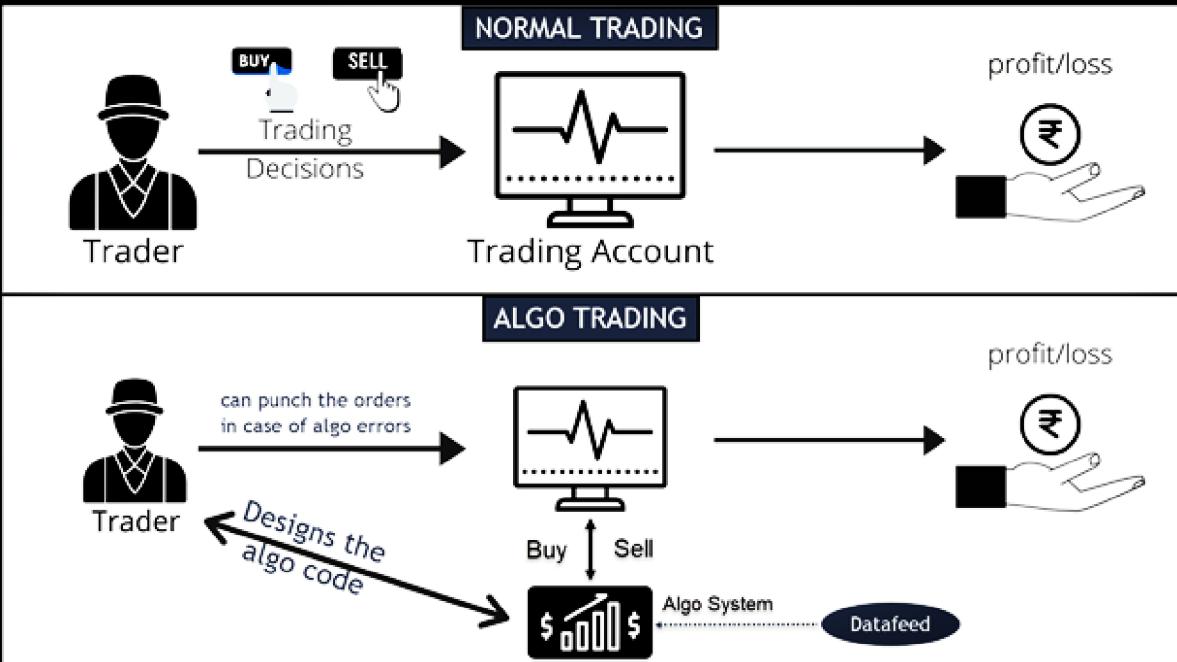


Closing Price vs Prediction for the last 13 days

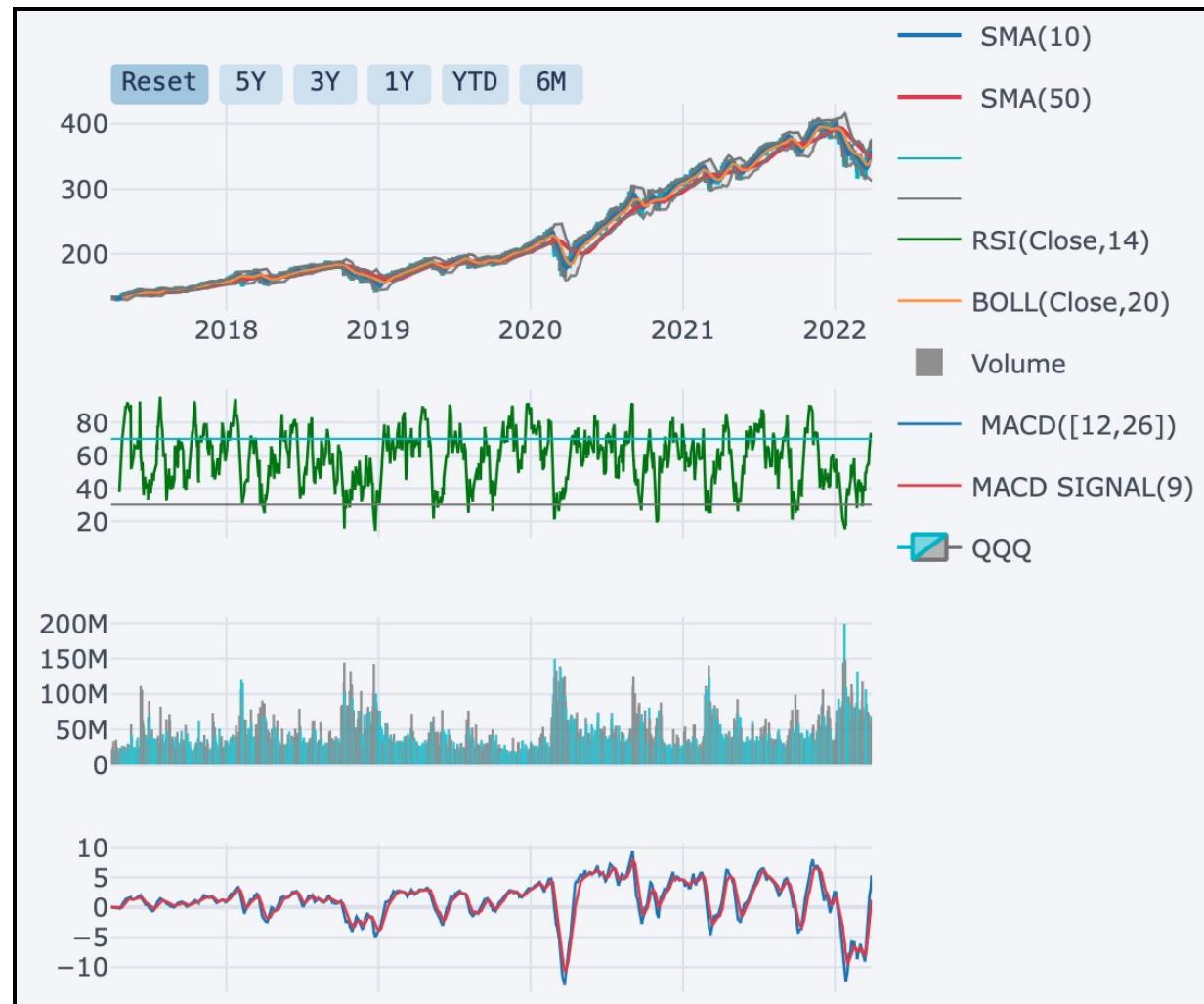


Algorithmic Trading

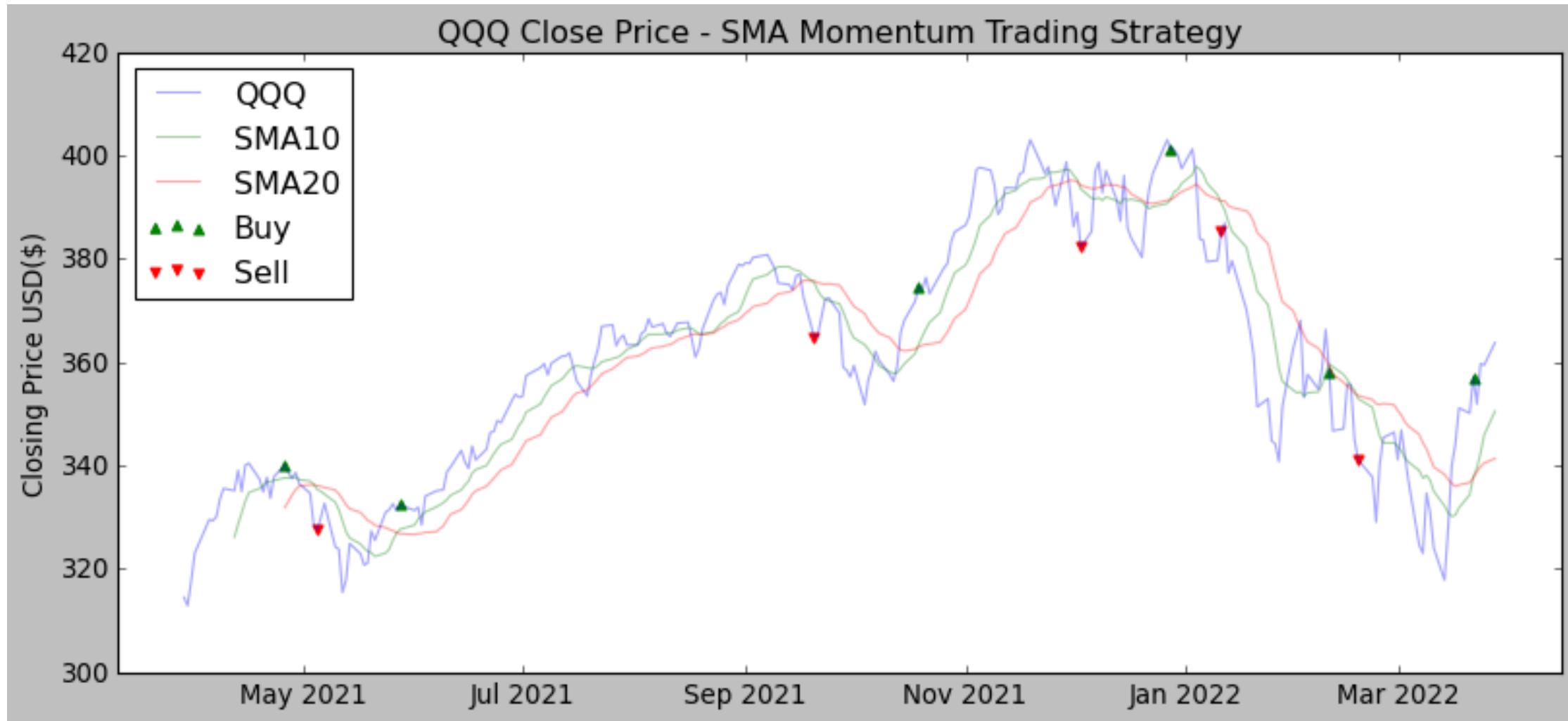
Momentum Trading Strategies



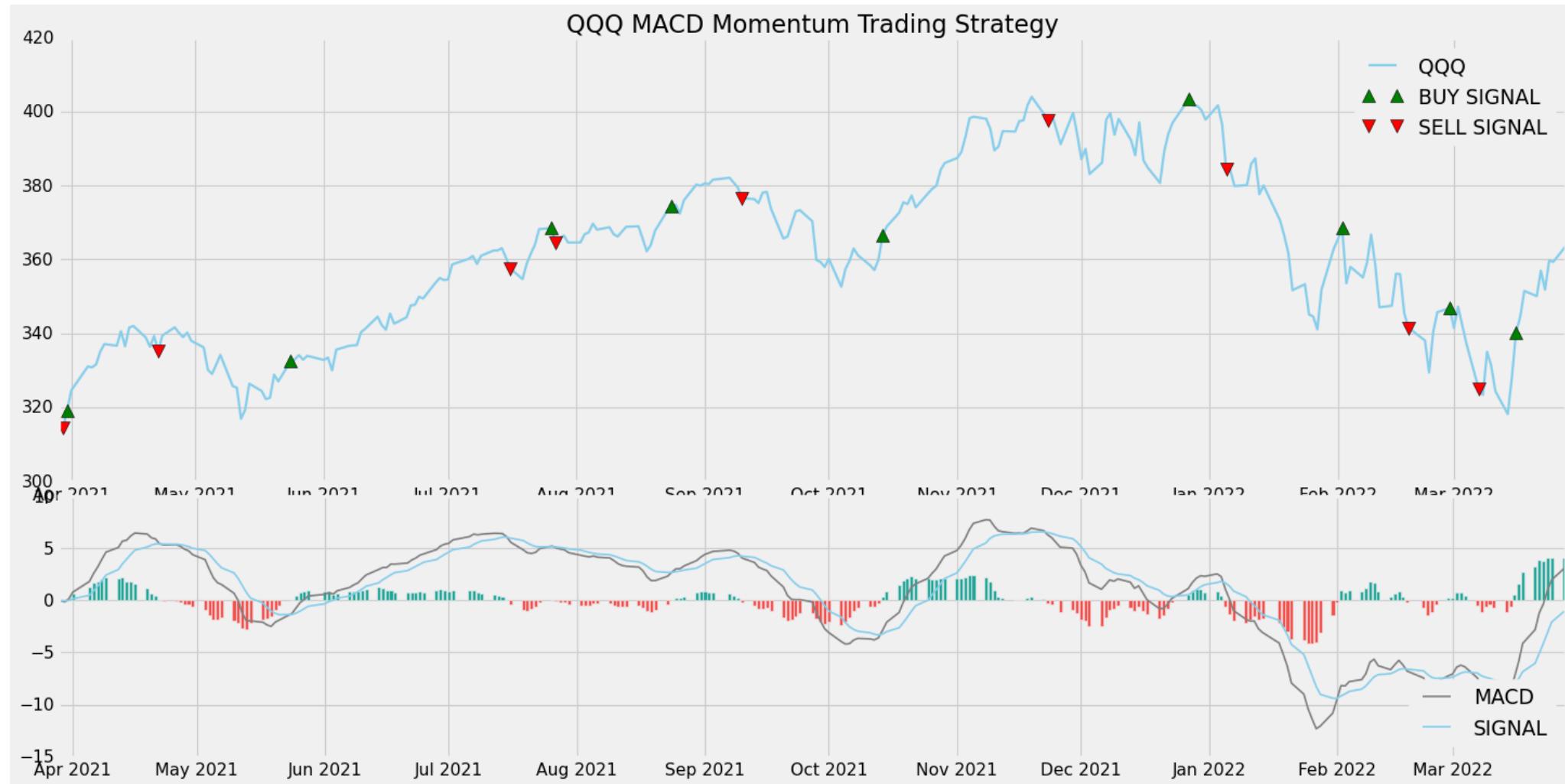
Momentum Trading Strategies



SMA Momentum Trading Strategy



MACD Momentum Trading Strategy



Conclusions and Future works



Conclusions

- Forecasting the price of a financial asset is a complex challenge. In general, the price is determined by an endless number of variables; Economic cycles, political developments, unforeseen events, psychological factors, market sentiment, and even the weather, all these variables will more or less exert an influence on the price. In addition, many of these variables are interdependent, which makes statistical modeling even more complex.

Future Works



Thank you!





**“Always make the
audience suffer
as much as
possible.”**

Hitch



