Algo Trading Bot

By Guillermo Gamez & Tobechi Okuagu

Purpose

- The purpose of this project was to create and algorithmic trading bot that uses indicators such as RSI, Average directional index(ADX), and Simple Moving Average to understand the general direction of where price was moving. From there we used the machine learning tool, ‘Prophet’, to help us get a better understanding of some potential prices that the stock could hit.

Data Clean up and Training

- The data were going to be utilizing for our project is going to be the closing prices of the Stock '**SPY**'.
    - We pulled the the stock price of SPY from the last 5 years. We began to clean the date by dropping all the other columns that were associated with the stock. 'High, Lows, Volume, and Open.
    - Then were going to assign the Date and Close column 'ds' and 'y'.
    - Split the data into a testing and training data sets to run our code through

Indicators - 50 & 100 Days Simple Moving Averages

The simple moving average is a trendline that shows the average of 50 and 100 days of closing prices for a stock, plotted over time

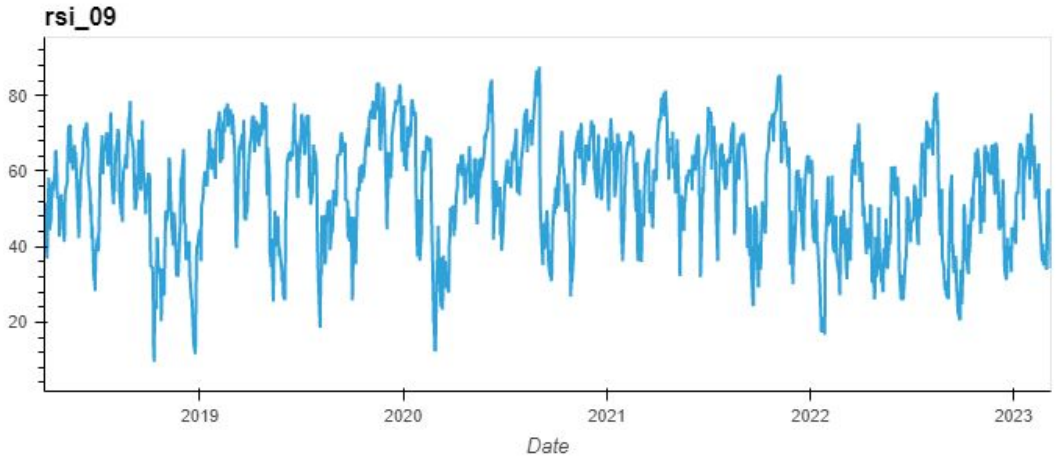
The 50-day average is considered the first line of support in an uptrend or the first line of resistance in a downtrend

Indicators - Relative Strength Index (RSI)

RSI measures price change momentum in relation to recent price highs and lows.

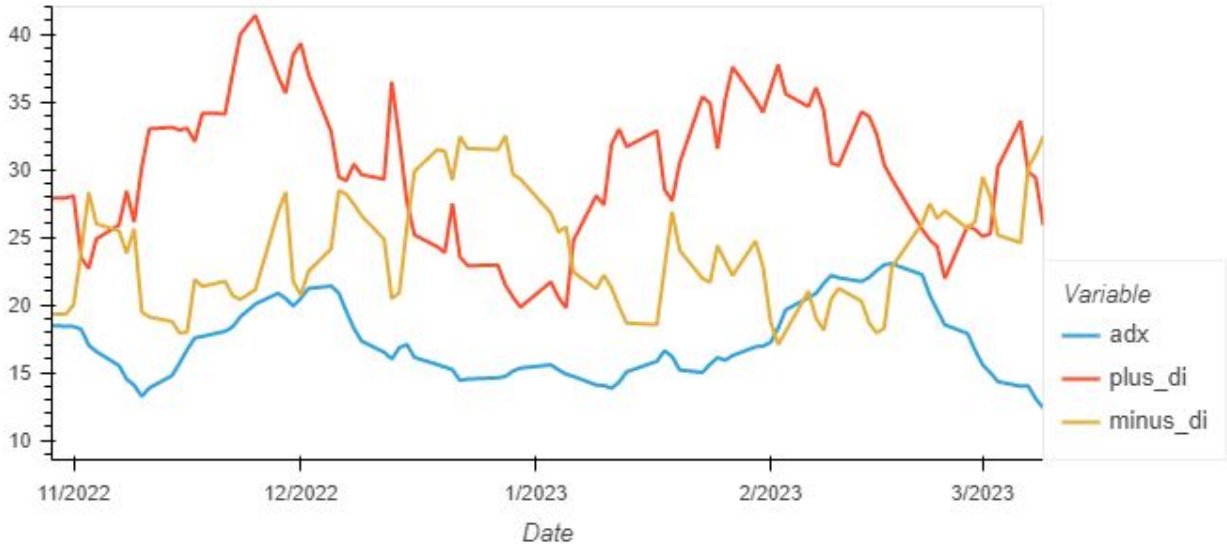
Plots results in a scale from 0 to 100

Readings below 30 generally indicate that the stock is oversold, while readings above 70 indicate that it is overbought.



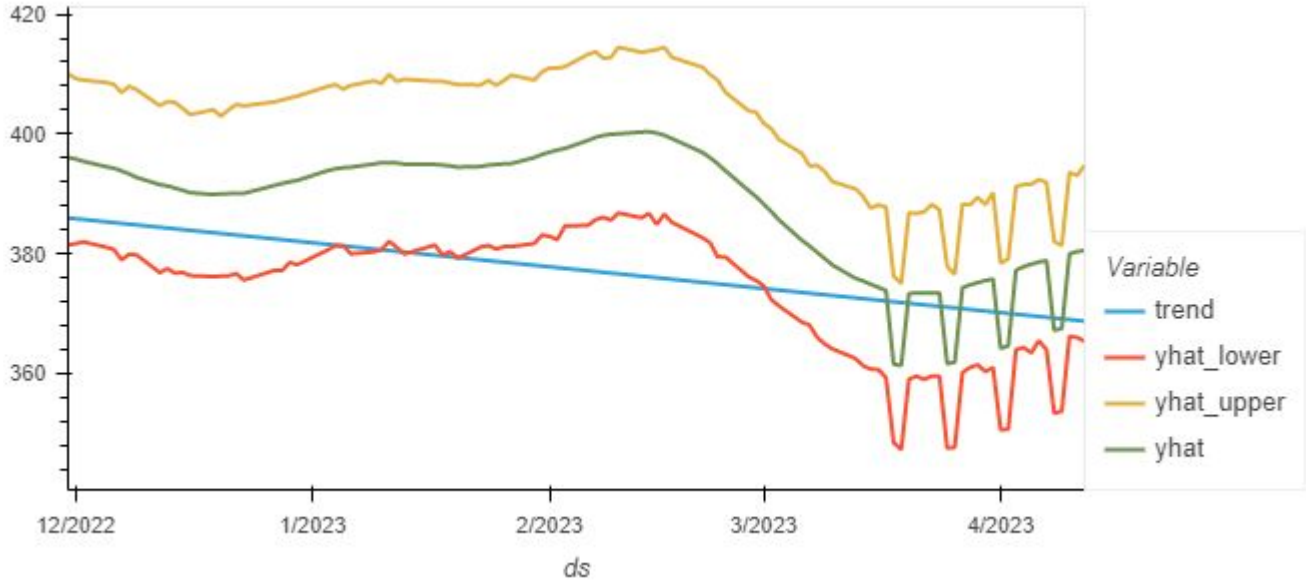
Indicators - Average Directional Index (ADX)

ADX Value	Trend Strength
0-25	Absent or Weak Trend
25-50	Strong Trend
50-75	Very Strong Trend
75-100	Extremely Strong Trend



Machine Learning - Prophet

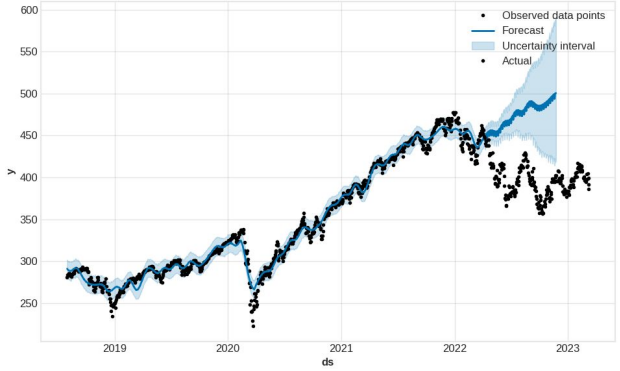
It is a machine learning model designed to make accurate predictions on time series data, which are data points collected over time, such as sales, website traffic, or stock prices.
Prophet uses a decomposable time series model with three main components: trend, seasonality, and holidays. The trend component models non-periodic changes in the time series, while the seasonality component models periodic changes, such as daily, weekly, or yearly patterns. The holidays component models events that occur irregularly, such as national holidays or major events.

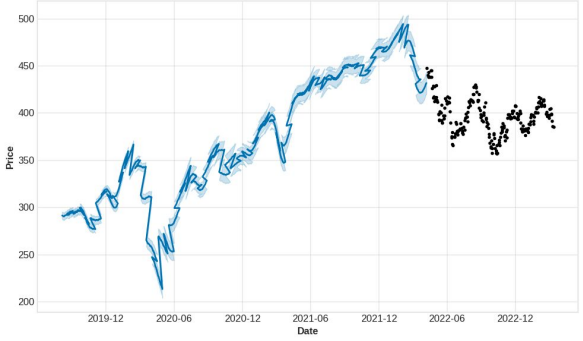


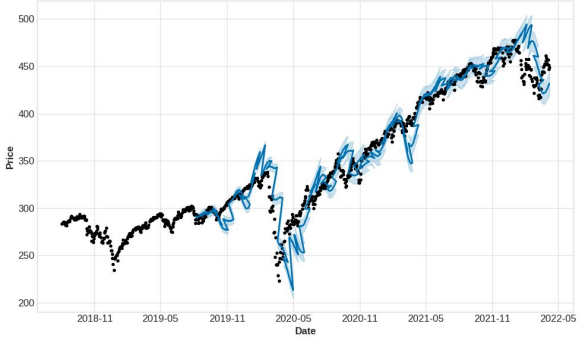
Summary

- During this Project our main goal was to find how we would be able to get as close to the predicted price as possible. Our main variable that we used to measure this was adding parameters and back testing using cross-validation. We used the initial prophet model as baseline and got a score of
    - MAE: 18.7
    - RMSE 22.5
- After adding the some parameters to our prophet model and back testing it with cross-validation out scores actually increased to
    - MAE: 21.3
    - RMSE 25.1
- But when we back tested our original model we actually saw a decrease in Scores
    - MAE: 14.8
    - RMSE: 20.2

The overall scores are pretty low, but based off what were seeing it looks like running the original prophet model without any parameters will give us more accurate results on what future closing prices will be.







Further Discussion

- As we continue to build this code we look to create and modify the parameters to help give us a better idea of where the stock price can actually hit.
- Why did adding parameters give us a higher score?
- We also look to use this data into smaller time frames to help us if we were looking at day-trading vs. swing trading.
- Were looking to also see which indicators help us in our future predictions.
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Questions???