

Aaron Kamal

Kevin Ryan

CS 110

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Project Report - Stock Signal Indicator

Section One; "Overview and Summary of Project"

I would like to start by explaining that the code which I developed can be broken up into three fundamental parts that all work together to indicate the best times for entry and exit in a stock position. The three parts are resistance levels, moving averages, and the MACD indicator. The way my code begins is by inputting a ticker symbol which is then used in yfinance to bring up to date data. I have set the start and end date as 1/2/2020 - current but this can be changed to whatever time frame you are looking for. The first part of the code is the resistance levels which appear as black straight lines across my graph but also as numbers printed out in the shell of the code. Each line appears because the stock has been rejected off of a certain price level and the way resistance levels work is that there is a likelihood that the stock price will reject against this line in the future and could be a potential selling point. If the price of a given stock happens to break through the black resistance level, that level then turns into a support level which can be used for future position entries.

Now onto the second portion of my code which is building a MACD indicator, also known as the Moving Average Convergence Divergence. This indicator is a graph of the momentum of a stock based on two moving averages, the MACD line, and a signal line. First I made a MACD line which consists of the 12-day exponential moving average of a stock minus the 26 day EMA of a stock. Next, I built the signal line which is the 9 day EMA of the MACD

line. On my graph, these two lines appear at the bottom as the purple and orange lines. The way a MACD indicator is used is by seeing where the signal line and MACD line cross. If the MACD line moves above the signal line, investors see that as a buy signal. If the MACD line moves below the signal line, investors see that as a sell signal or are bearish on the stock. This indicator is not guaranteed to be profitable 100% of the time but when paired with other moving averages and technical levels I have learned that this indicator can be a useful tool to have in your arsenal.

This leads me to the third part of my code which is my moving averages. To be more exact I included a Simple Moving Average and a 200 day EMA. The SMA is shown as the red line and the 200 EMA is the blue line. A SMA is good for shorter swing trades and is used by buying the stock when it moves above the SMA line and selling the stock when it crosses below the SMA line. A 200 EMA works on the same principle but is used for long-term investments hence the 200 days. Now that I have the three main components of my code I put them all together to indicate buy and sell signals on the graph itself. I used my past trading experience to indicate what I believe is the best combination of these three elements in an If-statement. My conditions to buy a stock would be if the MACD line crosses above the signal line, if this cross occurs below the zero line which I have learned from personal experience is the best time to buy, and if the stock is trading above the SMA line. My conditions to sell the stock are if the MACD line crosses below the signal line, if the MACD cross occurs above the zero line, and if the stock is still trading above the SMA line so I can catch the stock at its highest point. I then graph these buy and sell signals with either a green-up arrow or a red-down arrow respectively.

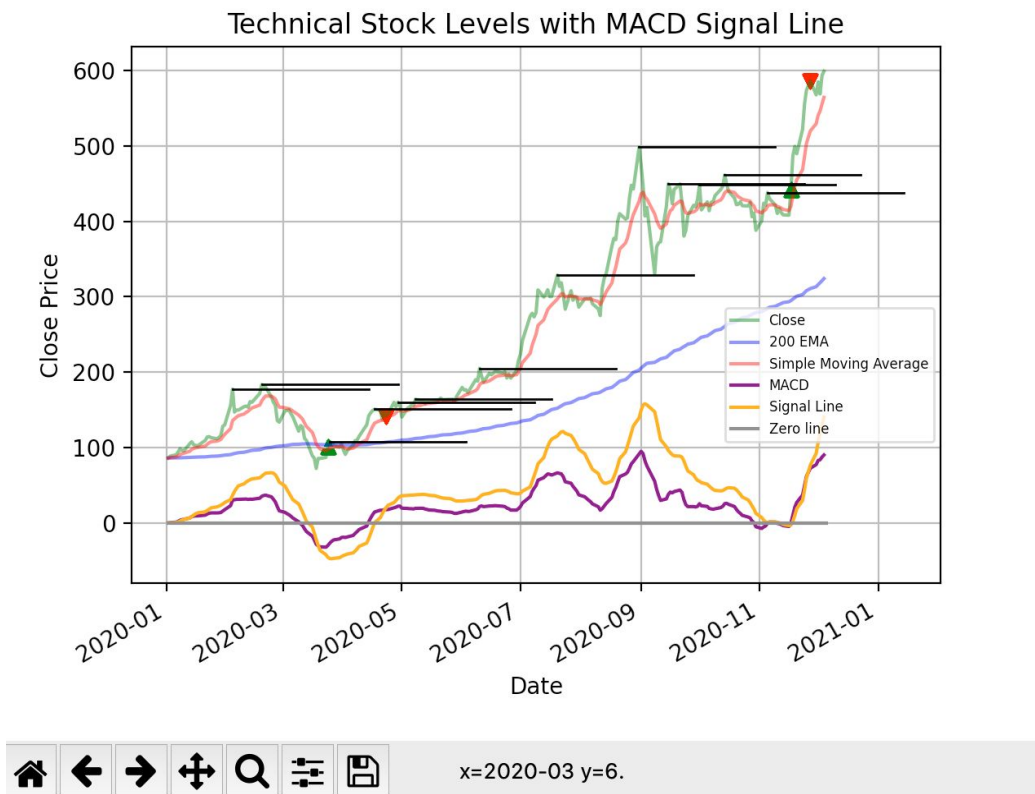
```
*Python 3.8.5 Shell*
Python 3.8.5 (v3.8.5:580fbb018f, Jul 20 2020, 12:11:27)
[Clang 6.0 (clang-600.0.57)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: /Users/aaronkamal/Desktop/Cs110 final project copy.py =====
DISCLAIMER: Every buy and sell signal shown here is only a recommendation and all
investments should be conducted after thorough research!
The chart starts from 2020-01-02 00:00:00 and goes to 2020-12-05 00:22:28.279041
Enter stock:|
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*Python 3.8.5 Shell*
Python 3.8.5 (v3.8.5:580fbb018f, Jul 20 2020, 12:11:27)
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The chart starts from 2020-01-02 00:00:00 and goes to 2020-12-05 00:22:28.279041
Enter stock: TSLA

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

177.41:2020-02-04 00:00:00
183.48:2020-02-19 00:00:00
187.85:2020-03-25 00:00:00
158.78:2020-04-17 00:00:00
160.1:2020-04-29 00:00:00
163.88:2020-05-08 00:00:00
205.01:2020-06-10 00:00:00
328.6:2020-07-20 00:00:00
498.32:2020-08-31 00:00:00
449.76:2020-09-15 00:00:00
448.16:2020-10-01 00:00:00
461.3:2020-10-14 00:00:00
438.09:2020-11-05 00:00:00
```

Figure 1



Section Two; “Target Audience”

When I was developing this code my main goal was to provide insight to retail investors, like myself, when to potentially enter and exit a position. All of the entry and exit points shown on the graph would be best used as a suggestion rather than a firm BUY or SELL. So this would be just another thing to consider for them before entering or exiting a position.

Section Three; “Specific Programming Techniques Used”

The techniques I used in this code range across the board some of which I learned from class and others I learned from watching many hours of Youtube videos. One of the most fundamental parts of my code was the if-statement which allowed me to produce buy and sell signals. As for how I got my data and sorted it, I used yfinance which was very useful and much easier than downloading many CSV files. I also defined a function called signalFunction which allowed me to show when and where I should buy and sell depending on if my conditions are met. Finally, I cleaned up my graph by the plt.plot function which allowed my outcome to be more organized and a little easier to understand.

Section Four; “Challenge(s)”

Along the road, I did face a few challenges. In the beginning, I did not want to download multiple CSV files so I figured out how to properly utilize YFinance and also downloaded a few other directories. Secondly, I had some trouble when trying to create the resistance points of a graph and showing those levels as a straight line but with the help of multiple resources and a dozen different videos, I was able to figure it out.

Section Five; “Future Extensions”

Surprisingly this code does not include all that I wanted it to. When I was in the early planning phase for this project I wanted to include everything I looked at on a daily basis to indicate a buy and sell signal. Unfortunately, I was not able to do everything due to my limited knowledge of coding. In the future, I want to include a sentiment analysis scanner that tracks if certain websites are bullish or bearish on a stock and compare this data to that of what I have already. I would also like to include an RSI indicator to show when a stock is overbought and oversold to show even better entry and exit points. Finally, I would like the code to send me an email or alert me when a stock, on a list I provide, has a buy or sell signal.