AMAZON STOCK PREDICTION

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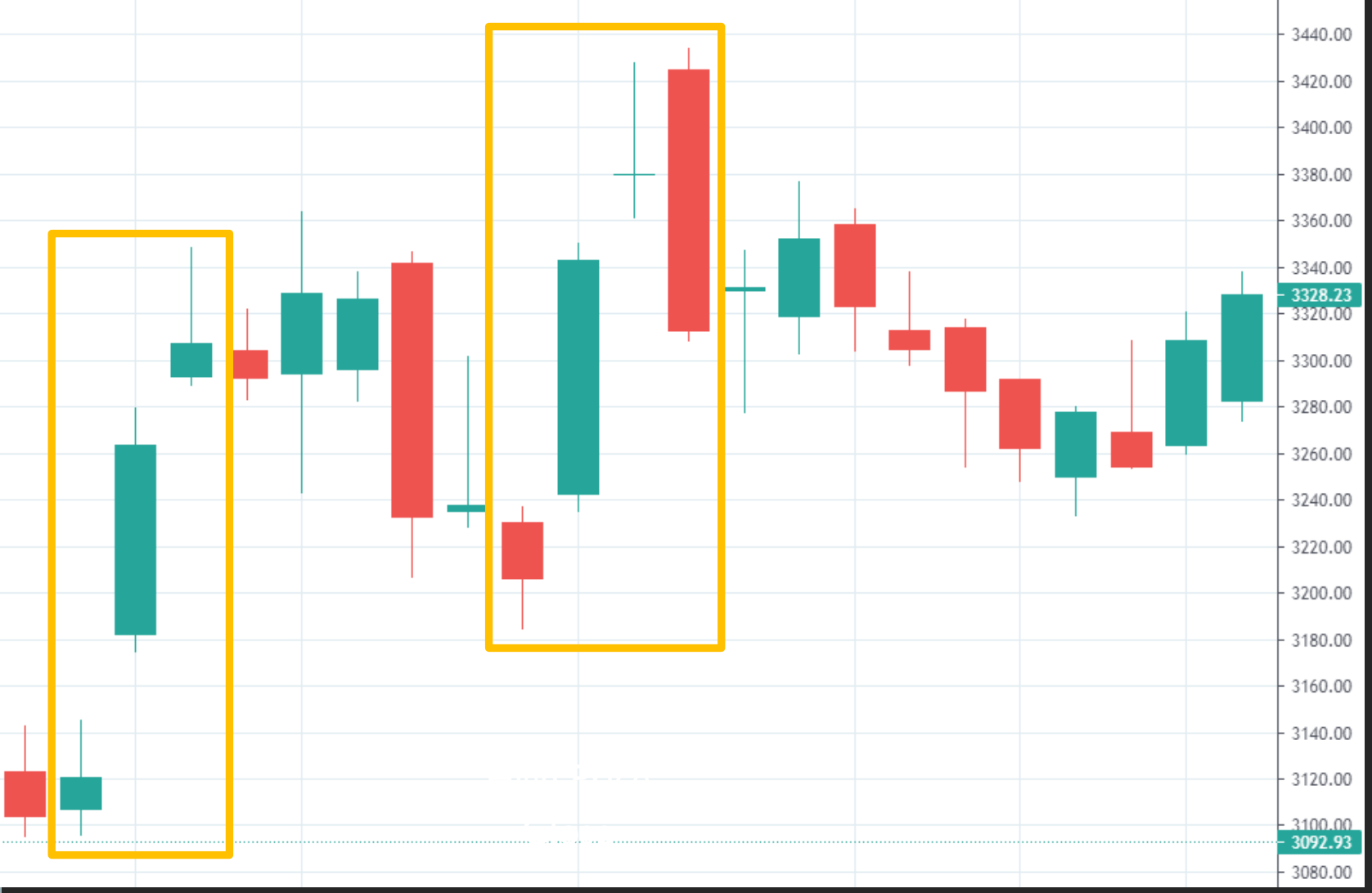
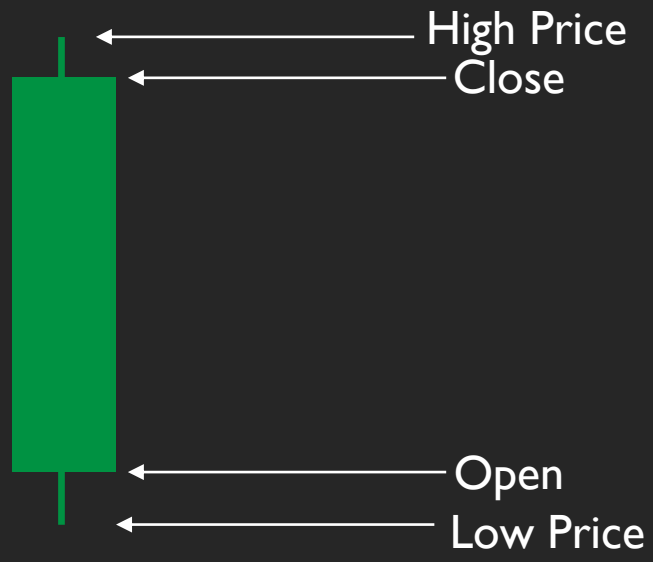
BUSINESS CASE

An investment company wants to start looking into AI to predict the markets. As a Data Scientist, I have been hired to look at Amazon stocks to predict when to invest the company's money into the stock. If this prediction model works, the company will expand their AI efforts to other stock markets.





- If the bar is red, open price is higher than closing price

In place of using a time series model, I decided to use a more unconventional route and implemented a classification model instead.

My model is focused on predicting any 4 percent price increase within a five-day range.

THE DATA

The data used for my model was sourced from Alpha Vantage stock API.

The data about Amazon is comprised of 5,362 days ranging from November 1st, 1999 to February 23, 2021. The Alpha Vantage data features open, high, low, and close prices, plus volumes for each day.

https://www.alphavantage.co/

TECHNICAL INDICATORS: COLUMN ENGINEERING

By analyzing historical data, traders use technical indicators to try to predict future price movements in the stock market.

I created a list of technical indicators to use for my model; These included:

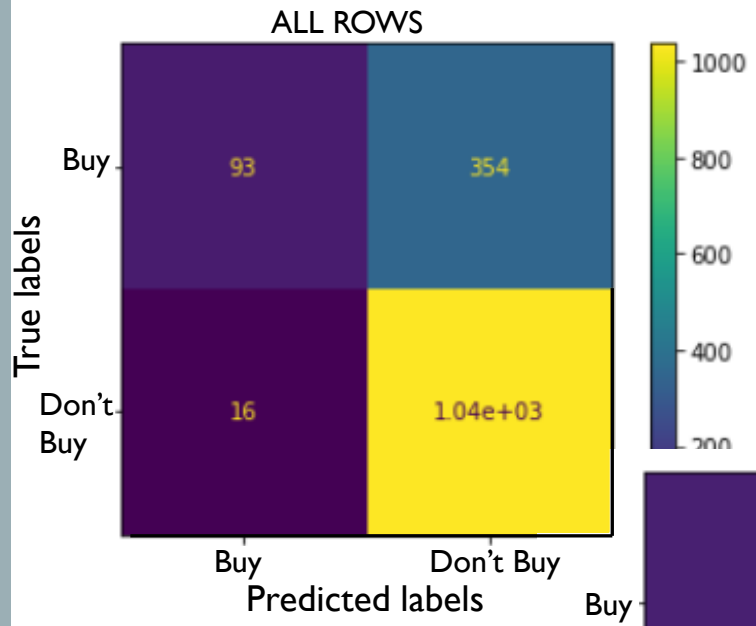
- Simple Moving Average (SMA)
- Stochastic
- Relative Strength Index (RSI)
- Rate-of-change (ROC)
- Average True Range (ATR)
- Average Directional Index (ADX)

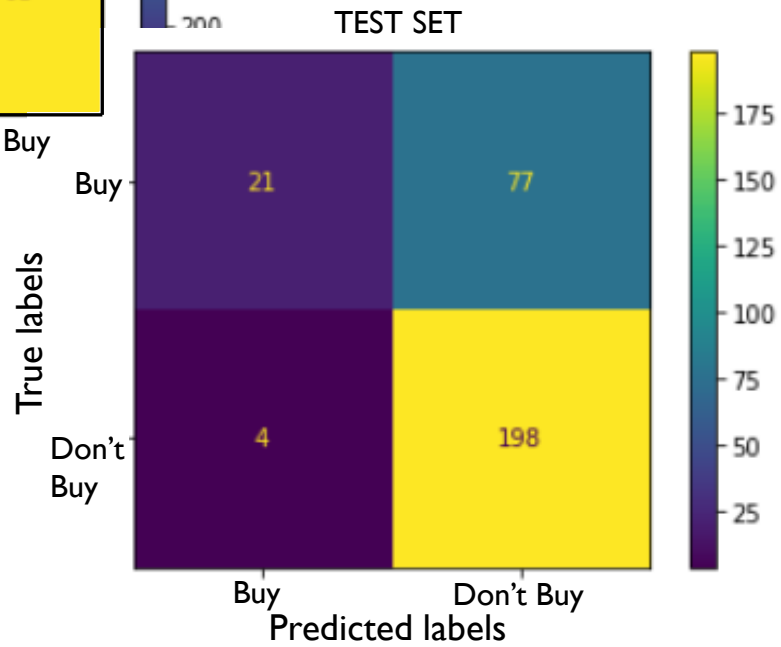
CLASSIFICATION MODEL: DECISION TREE CLASSIFIER + GRADIENT BOOSTING

While using the decision tree classifier as a best estimator to the gradient boosting model, I was able to achieve an 84 percent precision rate.

- Precision matters because it is the ratio between good opportunities and false opportunities.
- Although recall is not as important as precision, it is still important because it is the ratio of found opportunities to missed opportunities.

	precision	recall	f1-score	support
0	0.72	0.98	0.83	202
1	0.84	0.21	0.34	98
accuracy			0.73	300
macro avg	0.78	0.60	0.59	300
weighted avg	0.76	0.73	0.67	300





Interestingly my model did not make use of the stochastic or the relative strength index features.

	features	importance
0	High	0.349440
1	ATR	0.277382
2	SMA	0.177494
3	ADX	0.079555
4	ROC	0.076901
5	Close	0.039228

RECOMMENDATIONS

- I would recommend the investment company to continue to expand their AI efforts to other stock markets.

- When focusing on technical indicators, I would suggest focusing on: Average True Range (ATR), Simple Moving Average (SMA), Average Directional Index (ADX), Rate-of-change (ROC); With less focus on: Stochastic and Relative Strength Index (RSI) indicators.

- Having a sell point barely lower than 4 percent to catch some false positives.

FUTURE WORK

- My initial XGB models yielded decent stats, so I would like to test the XGB model as a best estimator in place of the decision tree.
- Focus on adding more technical indicators.
- Explore other stock markets to be able to find at least 5-10 investing opportunities a week.

THANK YOU!

Thank you to my audience today for taking the time to listen to my presentation.