


Automating/BackTesting Trading Strategies for CryptoCurrencies

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For: JPMorgan



Agenda

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The
Objective/Problem

2

The Outside
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Process of Creation

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Final Analysis



To consider warning

ADA

BCH

HBAR

ETH

VET

LTC

ONE







1

The objective/problem



Problem

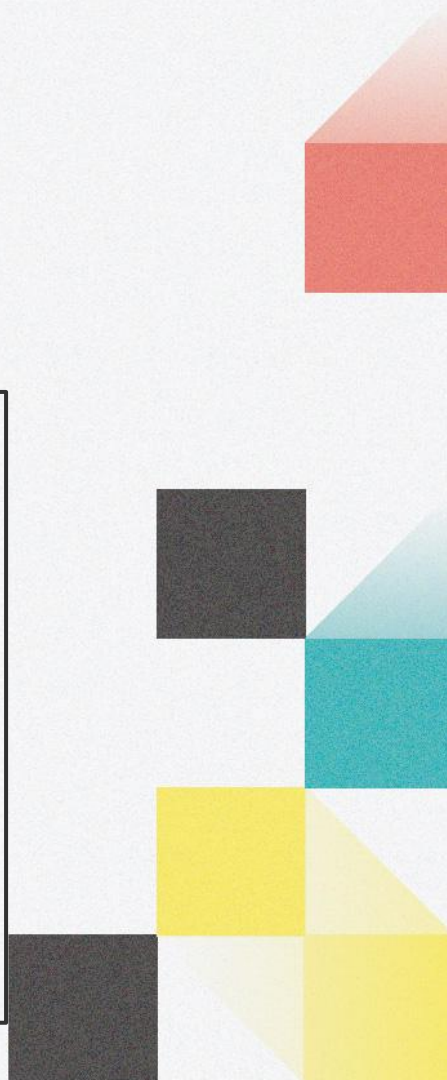
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- The Crypto market is very scary and unpredictable. What do I buy? How much do I buy? Why do I keep losing money? Are all very common question when entering the market. Unfortunately, the answer to all these questions is "It depends." I was brought on by JPMorgan to analyze specifically the Crypto Market and discover possible investment strategies that would make the Crypto Market worth it.
- 



Goal and Objective

1. Creating a platform to create candlestick trend analysis strategies.
2. Create a machine learning forecaster that predicts the close price of a specific cryptocurrency.

The main objective is to maximize your gains in your "wallet" or alternatively minimize your losses in your "wallet" while simultaneously maximizing the shares you have.





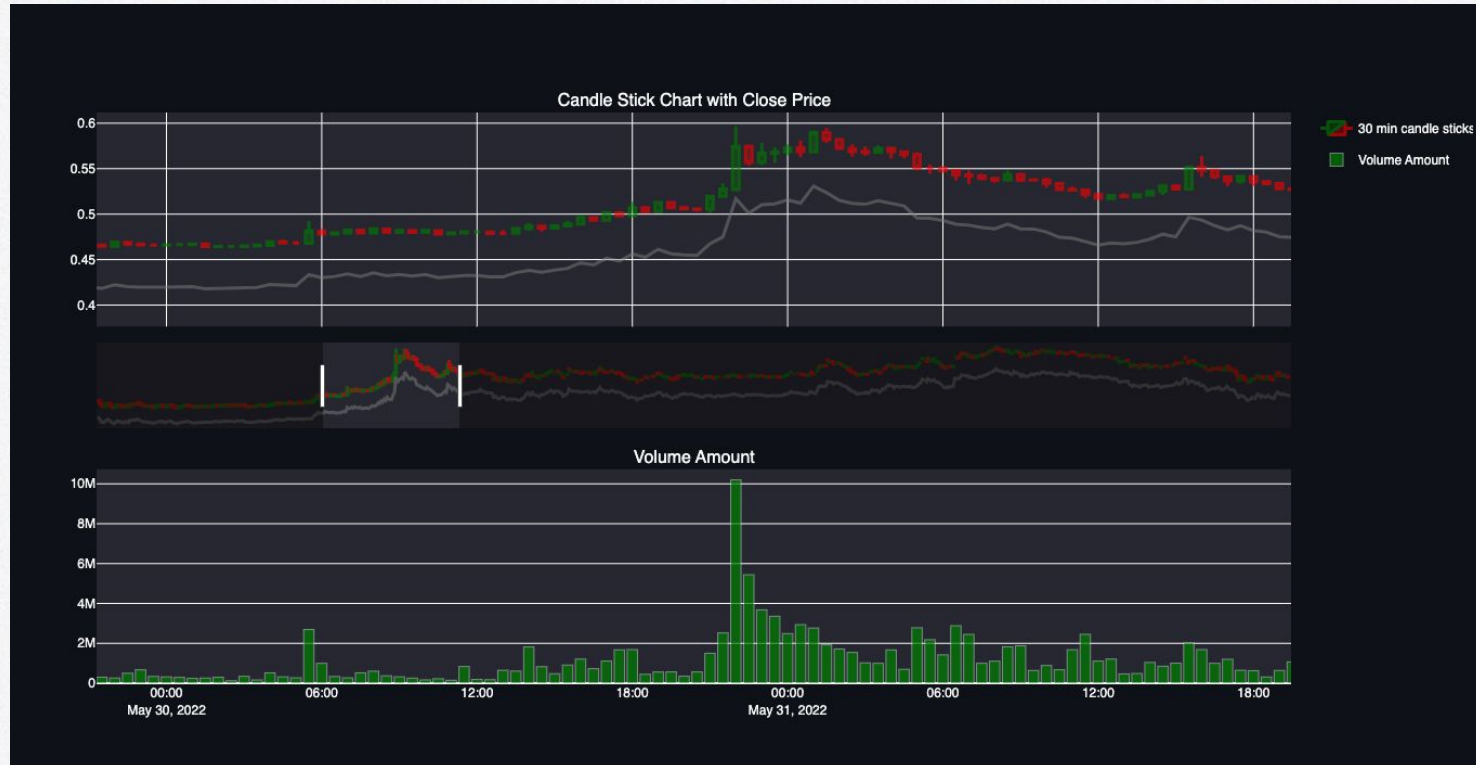
2

The Outside Research

CandleStick Charts

- A standard trading graph looks at the the close at the end of each interval.
 - So a simple line plot that shows you close price and historical direction
- A candlestick chart on the other hand shows you open, high, low, close of each interval.
 - This can give you a lot more insight into the general trend of a cryptocurrency.

CandleStick Charts

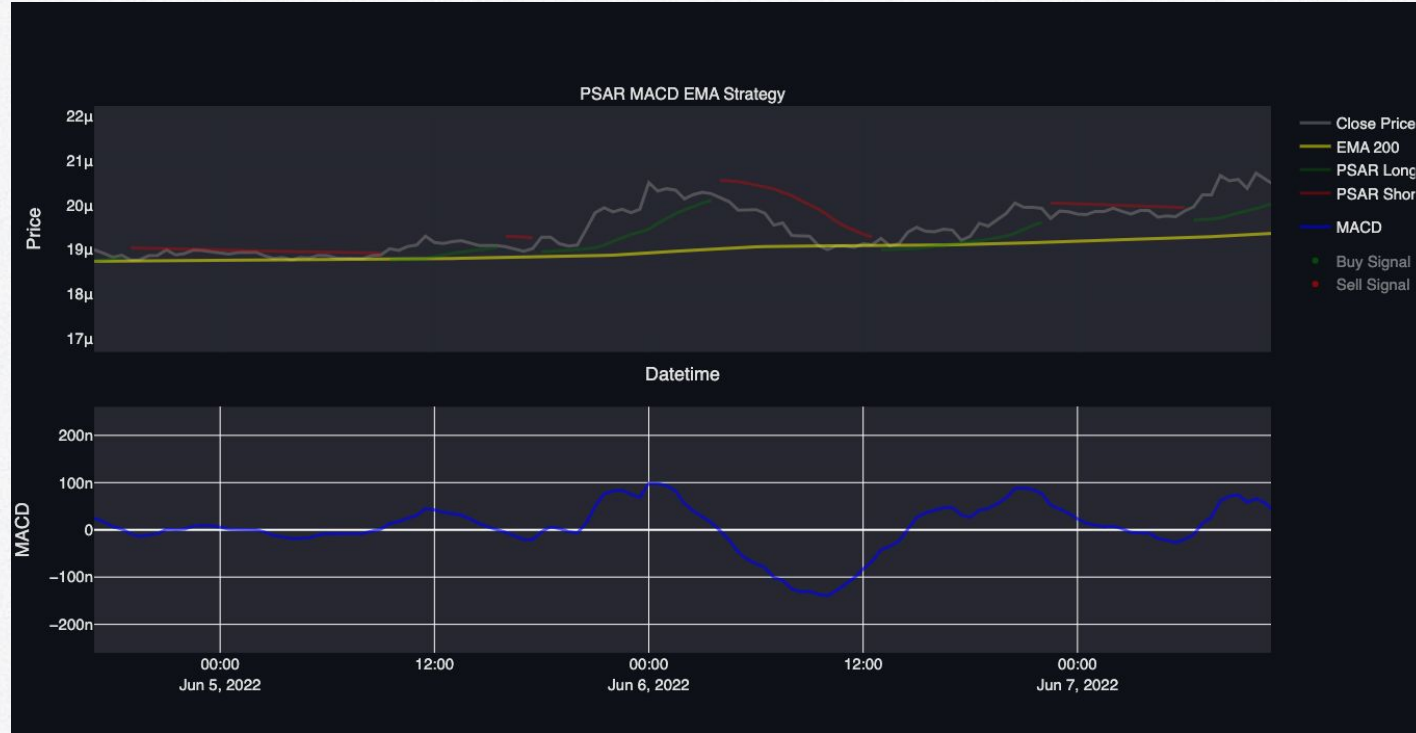


Different Strategies:

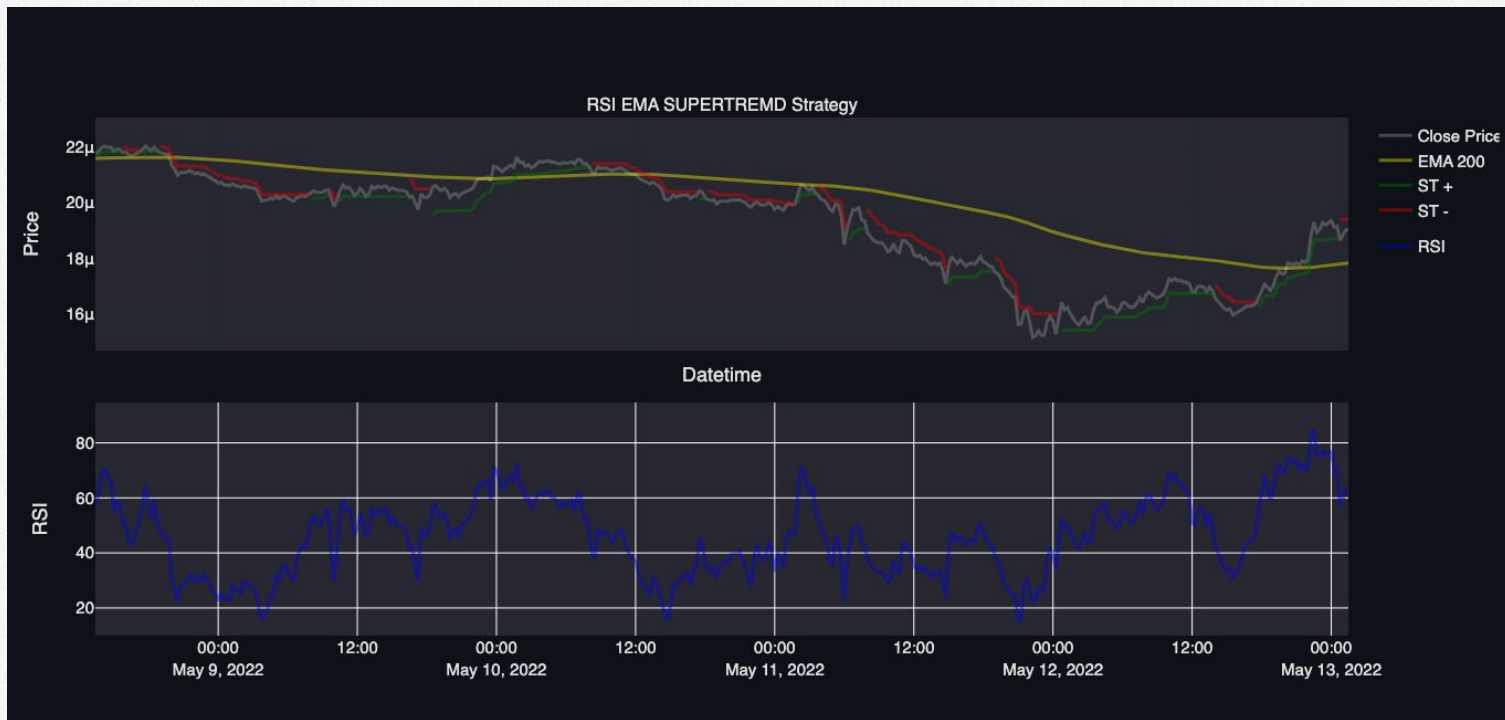
PSAR+MACD+ EMA 30 minute intervals	RSI+EMA+ ST 15 minute intervals	HOFFMAN 15 minute intervals
Parabolic Sar	Relative Strength Index	Several Simple Moving Averages
Moving Average Convergence Divergence	Exponential Moving Average	Several Exponential Moving Averages
Exponential Moving Average	SuperTrend	Running Moving Average
		Several Combinations of those stated above



PSAR + MACD + EMA



RSI + EMA + SuperTrend



Hoffman





3

Process of Creation



Bot

- Using a AWS RDS Postgres Database and SQLAlchemy to automate the data collection process.

Bot Summary



Getting Live data

- Getting live trading data.
- Open, high, low, close



Refining Issues

- Fixing Pipeline issues that were cause duplicate entries of timeframes.



ETL Pipeline for different time frames

- Transforming that data in different ways and pushing that data to a database table.



Script to Raspberry pi

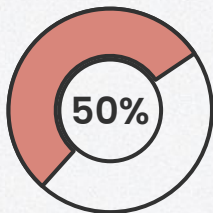
- Using a raspberry pi with a strong connection to internet to run indefinitely.



Backtester

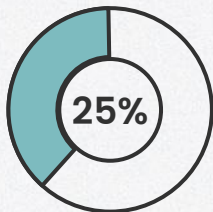
- Building a Web Application platform to interpret strategies in a visually pleasing way.

Streamlit Application



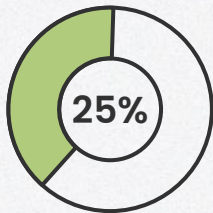
Web App Structure

- Getting the graphics down and general layout of the page.



Translating strategies to code

- Converting the strategies and buy and sell signals to code.



Wallet Calculations

- Interpreting those buy and sell signals to visualize how they would perform on a wallet with starting buy power of 500 USD.



Application

Let's take a tour of my application

Modeling Process

- Creating 3 Neural Network Forecasting Models to Predict the close price of several crypto currencies based on strategy features.



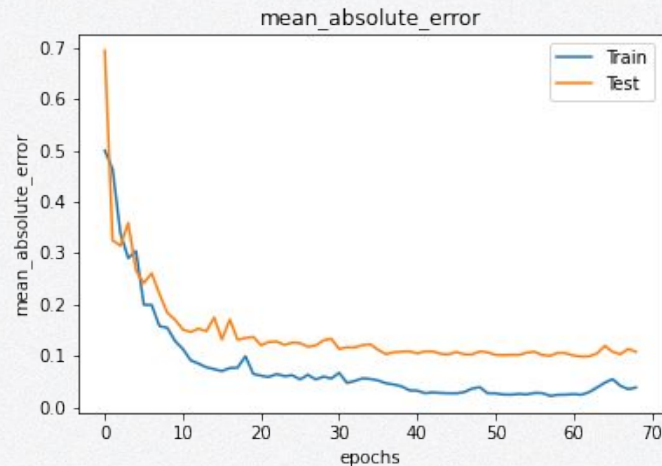
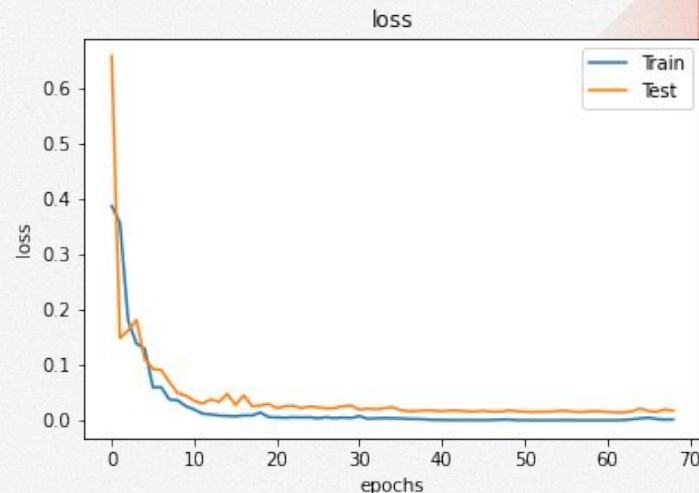
“In order to secure the ability of the network to generalize the number of nodes has to be kept as low as possible. If you have a large excess of nodes, your network becomes a memory bank that can recall the training set to perfection, but does not perform well on samples that were not part of the training set.”

— Steffen B. Petersen,
Aalborg University



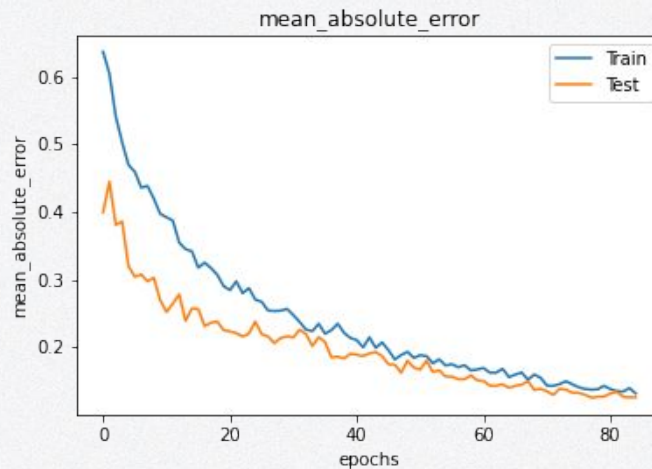
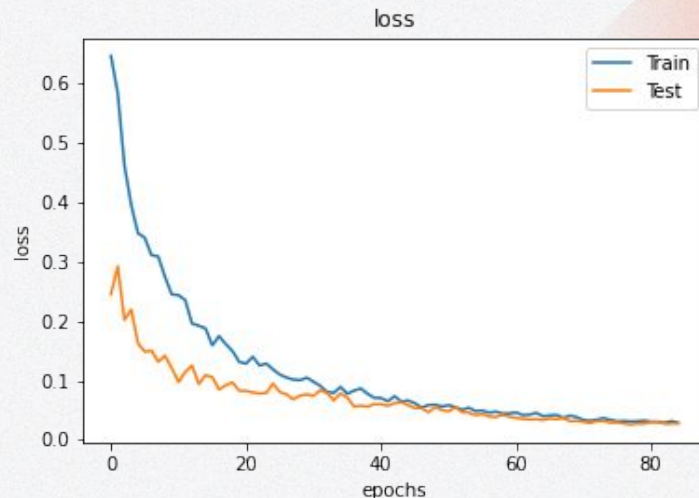
Model PME + MACD+ EMA Performance:

- Loss:
 - 0.0036
- Mean Absolute Error:
 - 0.0463
- Val Loss:
 - 0.0121
- Val Mean Absolute Error:
 - 0.0841



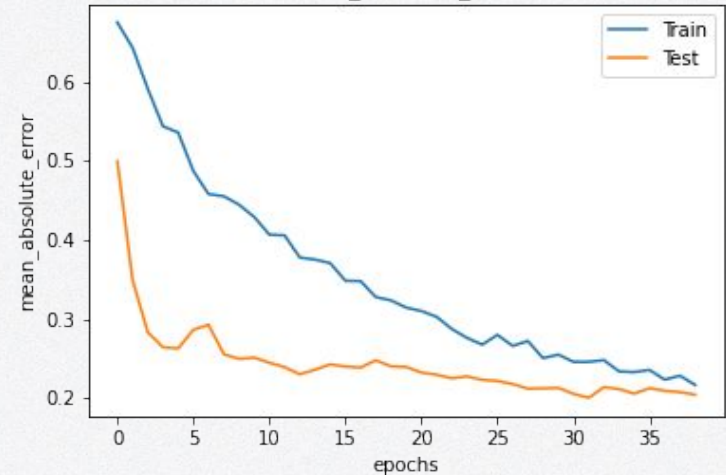
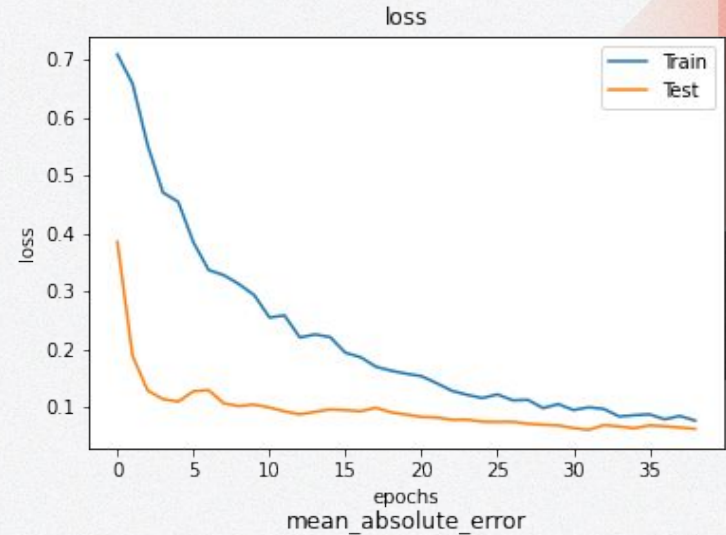
Model RSI + EMA+ ST Performance:

- Loss:
 - 0.0235
- Mean Absolute Error:
 - 0.1215
- Val Loss:
 - 0.0176
- Val Mean Absolute Error:
 - 0.1063



Model Hoffman Performance:

- Loss:
 - 0.1175
- Mean Absolute Error:
 - 0.2671
- Val Loss:
 - 0.1309
- Val Mean Absolute Error:
 - 0.2869





4

Final Analysis

Conclusion

- My findings were that the PSAR + MACD + EMA and HOFFMAN strategies greatly outperformed RSI + EMA + SUPERTREND.
 - On average they lost 20 percent and gained on average 5 percent
- Although the NN's performance was good. when tested on the test set it was off.
- However the trend direction was accurate and the NN's performance seemed to follow the general trend which is a good sign.
- I believe my strategies and my NN's greatly reduced the amount of loss an average trader would see. Not only did I choose unknown crypto currencies, but I was still able to reduce my losses and maximize gains.

Future Improvements

- Improve ETL Pipeline.
- Adapt Bot to Raspberry Pi.
- Add additional Strategies.
- Reformat Database.
- Improve models performance with more feature engineering.
- Migrate strategies to stock.

Resources

- Japanese CandleStick Charting Techniques – Second Edition, written by Steve Nison
- <https://www.tradingview.com/chart/Bly58aYC/>
- <https://www.best-trading-platforms.com/trading-platform-futures-forex-cfd-stocks-nanotrader/rob-hoffmans-inventory-retracement-trades>
- <https://www.investopedia.com/terms/r/rsi.asp>
- <https://www.investopedia.com/terms/e/ema.asp>
- <https://www.elearnmarkets.com/blog/supertrend-indicator-strategy-trading/#:~:text=web.stockedge.com-,Key%20Takeaways,accurate%20signals%20on%20precision%20time>
- <https://www.investopedia.com/terms/p/parabolicindicator.asp>
- <https://www.investopedia.com/terms/m/macd.asp>
- <https://www.investopedia.com/terms/e/ema.asp>



Questions

Thanks!

Do you have any questions?

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