TECHNICAL PORTFOLIO ANALYSIS

A study on equity and cryptocurrency baskets

Introduction

We are presenting a technical analysis study on baskets of stocks and cryptocurrencies. We used data analysis to determine when the market is in a good state to make a trade and used technical indicators to determine long/short bias.

Portfolio selection

We chose five stocks from a list of volatile and actively traded symbols. We used a baseline of 7% weekly volatility and one million shares per day average. We ended up with Rivian (RIVN), Twitter (TWTR), Doordash (DASH), Unity Software (U), and Cleveland-Cliffs (CLF).

For our crypto portfolio, we selected five based on volatility and market cap. We settled on Bitcoin (BTC), Ethereum (ETH), BinanceCoin (BNB), Solana (SOL), and Cardano (ADA).

Cleaning the data

The first part of our study is cleaning the data. We pull data using Alpha Vantage for stocks and CoinGecko for crypto. We use python to clean the data and sort it into readable dataframes.

Using the API

Alpha Vantage

- TIME_SERIES_INTRADAY_EXTENDED method to retrieve Intraday stock data.
- Interval between data- points
  - 60 minutes for computing RSI and EMA
  - 5 minutes for computing Volatility
- Limits on API calls - 5 calls per minute, total of 500 per day. API key required

CoinGecko

- market_chart/range method to retrieve Intraday crypto data
- Interval between data-points 60 minutes
- Range required time in epochs
- Limits on API calls - 50 per minute, no API key required

Master python file

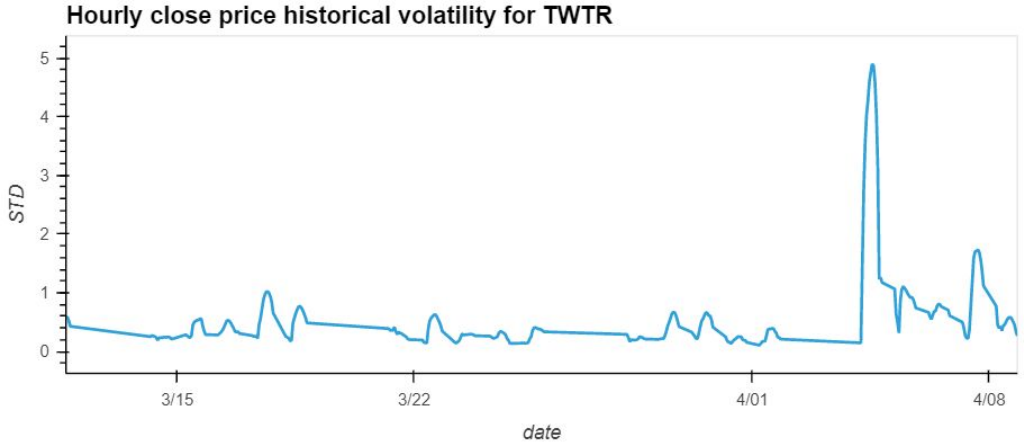
- master_functions.py python module to house reusable methods
- Common tasks -
    - Retrieve data from APIs
    - Process and convert data formats
    - Load data from csv files
    - Plot graphs for various data points

Volume and volatility

We use volatility at certain times of the day/week to determine when is the best time to trade. Data is measured every five minutes over a one month time horizon.

Elijah Obasanya notes

Volatility


Hourly close price historical volatility for TWTR
STD
5
4
3
2
1
0
3/15
3/22
4/01
4/08
date


Hourly close price historical volatility for CLF
STD
1.6
1.4
1.2
1
0.8
0.6
0.4
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4/01
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Applying our strategy

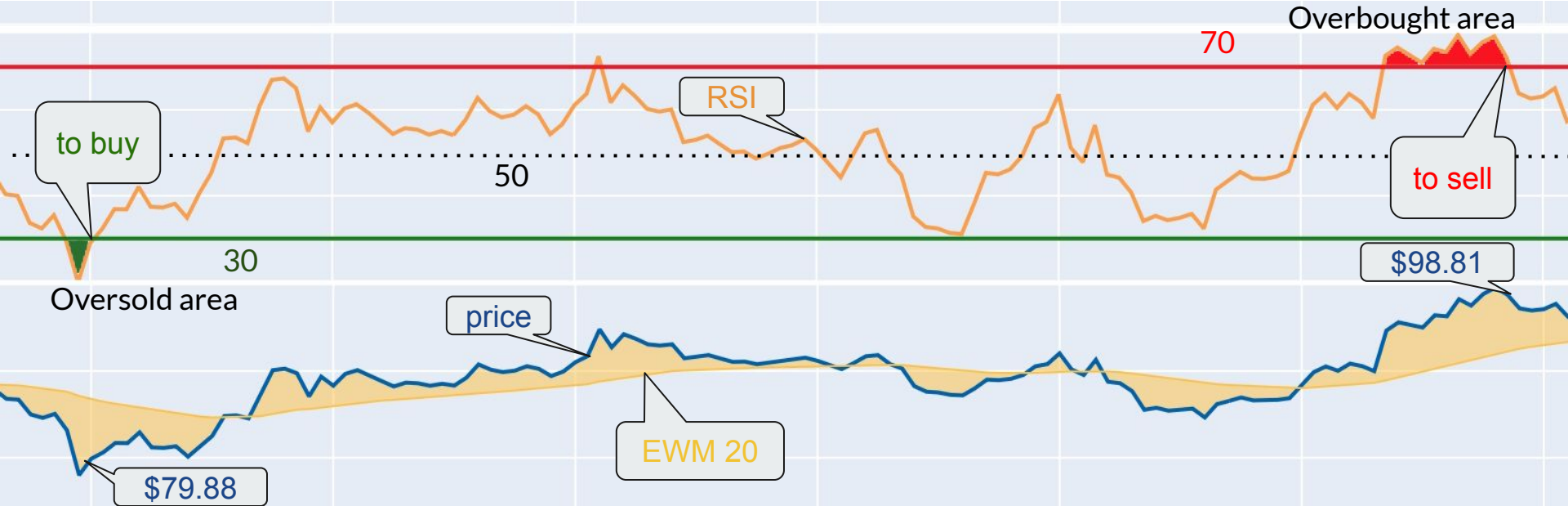
Once the user determines the best times to trade by looking at the top quadrant of volatility readings, we use RSI, EMA and MACD to determine bias.

This is not investment advice.

Relative strength index RSI

The Relative strength index (RSI) is a technical indicator.
It is classified as a momentum oscillator (changes from 0 to 100)

- **RS = Average Gain/ Average Loss**
- **RSI = 100 - 100/(1+RS)**
- RSI <50 downward trend indicator,
- RSI >50 upward trend indicator



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RSI

Result of the back testing:

- RIVN: the profit is -$2.52 per share
- TWTR: the profit is $2.97 per share
- DASH: the profit is $43.32 per share
- U: the profit is -$5.02 per share
- CLF: the profit is $7.68 per share

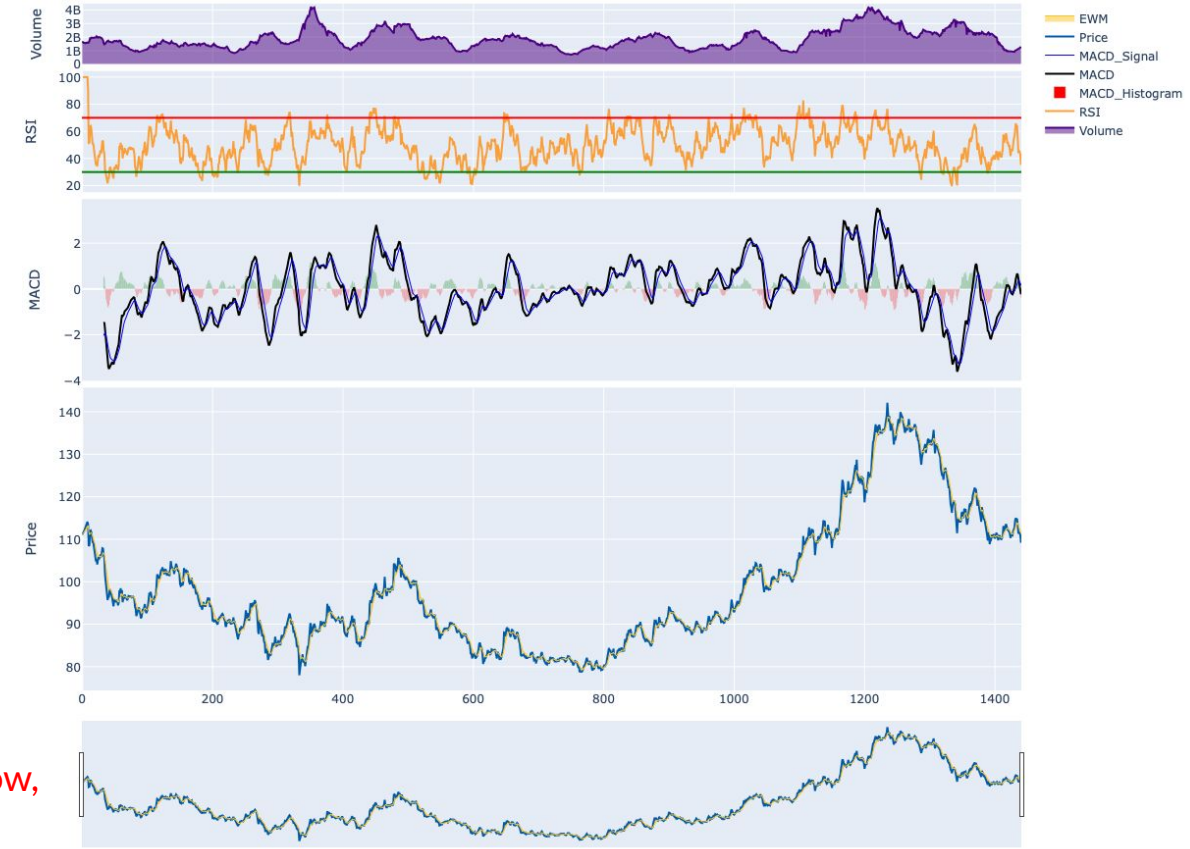
This is not investment advice.

RSI & MACD

Result of the back testing (per coin):

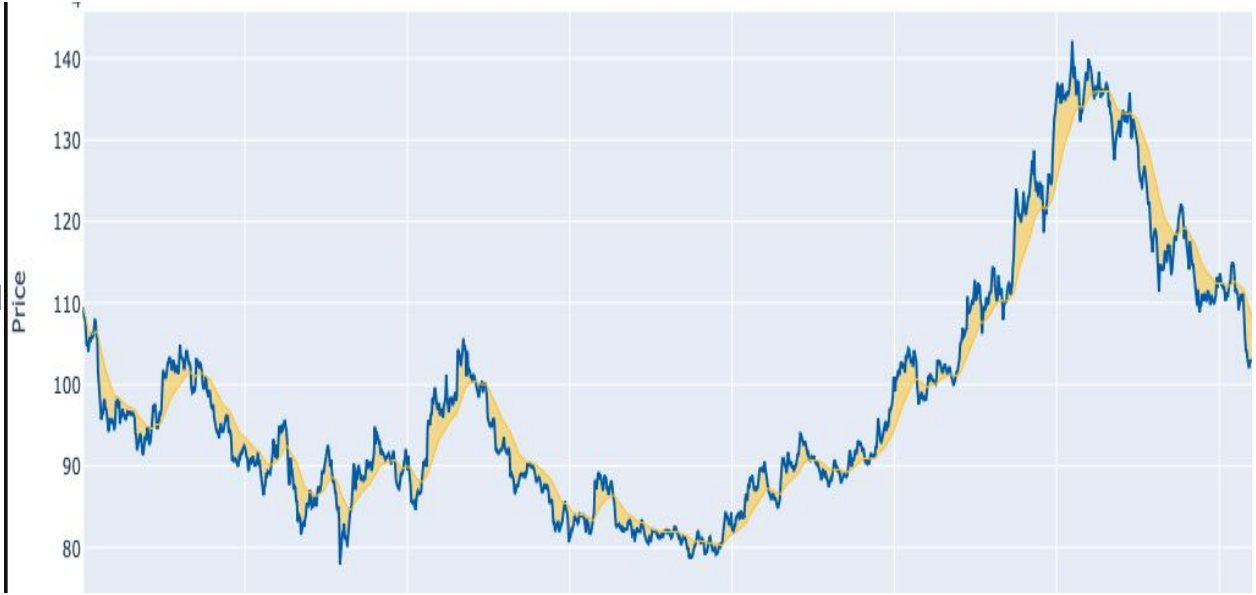
- SOLANA the profit is $18.89
- BITCOIN the profit is $2704.92
- ETHEREUM the profit is $675.35
- BINANCECOIN the profit is $58.80
- CARDANO the profit is $0.05

It is better to use RSI in combination with other indicators like MACD, Stochastic Slow, etc. More to come.



EMA, MACD

EMA data is tested over a two month period. For EMA our signal is: buy above 20 day EMA, sell below.



Summary

Through this analysis, we created an algorithm with the following parameters.

Go long if all parameters are met:

1. Volatility is in the top 25 percent of all recorded values.
2. Last price is above the 20 period EMA.
3. RSI is below 30.

Summary

Go short if all parameters are met:

1. Volatility is in the top 25 percent of all recorded values.
2. Last price is below 20 period EMA.
3. RSI value is above 70.

Limitations

1. This analysis does not search for optimal entry points for trades
2. This analysis does not identify optimal conditions for exiting a trade
3. This analysis only utilizes technicals that rely on momentum trading

Iteration Opportunities

1. Use this analysis as a foundation for creating a trading bot!