Cryptocurrency Analysis with Python

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PROJECT #1

STEPS FOR PROJECT #1

STEP 1:

- Executive Summary

STEP 2:

- Data Collection / Preparation

STEP 3:

- Approach to Achieve our Goals

STEP 4:

- Results / Conclusions

STEP 5:

- Appendix - Links to Github Repos

STEP 1: EXECUTIVE SUMMARY

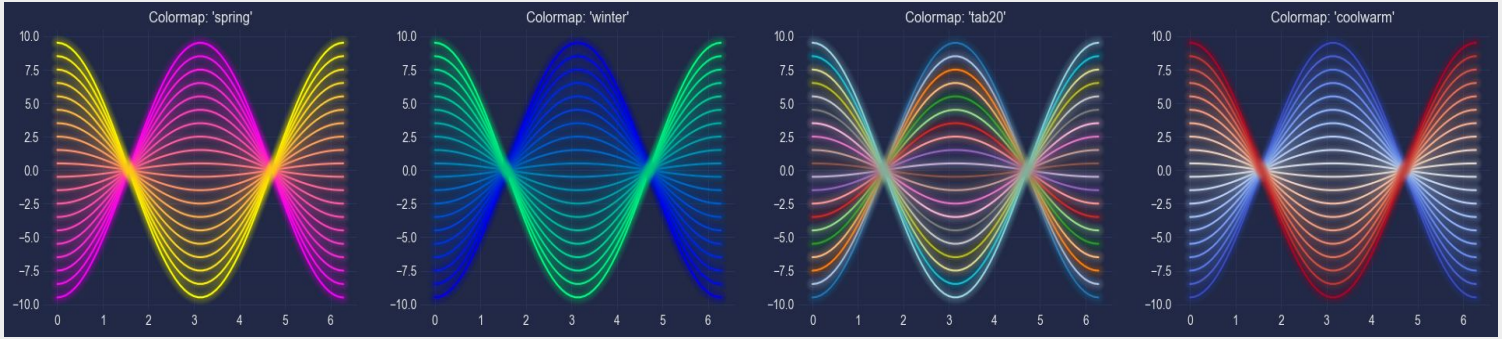
- We are analyzing the top 37 + coins from Coin Market Cap to run a 5 year historical analysis
- After our 5 year historical analysis of the top 30 + cryptocurrencies, we will then run a 5-year Monte Carlo simulation to decide which 5 coins will realize the maximum profits. Other calculations include: Calmar Ratio, Sharpe Ratio, Annualized Daily Returns, Cumulative Returns. We use different weights of each calculation to determine our choices
- After we have run our simulations, we will plot our analysis using several forms of interactive plots with advanced design.

STEP 1: EXECUTIVE SUMMARY

- Our advanced analysis uses time tested financial coding analysis to predict the best digital assets and cryptocurrencies to add to our portfolio
- We analyze historical data of the top performing cryptocurrencies while using advanced forecasting tools and live api data to predict maximum returns on investments
- Our advanced analysis uses time tested financial coding analysis to predict the best digital assets and cryptocurrencies to add to our portfolio

STEP 1: EXECUTIVE SUMMARY

Using Cyberpunk in Matplotlib there are many options for advanced design



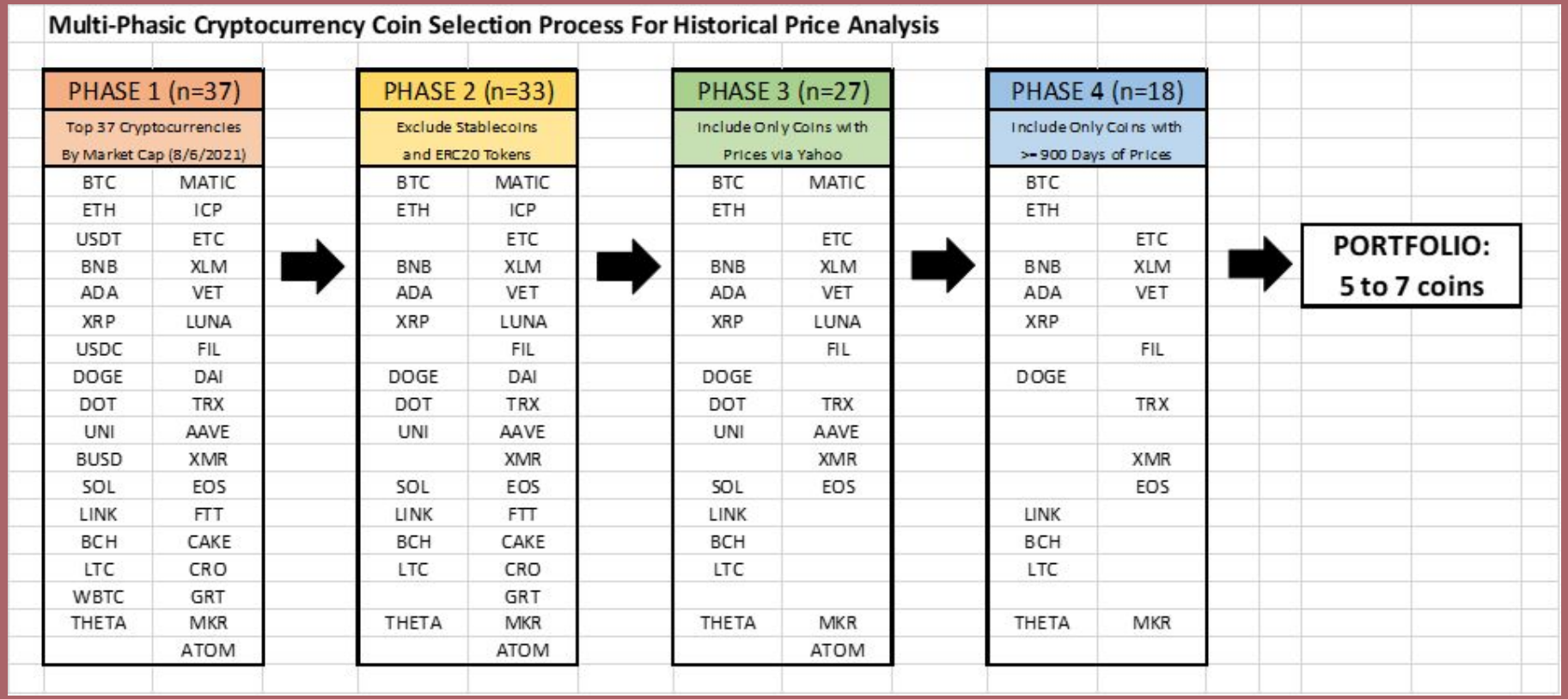
STEP 2: DATA COLLECTION AND PREPARATION

- Starting point: 30+ cryptocurrencies, 5-year lookback.
- Base initial cryptocurrency list upon market capitalization.
- Exclude any stablecoins (pegged to USD e.g. Tether) and ERC20 tokens (“wrapped” bitcoin that runs on ETH blockchain).
- For final analysis, aim for at least 15 cryptocurrencies with at least two years of data to get us to the final 5 to 7 coins.

STEP 2: DATA COLLECTION AND PREPARATION

- **Source for Cryptocurrency historical pricing: Yahoo Finance**
  - **Prices for 350+ of the top cryptocurrencies (by market cap)**
  - **Sufficient historical data available**
  - **No-cost, API-free access to data**
  - **Minimal code required to bring data directly into dataframes by using pandas_datareader**

STEP 2: DATA COLLECTION AND PREPARATION



STEP 2: DATA COLLECTION AND PREPARATION

STEP 2: DATA COLLECTION AND PREPARATION

Launcher | Project1.ipynb

Code | Python 3

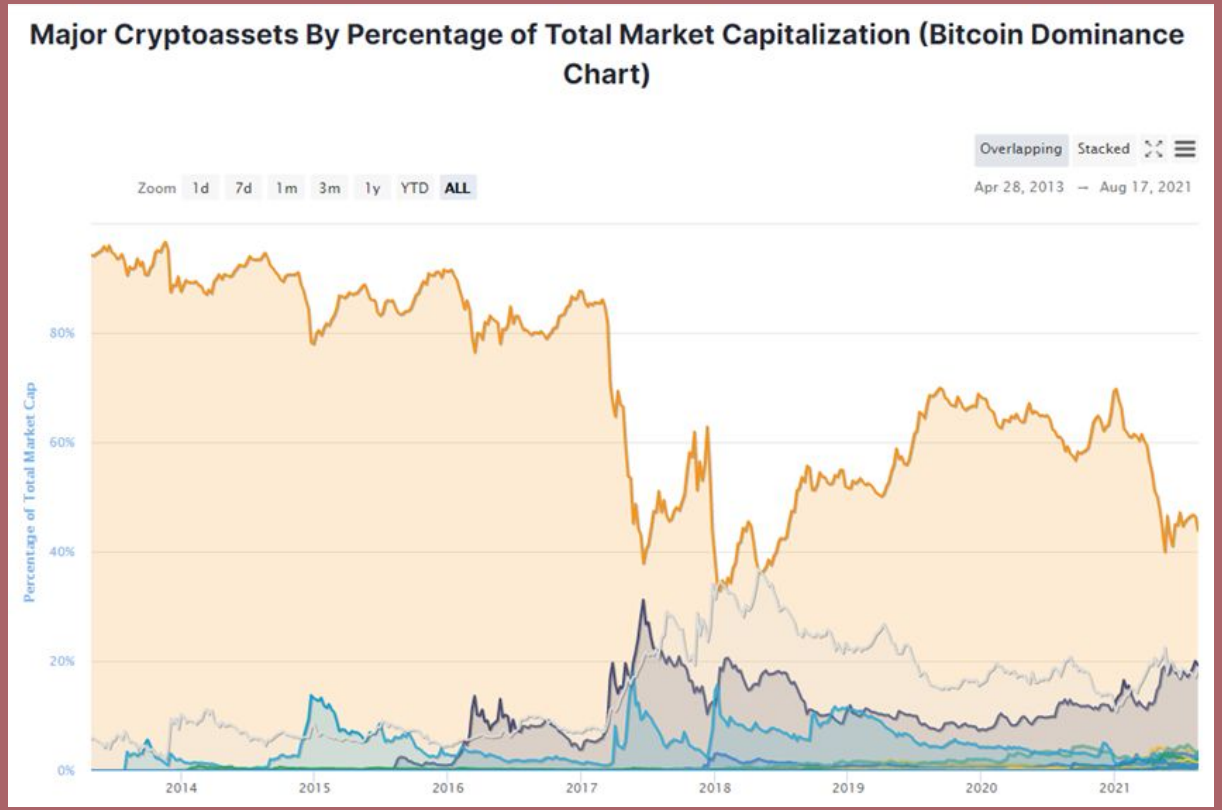
[1]:
```
import os
import requests
from dotenv import load_dotenv
import pandas as pd
import pandas_datareader as web
import datetime as dt
import numpy as np
from MCForecastTools import MCSimulation
import alpaca_trade_api as tradeapi
```

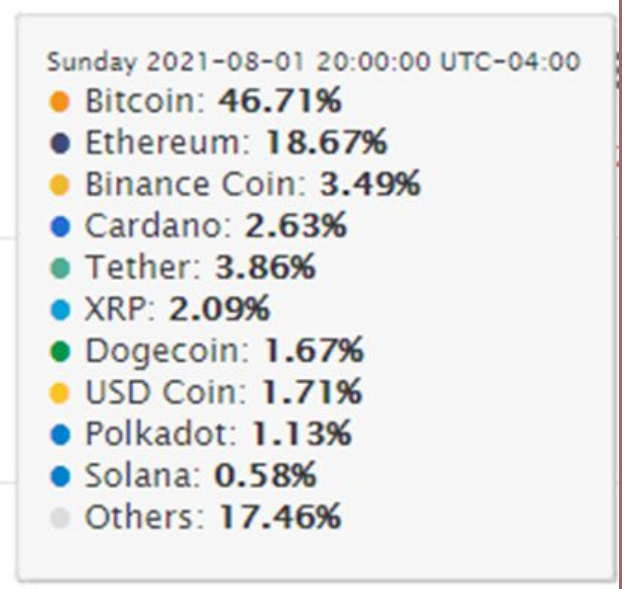
[2]:
```
historical_start_date = dt.datetime(2016,8,1)
historical_end_date = dt.datetime(2021,7,31)

ADA_df = web.DataReader('ADA-USD','yahoo',historical_start_date,historical_end_date)
BCH_df = web.DataReader('BCH-USD','yahoo',historical_start_date,historical_end_date)
BNB_df = web.DataReader('BNB-USD','yahoo',historical_start_date,historical_end_date)
BTC_df = web.DataReader('BTC-USD','yahoo',historical_start_date,historical_end_date)
DOGE_df = web.DataReader('DOGE-USD','yahoo',historical_start_date,historical_end_date)
```

STEP 2: DATA COLLECTION AND PREPARATION

- Desired cryptocurrency portfolio offering: 5 - 7 coins
- Decision made to auto-include certain coins regardless of analytic outcomes
  - Base auto-inclusion on market dominance
  - Decision: auto-include Bitcoin (BTC) & Ethereum (ETH)
    - BTC + ETH represent > 65 % total crypto market cap
    - Both are decentralized (BTC = POW, ETH = POW ---> POS)

STEP 2: DATA COLLECTION AND PREPARATION





Market Cap Dominance (since Jan 1, 2019)		
	LOW	HIGH
BTC	38.0%	71.0%
ETH	7.5%	19.0%

STEP 3: APPROACH TO ACHIEVE OUR GOALS

- Coins daily return
- Return based on 925 days of data, from 2018
- Annualized Standard Deviation
- Sharpe Ratio
- Sharpe Ratio
- Calmar Ratio

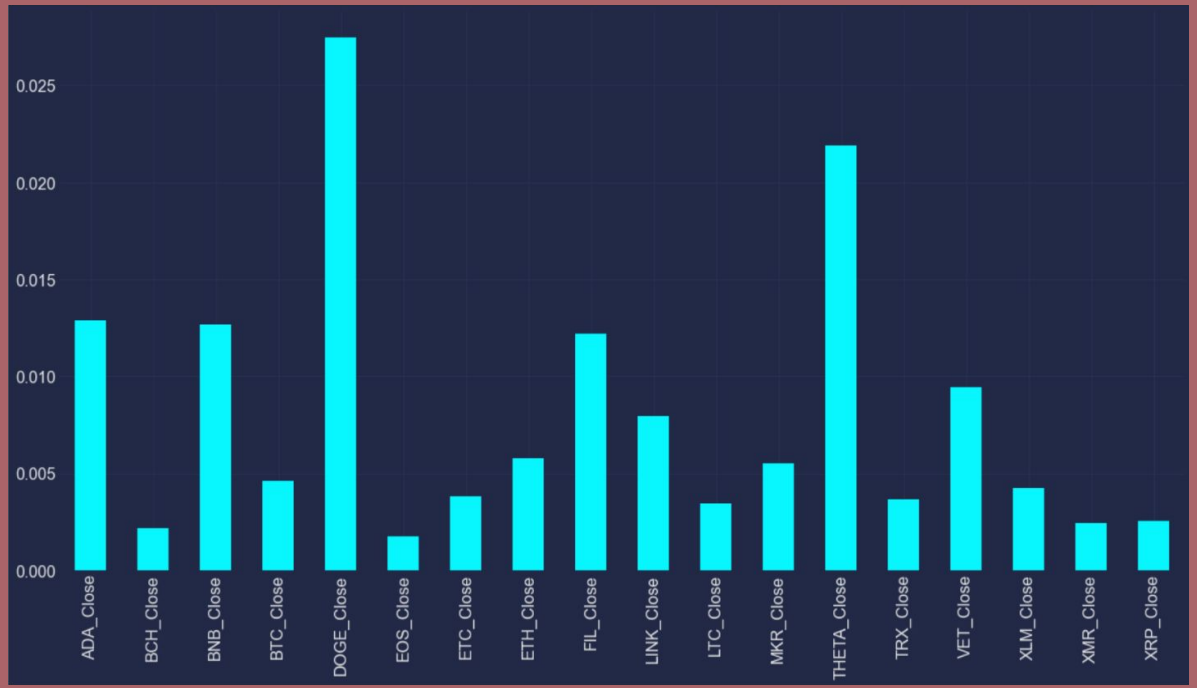
```
display(select_coin_close_df.count())
display(select_coin_close_df)
```

```
ADA_Close      925
BCH_Close      925
BNB_Close      925
BTC_Close      925
DOGE_Close     925
EOS_Close      925
ETC_Close      925
ETH_Close      925
FIL_Close      925
LINK_Close     925
LTC_Close      925
MKR_Close      925
THETA_Close    925
TRX_Close      925
VET_Close      925
XLM_Close      925
XMR_Close      925
XRP_Close      925
dtype: int64
```

STEP 3: APPROACH TO ACHIEVE OUR GOALS

Coins daily return

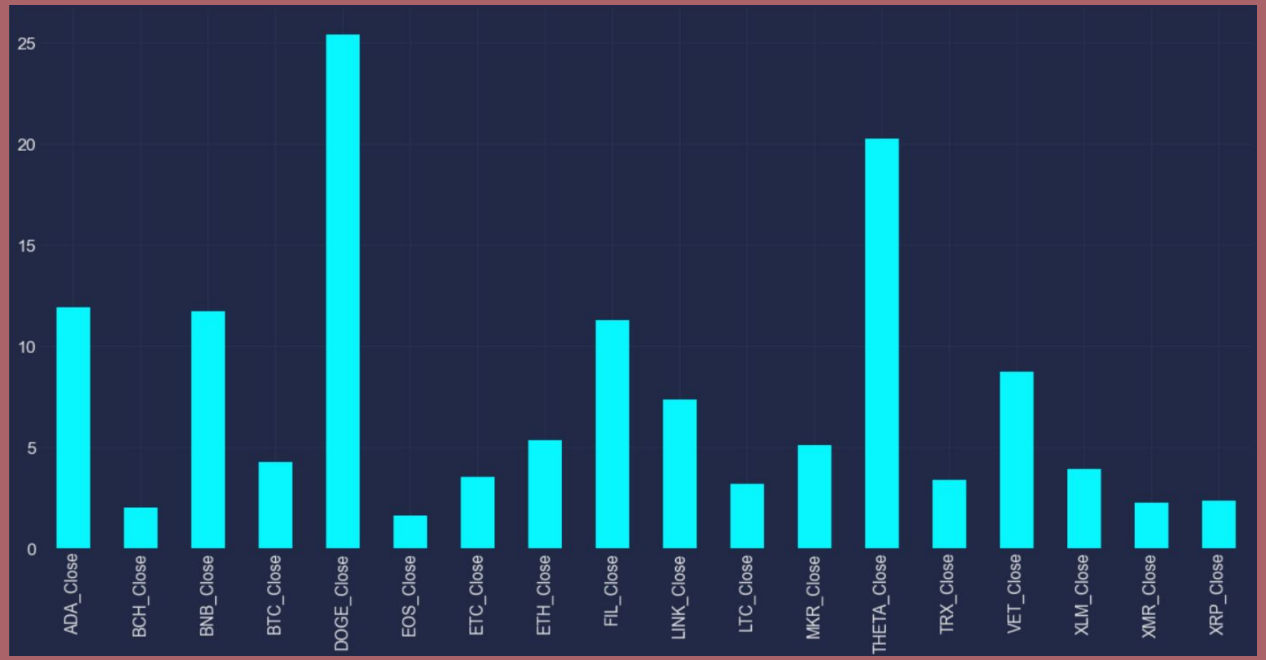
ADA_Close	0.012861
BCH_Close	0.002184
BNB_Close	0.012643
BTC_Close	0.004584
DOGE_Close	0.027445
EOS_Close	0.001737
ETC_Close	0.003829
ETH_Close	0.005792
FIL_Close	0.012164
LINK_Close	0.007935
LTC_Close	0.003443
MKR_Close	0.005508
THETA_Close	0.021908
TRX_Close	0.003641
VET_Close	0.009427
XLM_Close	0.004256
XMR_Close	0.002450
XRP_Close	0.002554



STEP 3: APPROACH TO ACHIEVE OUR GOALS

Return based on 925 days of data, from 2018

EOS_Close	1.606677
BCH_Close	2.020422
XMR_Close	2.266445
XRP_Close	2.362054
LTC_Close	3.185112
TRX_Close	3.367811
ETC_Close	3.542166
XLM_Close	3.936489
BTC_Close	4.240486
MKR_Close	5.094571
ETH_Close	5.357198
LINK_Close	7.339664
VET_Close	8.719679
FIL_Close	11.252054
BNB_Close	11.694454
ADA_Close	11.896824
THETA_Close	20.265084
DOGE_Close	25.387016

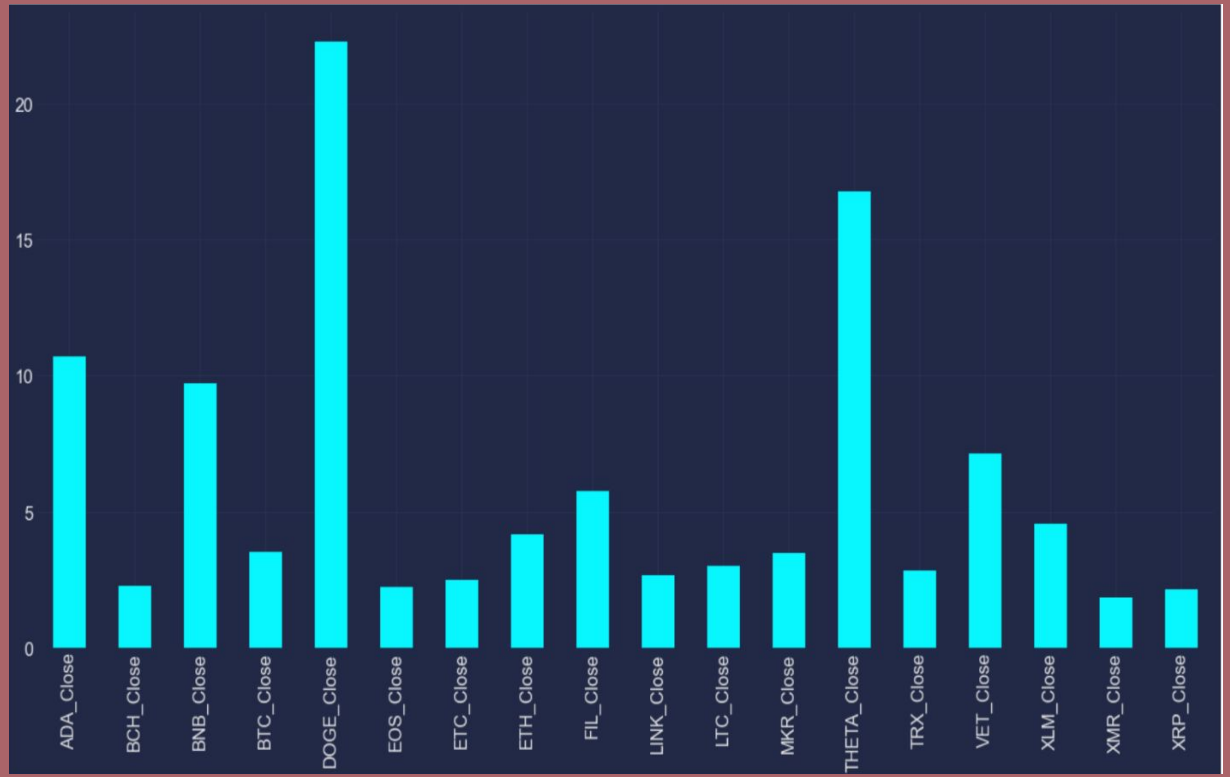



```
[94]: ############################################################
      spx_annual = spx_daily_returns.mean() * spx_daily_returns.count()
      spx_annual
[94]: 0.5293591238183528
```

STEP 3: APPROACH TO ACHIEVE OUR GOALS

Annualized Standard Deviation

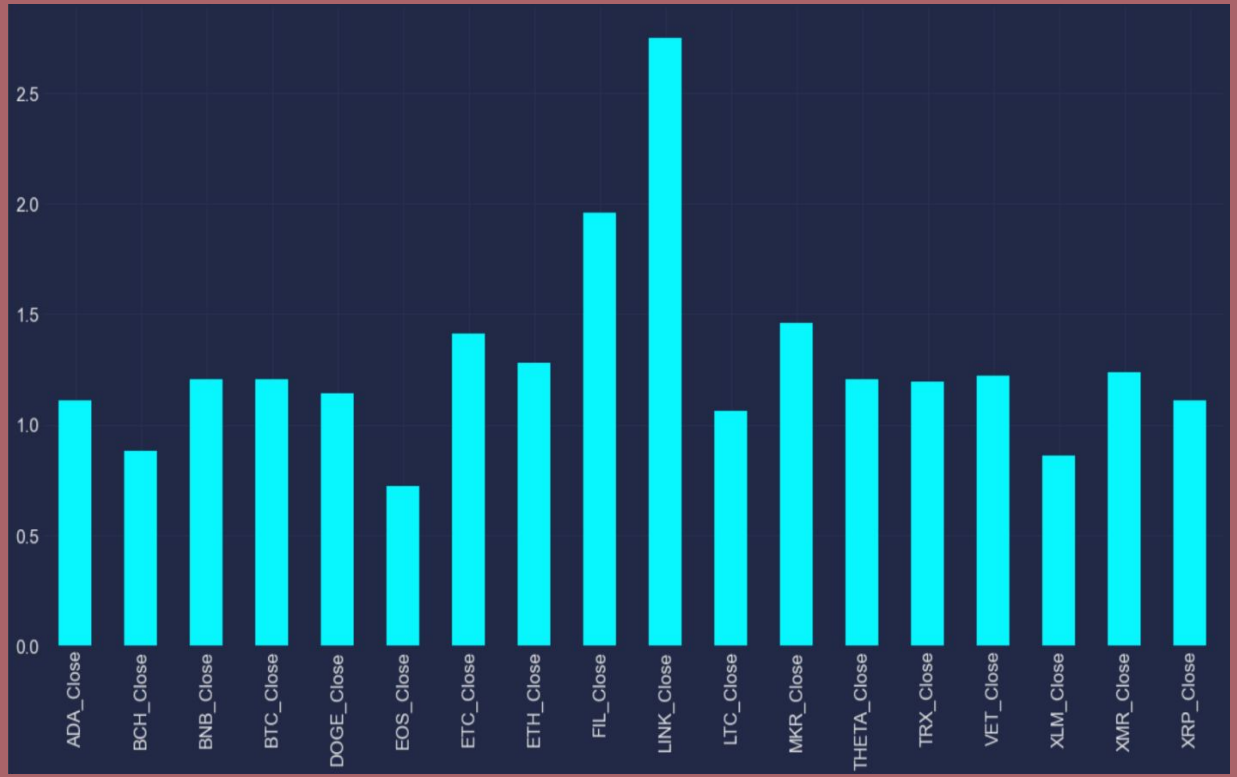
XMR_Close	1.832947
XRP_Close	2.131397
EOS_Close	2.222254
BCH_Close	2.293570
ETC_Close	2.506549
LINK_Close	2.671037
TRX_Close	2.826540
LTC_Close	2.998819
MKR_Close	3.494529
BTC_Close	3.524959
ETH_Close	4.189844
XLM_Close	4.568135
FIL_Close	5.751372
VET_Close	7.142779
BNB_Close	9.726643
ADA_Close	10.704584
THETA_Close	16.789641
DOGE_Close	22.271780



STEP 3: APPROACH TO ACHIEVE OUR GOALS

Sharpe Ratio

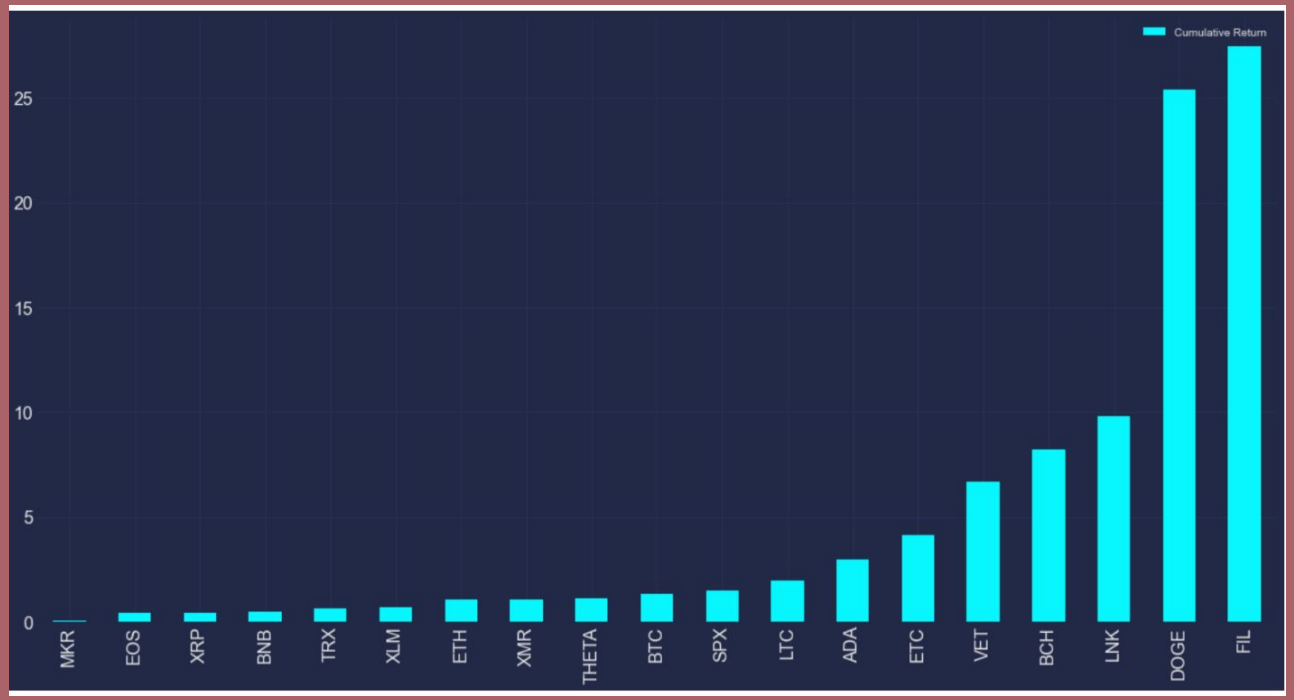
EOS_Close	0.722994
XLM_Close	0.861728
BCH_Close	0.880907
LTC_Close	1.062122
XRP_Close	1.108218
ADA_Close	1.111377
DOGE_Close	1.139874
TRX_Close	1.191496
BNB_Close	1.202311
BTC_Close	1.202989
THETA_Close	1.206999
VET_Close	1.220768
XMR_Close	1.236503
ETH_Close	1.278615
ETC_Close	1.413164
MKR_Close	1.457871
FIL_Close	1.956412
LINK_Close	2.747871



STEP 3: APPROACH TO ACHIEVE OUR GOALS

Monte Carlo Simulation

	Cumulative Return
MKR	0.023571
EOS	0.427302
XRP	0.440629
BNB	0.466771
TRX	0.656576
XLM	0.679494
ETH	1.029807
XMR	1.036915
THETA	1.117050
BTC	1.301272
SPX	1.498730
LTC	1.969878
ADA	2.956884
ETC	4.137720
VET	6.674055
BCH	8.235274
LNK	9.790649
DOGE	25.390810
FIL	27.442322



Number of simulation = 1000 / Number of trading days = 630

STEP 3: APPROACH TO ACHIEVE OUR GOALS

Calmar Ratio

ADA Calmar Ratio 1.0723
BTC Calmar Ratio 0.9438
ETH Calmar Ratio 1.2029
BCH Calmar Ratio 0.0440
BNB Calmar Ratio 3.7606
DOGE Calmar Ratio 1.7295
EOS Calmar Ratio 0.2838
ETC Calmar Ratio 0.5757
LINK Calmar Ratio 1.5361
LTC Calmar Ratio 0.6912
TRX Calmar Ratio 0.8909
XLM Calmar Ratio 1.0365
XMR Calmar Ratio 1.0566
XRP Calmar Ratio 0.9891

STEP 4: RESULTS AND CONCLUSION

COIN ANALYSES SUMMARY

WEIGHT:	45%		10%		45%			
	SHARPE RATIO		MC SIM (x10)		CALMAR RATIO		WEIGHTED	OVERALL
COIN	SCORE	RANK	SCORE	RANK	SCORE	RANK	SCORE	RANK
MKR	1.457871	16	0.81330	13	3.81489	17	16.15	1
LINK	2.747871	18	0.54000	6	2.78479	15	15.45	2
ETH	1.278615	14	0.60670	7	2.11822	14	13.30	auto
BNB	1.202311	9	0.48000	4	8.09126	18	12.55	3
THETA	1.206999	11	0.84000	14	1.93608	13	12.20	4
XMR	1.236503	13	0.67330	9	1.84708	10	11.25	5
FIL	1.956412	17	0.88000	17	0.68344	3	10.70	
DOGE	1.139874	7	0.42670	3	3.28809	16	10.65	
ETC	1.413164	15	0.88000	16	0.92600	5	10.60	
ADA	1.111377	6	0.86670	15	1.86710	11	9.15	
BTC	1.202989	10	0.66000	8	1.58107	8	8.90	auto
VET	1.220768	12	0.81330	12	0.89717	4	8.40	
TRX	1.191496	8	0.77330	11	1.50821	7	7.85	
XLM	0.861728	2	0.69330	10	1.88105	12	7.30	
XRP	1.108218	5	0.51330	5	1.76523	9	6.80	
LTC	1.062122	4	0.08000	1	1.13235	6	4.60	
BCH	0.880907	3	1.00000	18	0.06435	1	3.60	
EOS	0.722994	1	0.34670	2	0.43409	2	1.55	

	40%/20%/40%	33%/33%/33%	45%/10%/45%
	OVERALL	OVERALL	OVERALL
COIN	RANK	RANK	RANK
MKR	1	1	1
LINK	2	2	2
THETA	3	3	4
BNB	4		3
FIL	5	4	
BTC	auto	auto	auto
ETH	auto	auto	auto
ETC		5	
XMR			5
ADA			
BCH			
DOGE			
EOS			
LTC			
TRX			
VET			
XLM			
XRP			

STEP 5: APPENDIX

- **Yahoo Finance**
  - https://finance.yahoo.com/quotes/API,Documentation/view/v1/

- **Github link**
  - https://github.com/aparkon/project_1.git