Fintech - Project 1

Project Trade 24/7

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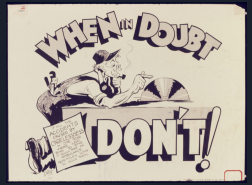
Motivation and Summary

Our Passion

The group members were highly curious to explore the cryptocurrency market, to develop an algorithm that would enable the user to decide whether to trade the selected coins based on certain parameters.

Key questions asked:

All the questions were designed to help determine whether its the right time to buy the selected coins or not.



- ➔ *Whether to "BUY" or "DON'T BUY" - [based on weights and investment value].*
- ➔ *Do you need a Diversified Crypto Portfolio to Spread Risk?*
- ➔ *Does Bitcoin really lift the Altcoin market?*
- ➔ *How volatile is the crypto market?*

Summary:

- ❖ As a team, we were able to develop an algorithm which analyzes historical and current prices of selected crypto assets to determine whether to invest in those assets or not.
- ❖ Algorithm developed helped us answer our questions to our satisfaction but algorithm can be further fine tuned to give more accurate answers.

Questions & Data

Questions asked

- Whether to buy an asset or not?
- Do you need a Diversified Crypto Portfolio to Spread Risk?
  - Are the Crypt assets correlated to each other
- Does Bitcoin really lift the Altcoin market?
  - Is Bitcoin correlated to the Altcoins
- How volatile is the crypto market?
  - How can we identify trends in volatility?
  - Can we measure the volatility of the selected cryptos as compared to a benchmark crypto selected by the user ?
- What are possible outcomes if portfolio is held for 2 years?

Data required

- Historical and current price data of the crypto assets.
- Google Trends data.

Data Source

- Cryptocurrency exchange - Coinbase.
- Python libraries to access Coinbase API to fetch the required data.
- Google Trends python library to fetch the required data.

Data cleanup & Exploration

Exploration and Cleanup process:

- Researching appropriate python libraries.
- Integrating the libraries to get the data mainly from Coinbase and Google Trends.
- Used Pandas library to handle the data received from these libraries and all the analysis was done using the dataframes.
- Each component of the algorithm required different subset of the data acquired and logic to get that subset was coded in that component.

Insights:

- Realised that not all assets have historical data available.
- Disparities in prices between crypto assets is quite significant.
- Different exchanges have different prices of the assets.
- Different exchanges operate in different time zones and fiat currencies. Realised a need to establish a reference point. The reference point is:
  - Fiat currency : USD
  - Start date for historic data : 1st october 2019
  - Time zone : UTC
  - Data format : OHLCV (Open-High-Low-Close-Volume) as a DataFrame
- Tickers are not universal across exchanges.

Problems:

- Once the reference point was established, data received was in the expected format.

Interesting figures:

- Coinbase API does not have historical data for some of the popular cryptocurrencies like Dogecoin, Cosmos, Cardano etc.

Data Analysis

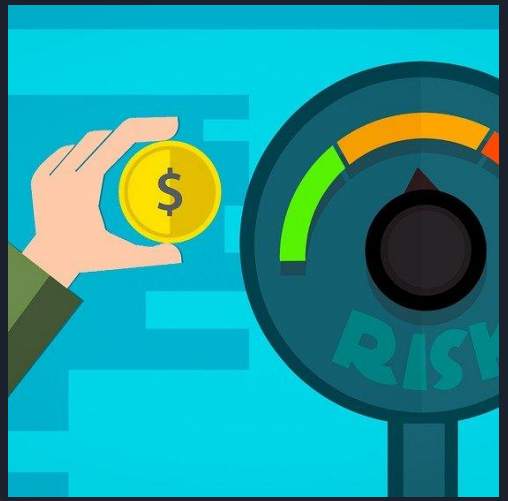
Buy Analysis

Question : Whether it is the right time to buy the asset or not?

- ➔ This is the core question our team wanted to answer. In order to answer it, we researched if any algorithm exists that would help in answering this question. After a bit of research, we found a Medium article in which the author describes his algorithm which helped him get **29% return** in trading Bitcoins over 90 days. Here is the link to the article.
- ➔ The article describes how the author used sentiment analysis by using Google Trends data to calculate “Buy Bitcoin”/”BTC USD” ratio and closing prices.
- ➔ Based on his observation, ***“Buy Bitcoin”/”BTC USD” ratio is more than 35% and closing price difference is more than 80$ then its best time to buy.***
- ➔ With Project Trade 24/7, our team have strived to automate this algorithm and expand it out to other coins and help user decide whether to BUY or NOT BUY at that point in time.

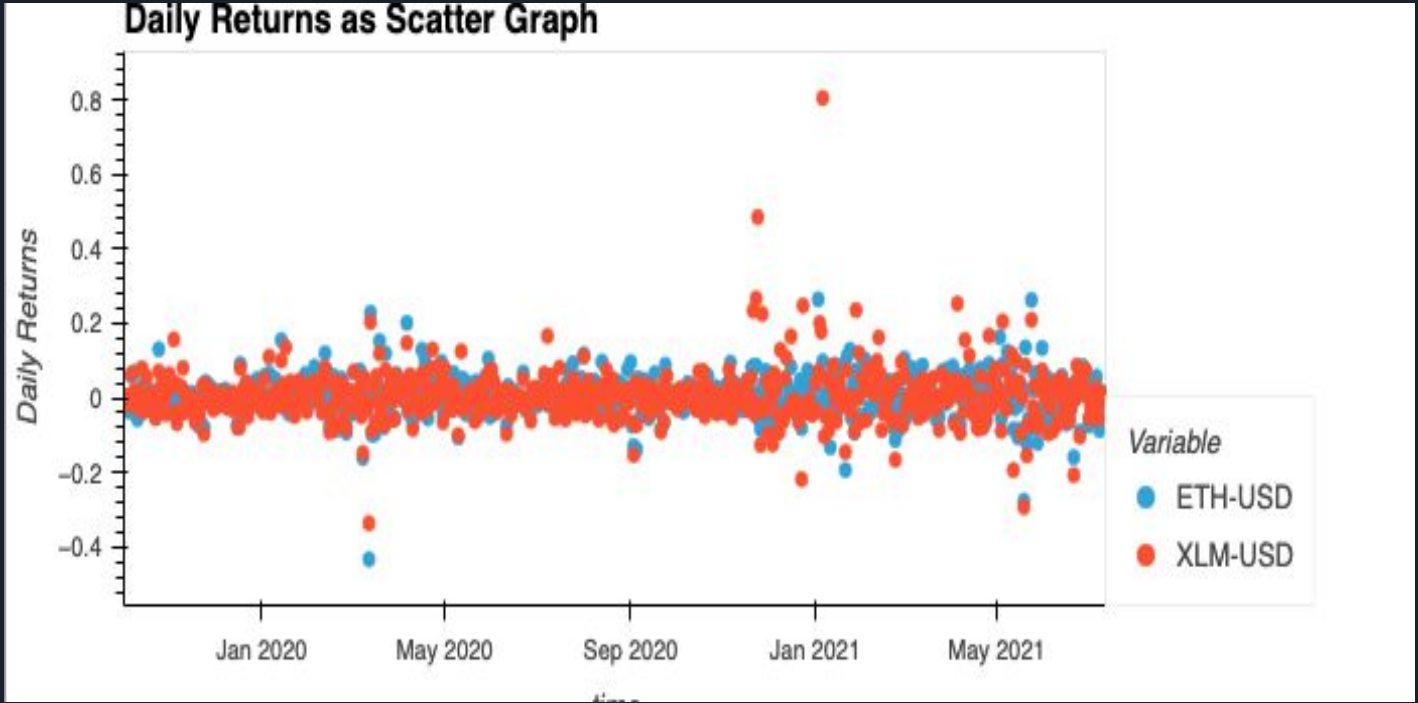
#	Ticker	Google Trend Ratio	Close Price Difference	Action	User Notified
0	ETH-USD	65.116279	-3.08	DON'T BUY	SM9d215ba6a3e14d4496d178722fb5fa7f ETH-USD:DON'T BUY XLM-USD:DON'T BUY Please see the da
1	XLM-USD	0.0	0.000022	DON'T BUY	SM9d215ba6a3e14d4496d178722fb5fa7f ETH-USD:DON'T BUY XLM-USD:DON'T BUY Please see the da

Risk Analysis



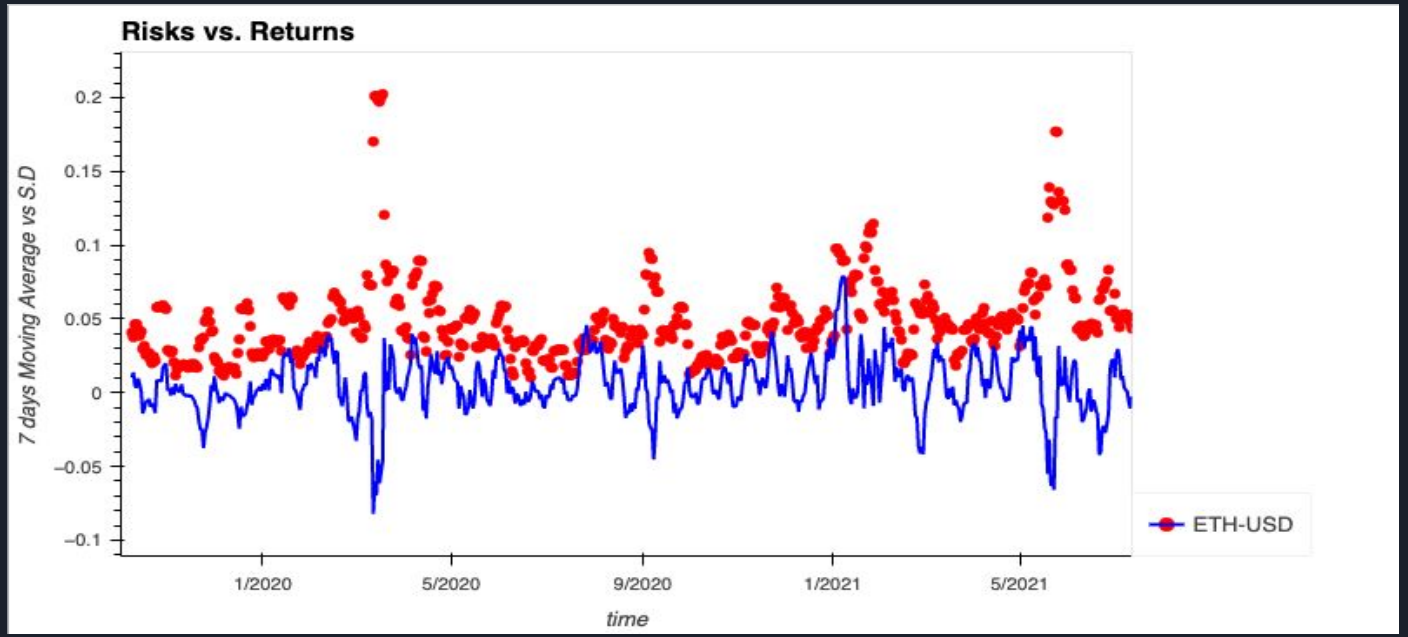
Question : How can we identify trends in volatility?

- ➔ Plotting Daily returns as a scatter graph would allow to analyze the price outliers
- ➔ Helps to identify the outliers and buying/selling opportunities



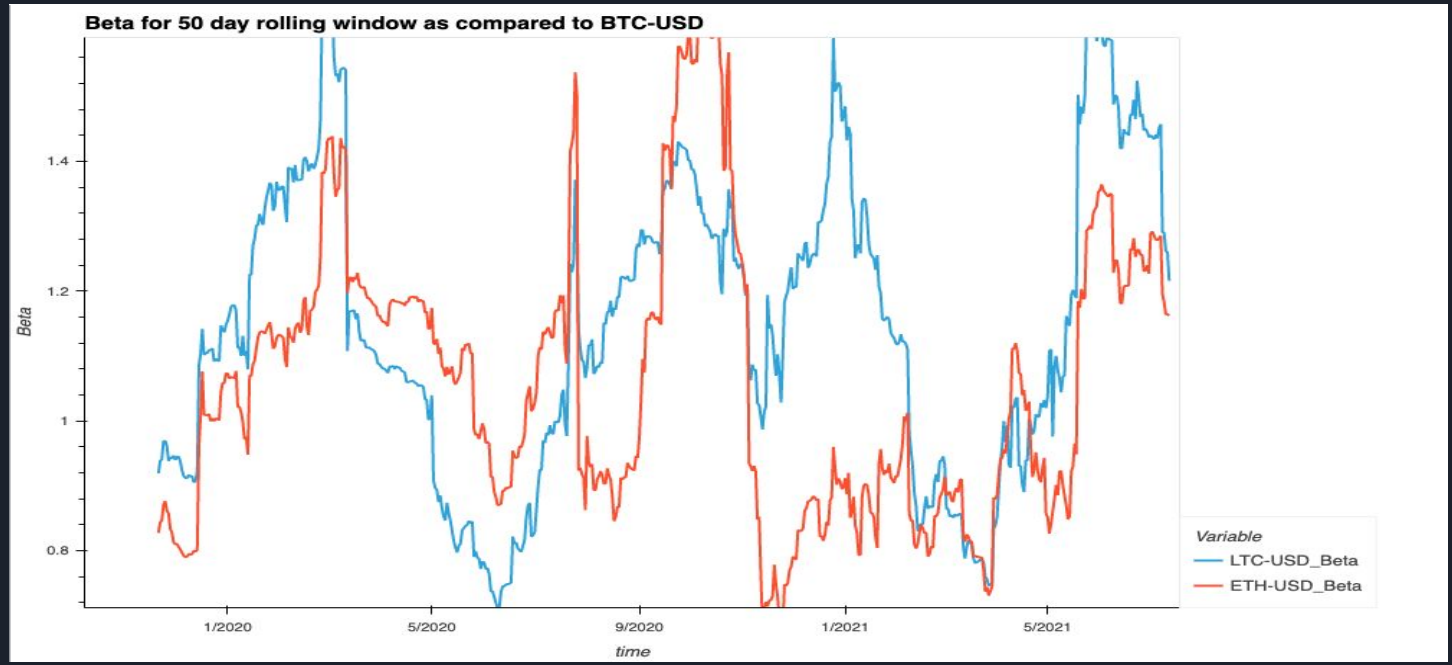
Question : How can we identify trends in volatility for 7 days rolling window?

- ➔ It smooths out regular daily fluctuations
- ➔ When the crypto has a low standard deviation, indicating low volatility or inactive market, then a breakout (price spike) may emerge.
- ➔ When the standard deviation is high, signaling a high volatility market, then a decrease in activity level is expected.



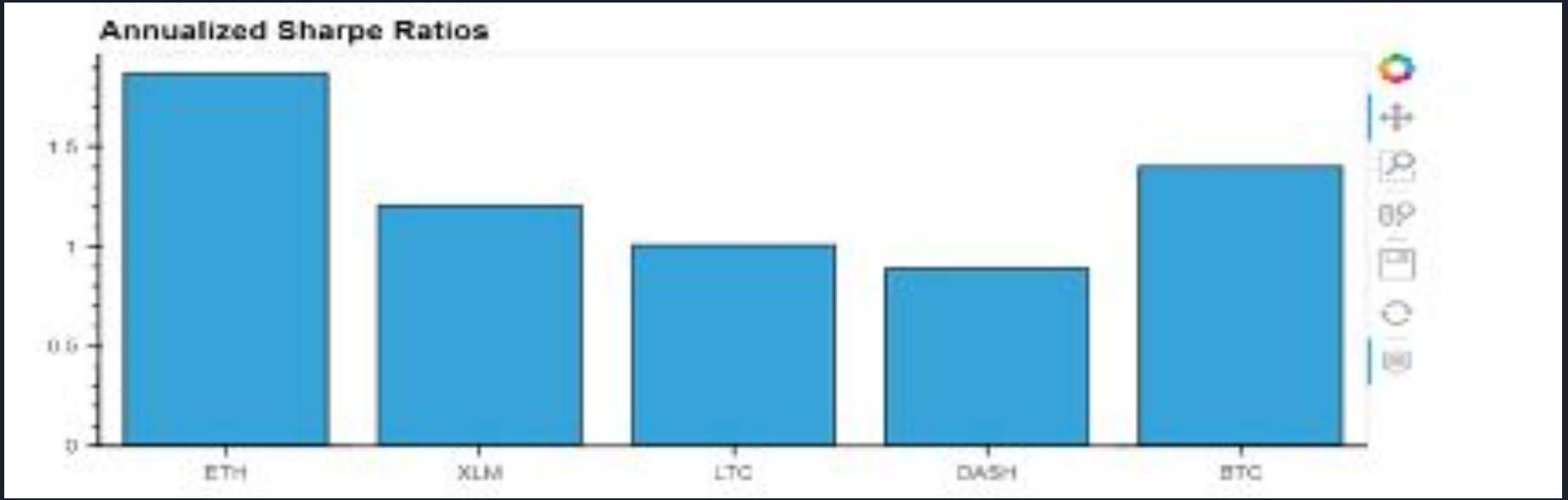
Question : Can we measure the volatility of the selected cryptos as compared to a benchmark crypto selected by the user ?

- ➔ Trade 24/7 algorithm is designed to allow users to choose multiple cryptos to analyse
- ➔ For Beta Analysis, BTC 's returns are used as a benchmark for other Crypto Tokens.
- ➔ All the selected Cryptos have higher Beta vs. Bitcoin

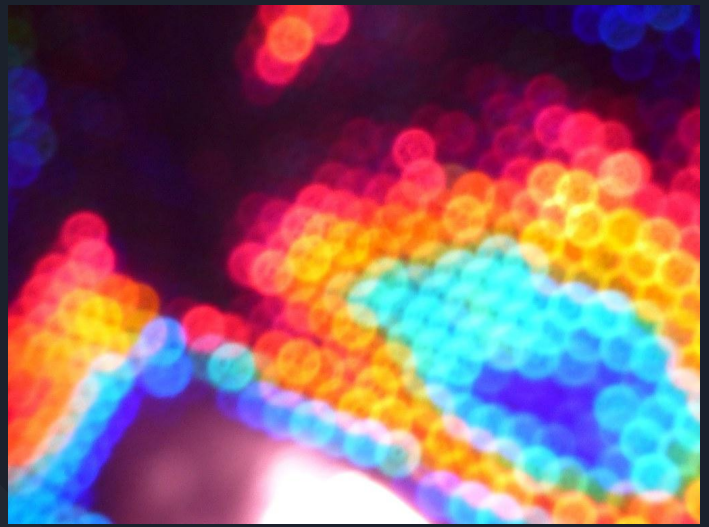


Question : Can we justify the potential risks associated with expected returns i.e risk adjusted returns?

- ➔ No. of working days- 365
- ➔ No Single analysis is enough to rely on. Better to use combination of different analysis
- ➔ Historical trends cannot be guaranteed to be repeated in future
- ➔ Investing in cryptos is risky and speculative

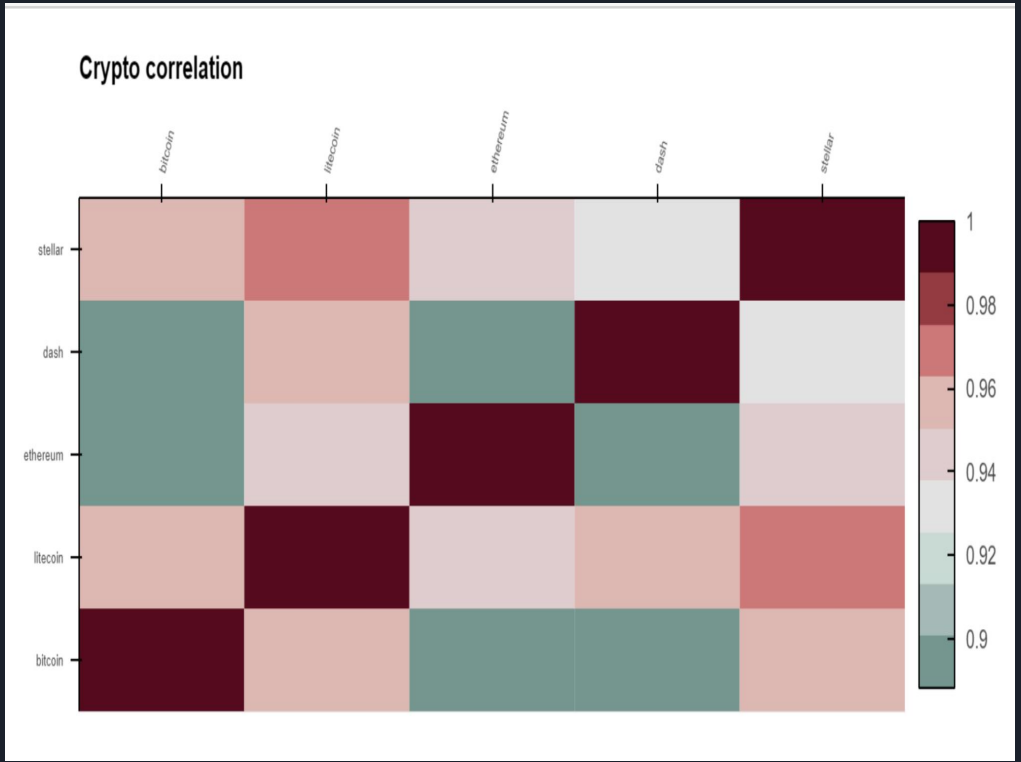


Correlation Analysis



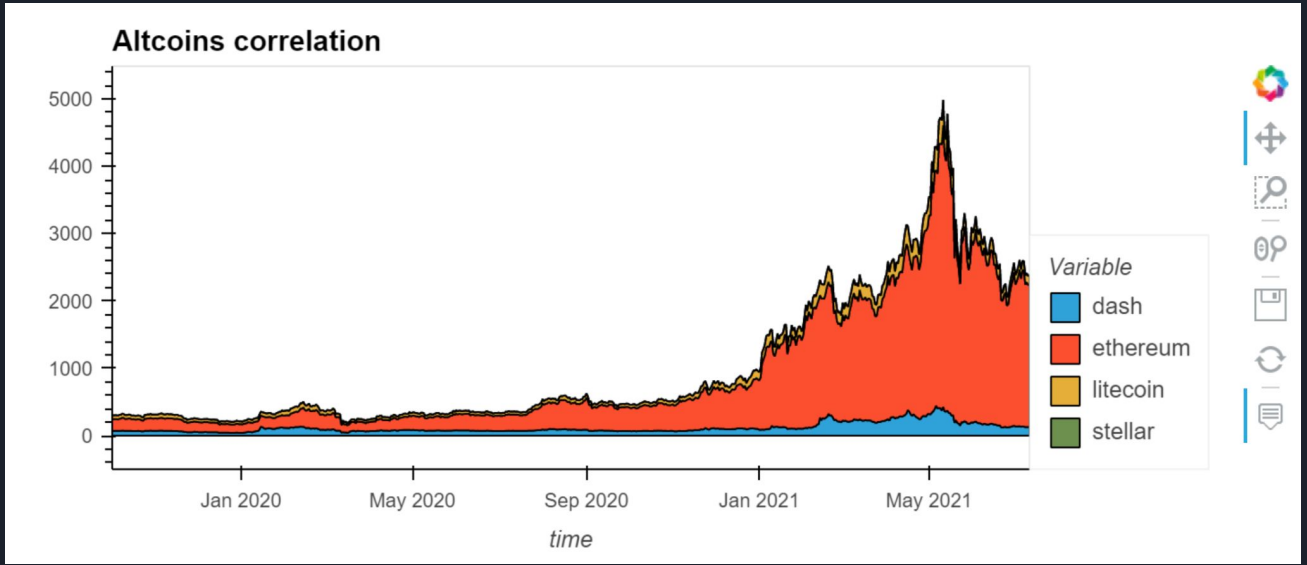
Question : Do you need a Diversified Crypto Portfolio to Spread Risk?

- The HvPlot heatmap shows a very strong positive relationship between bitcoin and the altcoins
- The least correlated cryptos in the sample are Ethereum and Dash with 0.889098
- The strongest relationships was seen between Litecoin & Stellar; Litecoin and Tether with both having 0.974922
- Maybe in the near future we could use Litecoin to predict the movements of Stellar and Tether



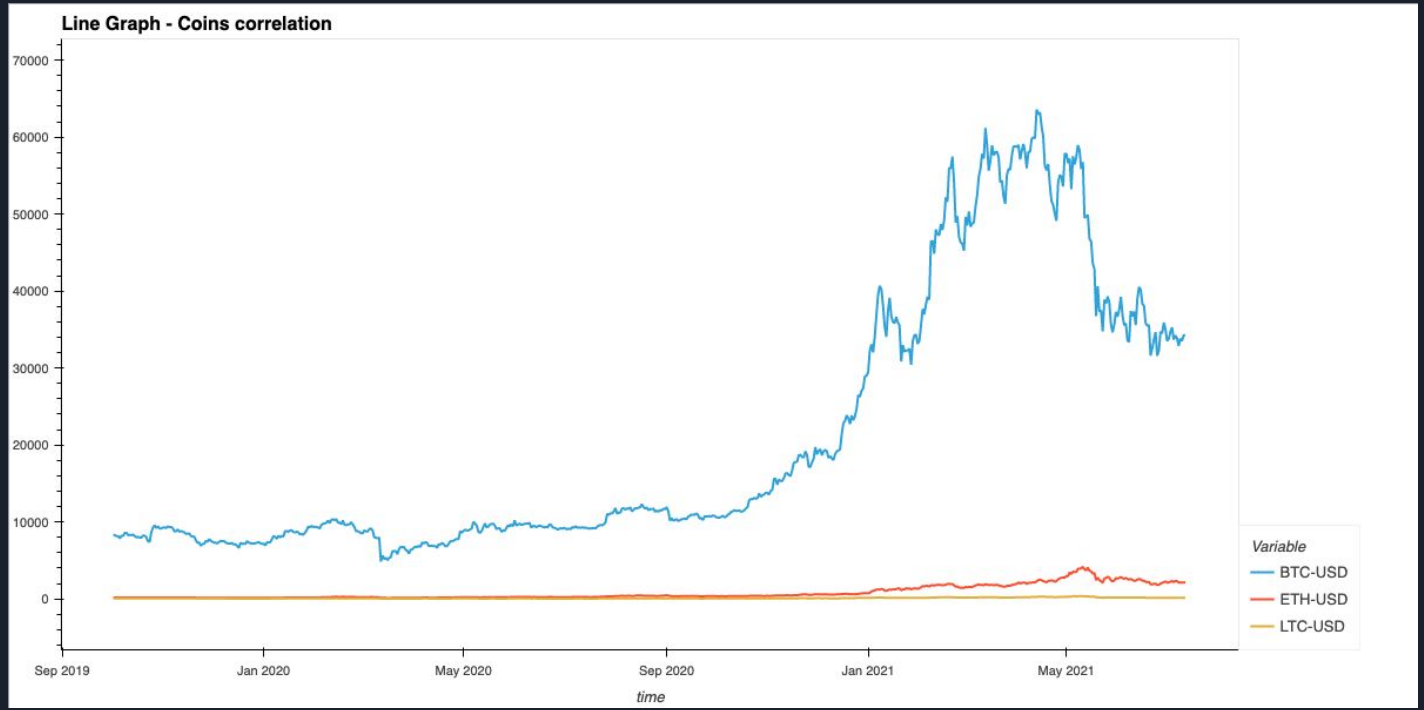
Question : Do you need a Diversified Crypto Portfolio to Spread Risk?

- ➔ The HvPlot area map also shows a very strong positive relationship between the altcoins themselves.
- ➔ Conclusion - A diversified crypto portfolio is anywhere from possible at this stage
- ➔ Maybe the correlations between crypto assets and the traditional assets (S&P 500) would be a good area to study in terms of a diversified portfolio.



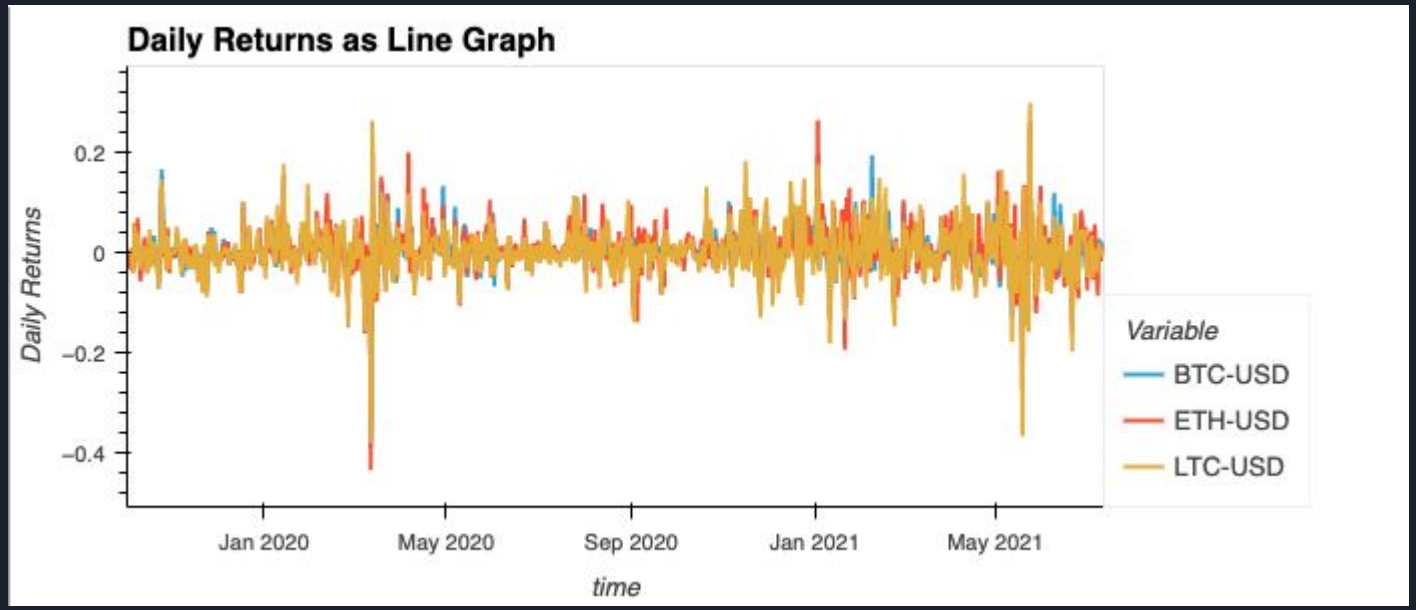
Question : Does Bitcoin really lift the Altcoin market?

➔ Bitcoin changed significantly from the beginning of 2021 and we saw some movements as well with the Altcoins with some even doubling in value



Question : Does Bitcoin really lift the Altcoin market?

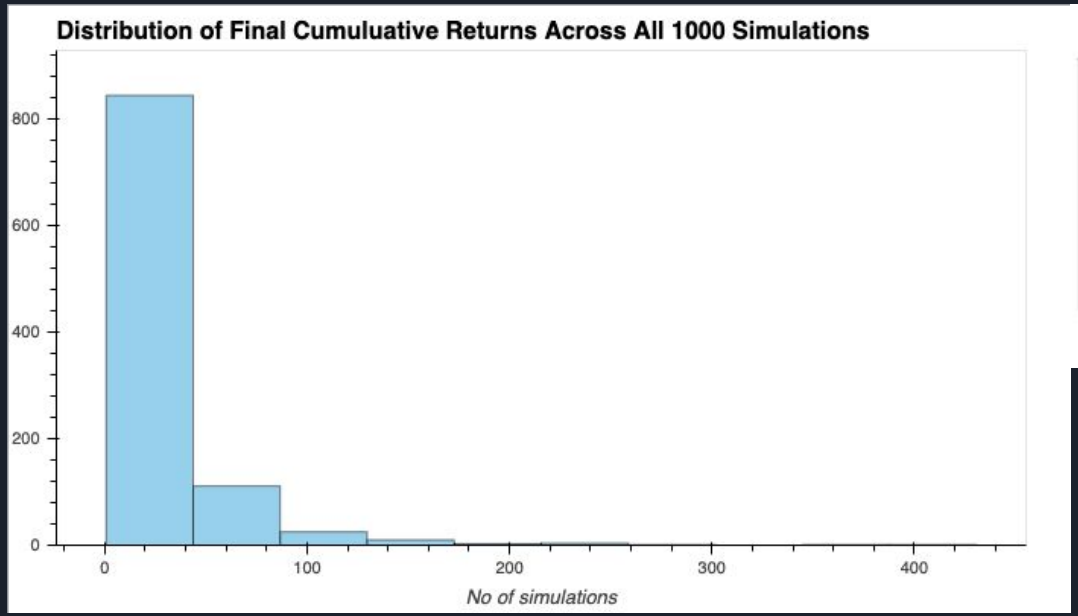
- ➔ Ethereum is one of the most trusted crypto aside from Bitcoin and is seen as the silver to Bitcoin's gold. It is the hope of the Altcoin market that the start of its bullish momentum could be the start of the so-called altcoin season
- ➔ Understanding how the prices of bitcoin relative to other cryptos move is certainly a developing and uncertain space



Future Predictions

Question : What are possible outcomes if portfolio is held for 2 years?

- ➔ We assign weights based on the user preference or risk appetite to obtain a diversified portfolio to ensure a bare minimum loss for the user.
- ➔ Simulating over 1000 scenarios of cumulative portfolio return trajectories over 2 years (365 trading days) as the market is 24/7 active with the initial investment of $1000.



#	Statistic	Value
0	25%	9,027.56
1	50%	19,448.6
2	75%	600,317.65
3	95%_lower	2,298.65
4	95%_upper	189,581.15

Postmortem

Challenges

- ➔ Issues with the environment when plotting the graphs: reached out to BCS Support and shared the learnings with the group.
- ➔ Using Github in a group environment: Went through Github tutorial as a group and learnt how to work with branches.
- ➔ Managing everyone's time and priorities: regularly communications via slack and regular check ins via Google meet to discuss the progress.
- ➔ Integrating the messaging platform "Twilio" to send out sms : reading the documentations and trial and error.

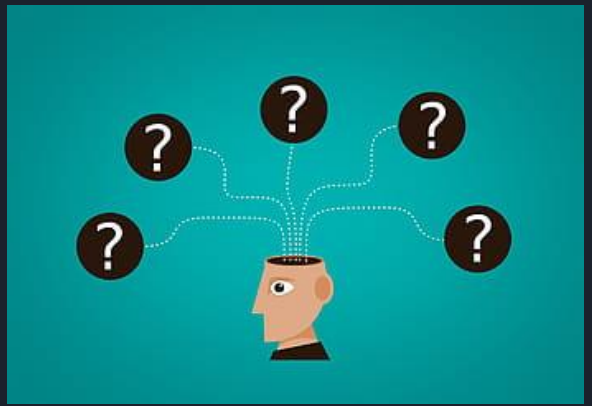
Additional Questions

- ➔ We would like to answer the question "when is the best time to sell" as well.
- ➔ Testing out the algorithm in a live environment, fine tuning it and better forecasting methods.
- ➔ What are the better modelling techniques.

What would we research if we had two more weeks

- ➔ Correlation between crypto and the stock markets.
- ➔ Are there better graphing libraries?
- ➔ How to improve the accuracy of the algorithm?
- ➔ Are there better algorithms to trade cryptos?

Questions?



Thank you