
**Indian Institute of Technology, Kanpur**
**Department of Computer Science and Engineering**

**CS685A: Data Mining**
**Project Report**

# Cryptocurrency Data Ananlysis

**Under the guidance of**
**Prof. Arnab Bhattacharya**
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**Group 21**

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# Contents

# 1 Abstract

Cryptocurrency is a new type of digital currency circulating in the market. With Bitcoin invented in 2009, there are now over 2,000 types of cryptocurrencies and has a total market value more than 1 Trillion US Dollars [https://coinmarketcap.com]. The price movement is exciting like roller coaster, while people are interested in investing in this asset, they really don't know much about this virtual asset.

In this project, we are analyzing the historical cryptocurrency dataset containing various aspects like day-to-day opening and closing prices and volume circulating along with market capitalization and try to answer some interesting questions using data analysis.

We have also compared this asset with some traditional investment options like Gold and Stocks ( S & P 500 Index(US) and Nifty 50 (India) Index).

# 2 Problem Statement

Since the cryptocurrency has drawn much attention, many a people are interested in invested in this digital asset. But this market possesses potential risk for investors and to tackle this a proper analysis of historical data is required which is not yet done. Many investors become greedy after seeing the returns given by this asset but don't think about the risk involved and hence many times face huge financial losses. Our study will give a fair idea about the risk involved and the different options available for investment.

We have analysed the top 100 cryptocurrencies circulating in the market in different aspects and compared them on the basis of various factors.

# 3 Data Preparation

## 3.1 Data Collection

### 3.1.1 Cryptocurrencies Dataset

We have taken day-by-day historical data of top 100 cryptocurrencies from "https://coinmarketcap.com" where the duration of analysis is from 1st January 2015 or from the day of inception (whichever is earlier) till 11th November 2021. The source conatins the data for all the 100 cryptocurrencies individually and not in combined form. So we have taken the data for each cryptocurrency and combined them to form a large single dataset

containing all the data at one place so that the analysis will be easy.

The dataset have columns as follows:

1. Name : Name of the currency
2. Symbol : Symbol of the currency in market
3. Rank : Rank of the currency according to closing price on 11th Nov 2021
4. Date : Date of observation
5. Open : Opening price of the currency on that date
6. High : Day high of the currency on that date
7. Low : Day low of the currency on that date
8. Close : Closing price of the currency on that date
9. Volume : Volume traded of the currency on that date

The dataset is as follows:

| | Name | Symbol | Rank | Date | Open | High | Low | Close | Volume | Market |
|---|---|---|---|---|---|---|---|---|---|---|
| **2506** | Bitcoin | BTC | 1 | 2021-11-11 | 64978.89000 | 65579.01000 | 64180.49000 | 64949.96000 | 3.588063e+10 | 1.225640e+12 |
| **4795** | Ethereum | ETH | 2 | 2021-11-11 | 4635.45000 | 4778.06000 | 4580.99000 | 4730.38000 | 1.793320e+10 | 5.596220e+11 |
| **6366** | Binance Coin | BNB | 3 | 2021-11-11 | 615.46000 | 634.84000 | 606.41000 | 629.89000 | 2.341653e+09 | 1.050670e+11 |
| **8813** | Tether | USDT | 4 | 2021-11-11 | 1.00000 | 1.00000 | 0.99800 | 1.00000 | 8.397083e+10 | 7.390663e+10 |
| **9394** | Solana | SOL | 5 | 2021-11-11 | 233.91000 | 246.45000 | 229.75000 | 234.24000 | 2.693457e+09 | 7.096338e+10 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **109530** | Zilliqa | ZIL | 96 | 2021-11-11 | 0.10240 | 0.10550 | 0.10070 | 0.10330 | 1.015481e+08 | 1.237856e+09 |
| **110880** | TrueUSD | TUSD | 97 | 2021-11-11 | 0.99970 | 1.00000 | 0.99780 | 1.00000 | 1.199213e+08 | 1.203523e+09 |
| **111865** | Ankr | ANKR | 98 | 2021-11-11 | 0.11770 | 0.12230 | 0.11550 | 0.12060 | 8.963828e+07 | 9.844365e+08 |
| **113265** | Telcoin | TEL | 99 | 2021-11-11 | 0.02058 | 0.02137 | 0.02006 | 0.02115 | 2.281707e+07 | 1.163864e+09 |
| **113804** | UMA | UMA | 100 | 2021-11-11 | 14.16000 | 19.48000 | 13.96000 | 19.44000 | 3.317494e+08 | 1.238591e+09 |

### 3.1.2 Gold Dataset

The second dataset contains day-by-day price of gold in US Dollars and other foreign currencies but we have primarily focused on considering prices in US Dollars only since our cryptocurrency dataset also have prices in US Dollars. We have fetched the gold prices dataset from an API which is as follows.

```
from datetime import datetime
start = datetime(2021, 1, 1)
end = datetime(2021, 11, 11)
# GOLD PRICE
import quandl
quandl.ApiConfig.api_key = 'jou3Hy9N_sKPZxy9mgxt'
gold_price = quandl.get("LBMA/GOLD", start_date = start, end_date = end)
gold_price.tail()
```

| Date | USD (AM) | USD (PM) | GBP (AM) | GBP (PM) | EURO (AM) | EURO (PM) |
|---|---|---|---|---|---|---|
| 2021-11-05 | 1793.20 | 1801.85 | 1335.58 | 1338.23 | 1554.70 | 1562.92 |
| 2021-11-08 | 1818.00 | 1822.35 | 1347.87 | 1344.71 | 1572.21 | 1574.51 |
| 2021-11-09 | 1824.40 | 1827.30 | 1341.85 | 1348.00 | 1573.18 | 1575.13 |
| 2021-11-10 | 1824.95 | 1859.40 | 1348.46 | 1375.21 | 1576.03 | 1608.57 |
| 2021-11-11 | 1859.25 | 1857.90 | 1387.93 | 1387.11 | 1620.89 | 1620.09 |

### 3.1.3 S & P 500 Index Dataset

We have also used a dataset containing day-by-day opening and closing prices of S & P 500 Index which is an index of US Stock Market.The code for fetching the dataset is as follows.

```
# S&P 500 INDEX
from pandas_datareader import data
stock_index = data.DataReader('^GSPC', 'yahoo', start, end)
stock_index.tail()
```

| Date | High | Low | Open | Close | Volume | Adj Close |
|---|---|---|---|---|---|---|
| 2021-11-05 | 4718.500000 | 4681.319824 | 4699.259766 | 4697.529785 | 3491150000 | 4697.529785 |
| 2021-11-08 | 4714.919922 | 4694.390137 | 4701.479980 | 4701.700195 | 3465720000 | 4701.700195 |
| 2021-11-09 | 4708.529785 | 4670.870117 | 4707.250000 | 4685.250000 | 3110230000 | 4685.250000 |
| 2021-11-10 | 4684.850098 | 4630.859863 | 4670.259766 | 4646.709961 | 3581630000 | 4646.709961 |
| 2021-11-11 | 4664.549805 | 4648.310059 | 4659.390137 | 4649.270020 | 2623140000 | 4649.270020 |

### 3.1.4 Nifty50 Dataset

This dataset contains information about Indian Stock Exchange(NSE) Indicator Nifty 50.It includes its index value in Indian Rupees.The dataset is as follows.

| | Date | Open | High | Low | Close | Volume | Change |
|---|---|---|---|---|---|---|---|
| **0** | 01-01-2015 | 8272.80 | 8294.70 | 8248.75 | 8284.00 | 56.56M | 0.0002 |
| **1** | 02-01-2015 | 8288.70 | 8410.60 | 8288.70 | 8395.45 | 101.89M | 0.0135 |
| **2** | 05-01-2015 | 8407.95 | 8445.60 | 8363.90 | 8378.40 | 118.16M | -0.0020 |
| **3** | 06-01-2015 | 8325.30 | 8327.85 | 8111.35 | 8127.35 | 172.80M | -0.0300 |
| **4** | 07-01-2015 | 8118.65 | 8151.20 | 8065.45 | 8102.10 | 164.08M | -0.0031 |

## 3.2 Data Cleaning

### 3.2.1 Cryptocurrency Dataset

In this we have preprocessed the dataset and the metadata before preprocessing and after the preprocessing is as follows.Also we have changed the date formats.The combined dataset of all cryptocurrencies are then assigned their respective names , symbols and ranks according to the closing value of currency on 11th November 2021.

```
data=pd.read_csv("Dataset/bitcoin.csv")
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2507 entries, 0 to 2506
Data columns (total 7 columns):
 #   Column      Non-Null Count  Dtype 
---  ------      --------------  ----- 
 0   Date        2507 non-null   object
 1   Open*       2507 non-null   object
 2   High        2507 non-null   object
 3   Low         2507 non-null   object
 4   Close**     2507 non-null   object
 5   Volume      2507 non-null   object
 6   Market Cap  2507 non-null   object
dtypes: object(7)
memory usage: 137.2+ KB
```

```
crypto.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 113808 entries, 0 to 113807
Data columns (total 10 columns):
 #   Column  Non-Null Count   Dtype
---  ------  --------------   -----
 0   Name    113808 non-null  object
 1   Symbol  113808 non-null  object
 2   Rank    113808 non-null  int64
 3   Date    113808 non-null  datetime64[ns]
 4   Open    113808 non-null  float64
 5   High    113808 non-null  float64
 6   Low     113808 non-null  float64
 7   Close   113808 non-null  float64
 8   Volume  113808 non-null  float64
 9   Market  113808 non-null  float64
dtypes: datetime64[ns](1), float64(6), int64(1), object(2)
memory usage: 8.7+ MB
```

### 3.2.2 Nifty50 Dataset

In this the daily change in price is given in percentage and is converted into ratio. The dates are chnaged to proper format according to the format of Cryptocurrency Dataset. Finally, we have sorted the dataset according to date from oldest to newest.

# 4 Methodology and Analysis

We have tried to answer the following questions using the data analysis on the dataset available to us. Each of the following subsection contains the significance of the question and the analysis of its results.

## 4.1 Ranking Based on Closing Price

We have ranked the cryptocurrencies according to their closing prices dated on 11th November 2021. The closing price indicates the price on which the last trade of that cryptocurrency took place on that day.

The result of the analysis of this question is saved in a Comma Separated Values(CSV) file. An instance of this file is as follows:

| | Name | Rank | Close |
|---|---|---|---|
| **0** | Wrapped Bitcoin | 1 | 65114.200000 |
| **1** | Bitcoin | 2 | 64949.960000 |
| **2** | Bitcoin BEP2 | 3 | 64834.890000 |
| **3** | yearn.finance | 4 | 33814.520000 |
| **4** | Ethereum | 5 | 4730.380000 |
| **...** | ... | ... | ... |
| **95** | Revain | 96 | 0.014770 |
| **96** | Holo | 97 | 0.013960 |
| **97** | BitTorrent | 98 | 0.003832 |
| **98** | eCash | 99 | 0.000195 |
| **99** | SHIBA INU | 100 | 0.000057 |

100 rows × 3 columns

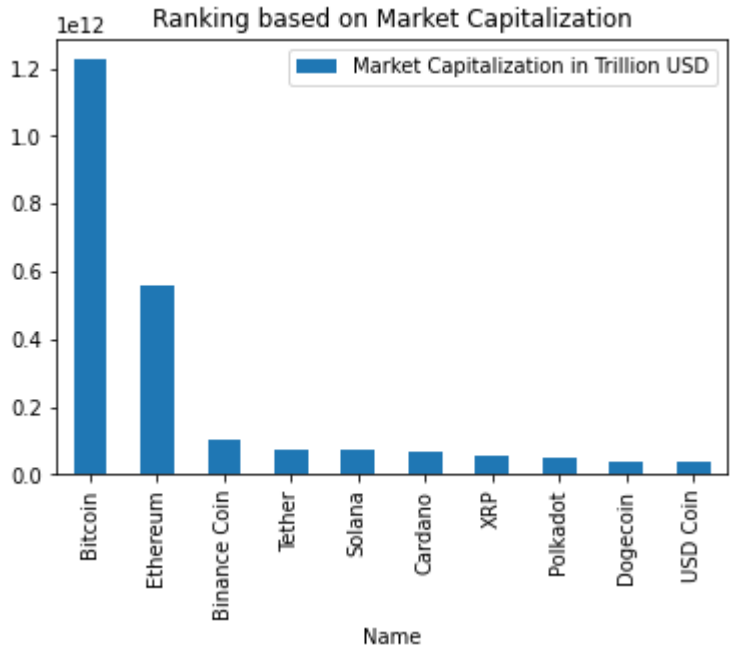
This ranking helps us to find what is the extent of the trade happening for each cryptocurrency on that day. We can see that "Wrapped Bitcoin" had the highest traded closing price and "SHIBA INU" had the lowest traded closing price on 11th November 2021.

## 4.2 Top 10 Cryptocurrencies According to Market Capitalization

Market capitalization (or market cap) is the total value of all the coins that have been mined. It's calculated by multiplying the number of coins in circulation by the current market price of a single coin.

The higher the market capitalization, the higher the number of coins in circulation and higher the price. Generally, the coin with higher market capitalization have a dominating share in the coin market.

The result of the analysis of this question is in the form of a bar graph with the Coin name on the X-axis and the Market Cap on the Y-axis in Trillion US Dollars ranked in decreasing order.

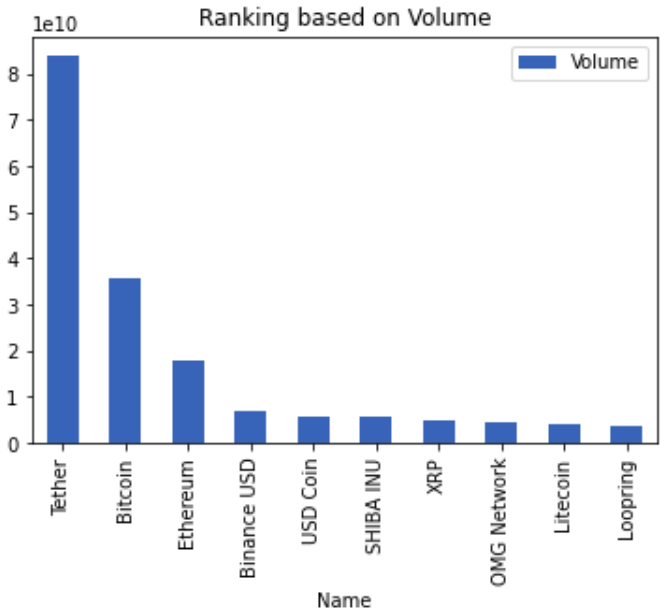



We can see that "Bitcoin" have the largest market cap (more than 1 Trillion US Dollars )among all other coins which indicates that it has the highest number of coins circulating in the coin market which is obvious since a large number of people are inclined towards investing in this coin.

## 4.3 Top 10 Cryptocurrencies According to Volume Traded

The volume of a particular Cryptocurrency found on a Coin Prices Index page is simply the total amount of coins traded in the last 24 hours. The date of our analysis is 11th November 2021 so the figures are according to this date.

Usually, the higher the volume of cryptocurrency transactions, the more liquid the crypto market will be. Liquidity is the ease of selling and buying the coin in the market. The higher the liquidity the higher the chances of getting the coin sold or bought in the market quickly.



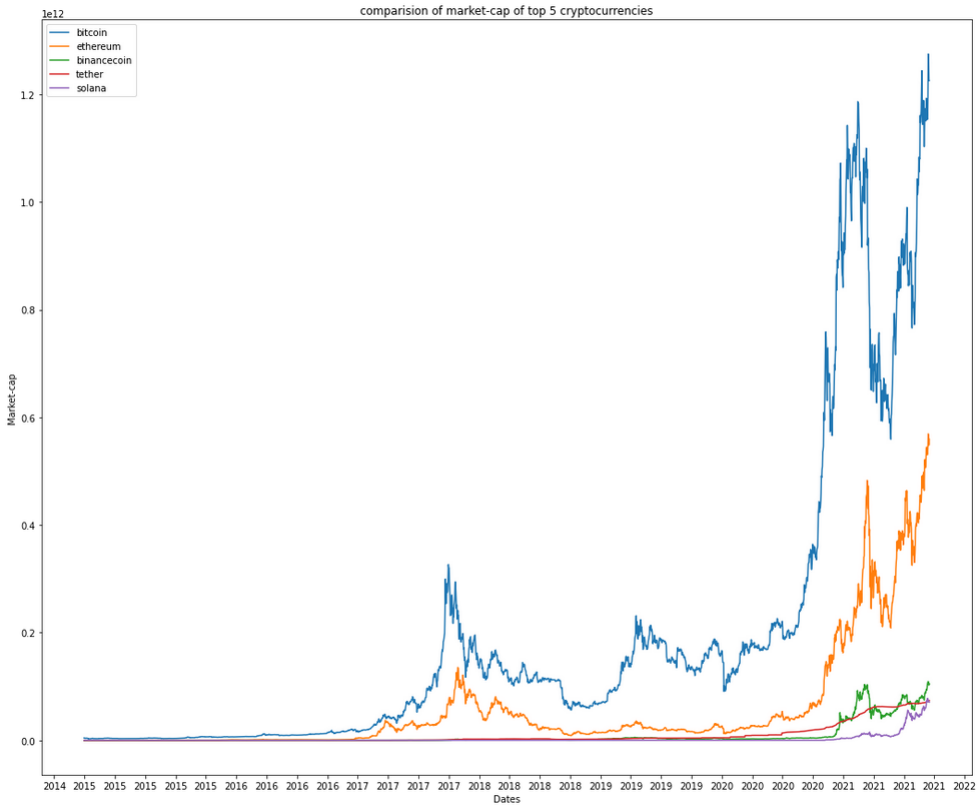

From the above graph, it is evident that "Tether" had the highest number of coins traded (more than 80 Billion units) on 11th November 2021. This also shows that "Tether" has more liquidity than "Bitcoin" despite "Bitcoin" having largest market capitalization.

### 4.4 Comparison of Top 5 cryptocurrencies according to Market Capitalization

This involves the comparison of top 5 cryptocurrencies on 11th November 2021 based on market capitalization. These coins are compared from 1st January 2015 or from the day of their inception till 11th November 2021 on daily basis.

This question helps us answer how the market capitalization is changing for these 5 coins. These 5 coins are the top 5 competitors in the coin market.

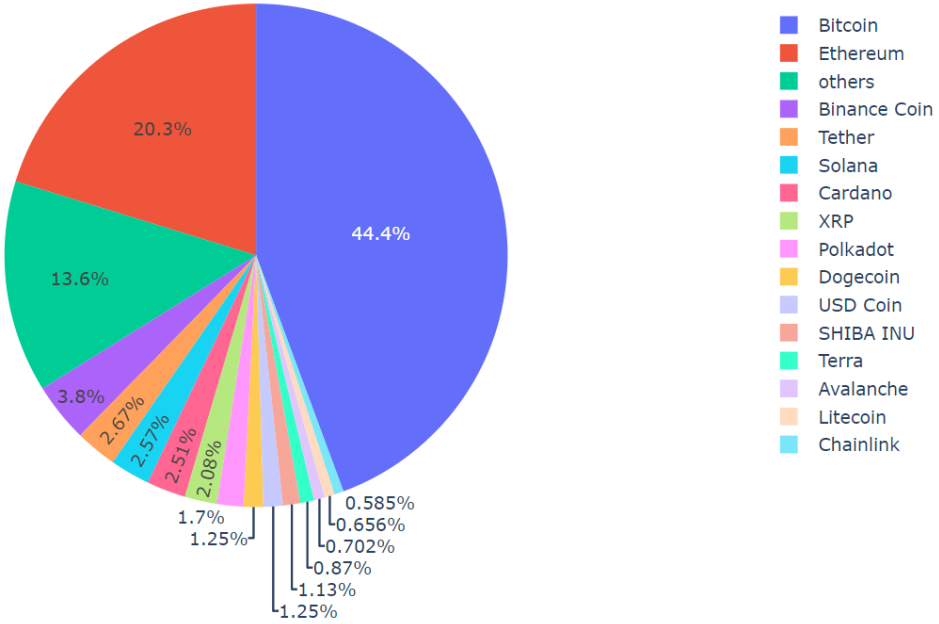
The output of this question is in the form of a graph where time period is on the X-axis and the market cap(in Trillion US Dollars) is on the Y-axis as shown:




## 4.5 Market Share according to Market Cap

This question helps us find the market share of all the cryptocurrencies circulating in the market according to market cap. This signifies that having a large share of market attracts more investors for investing in this coin. The coin which have relatively smaller share in the market have very less number of coin holders or investors in the coin market.

The output is in the form of a pie chart showing the percentage of market share of different coins in the market.




We can clearly see that "Bitcoin" is having the highest market share (44.4%) followed by "Ethereum" (20.3%) and the remaining other coins have individual market share less than 5%.

### 4.6 52 Week High and 52 Week Low

The 52-week high/low is the highest and lowest price at which a security, such as a cryptocurrency or a stock, has traded during the time period that equates to one year.

This indicates the highest and the lowest price that the coin have hit in the past 52 weeks or 1 year. Now by comparing the current price of the coin with these values, one can get an estimate of whether the current valuation is overvalued or undervalued before making an investment decision.

The output for this question is a comma separated values (CSV) file which gives the 52 week high and low values and the dates on which these values were hit.

| | Currency-Name | 52-week-high | Date-high | 52-week-low | Date-low |
|---|---|---|---|---|---|
| **83** | 0KB | 44.170000 | 03-05-2021 | 1.250000 | 17-05-2019 |
| **94** | Aave | 666.860000 | 18-05-2021 | 0.000000 | 10-02-2020 |
| **35** | Algorand | 3.280000 | 21-06-2019 | 0.102400 | 13-03-2020 |
| **44** | Amp | 0.121100 | 16-06-2021 | 0.000795 | 17-11-2020 |
| **68** | Ankr | 0.225200 | 28-03-2021 | 0.000711 | 13-03-2020 |
| **...** | ... | ... | ... | ... | ... |
| **98** | XRP | 3.840000 | 04-01-2018 | 0.004041 | 02-12-2015 |
| **30** | Zcash | 5941.800000 | 29-10-2016 | 18.940000 | 13-03-2020 |
| **85** | Zilliqa | 0.256300 | 06-05-2021 | 0.002477 | 13-03-2020 |
| **93** | eCash | 0.005112 | 11-10-2021 | 0.000017 | 20-07-2021 |
| **12** | yearn.finance | 93435.530000 | 12-05-2021 | 739.440000 | 21-07-2020 |

100 rows × 5 columns

## 4.7 Top 5 gainers and Least 5 gainers in the past 1 year

This question gives us the list of top 5 and least 5 gainers in the past 1 year from 12th November 2020 to 11th November 2021. The gains are calculated in terms of US Dollars that the coin has given in this time span. This signifies the performance of different coins in the last 1 year. The investors can have a rough idea about the risk involved by investing in these 10 coins.

The output for this question is a comma separated values (CSV) file which gives the top 5 gainers and the least 5 gainers along with their returns in this time span.

| | Currency-Name | Type | Gain |
|---|---|---|---|
| **53** | Wrapped Bitcoin | Gainer | 49874.410000 |
| **28** | Bitcoin | Gainer | 49659.050000 |
| **27** | Bitcoin BEP2 | Gainer | 46174.380000 |
| **12** | yearn.finance | Gainer | 15620.020000 |
| **87** | Ethereum | Gainer | 4280.700000 |
| **19** | Binance USD | Gainer | 0.000100 |
| **70** | SHIBA INU | Gainer | 0.000057 |
| **99** | Tether | Gainer | 0.000000 |
| **16** | Dai | Gainer | 0.000000 |
| **34** | USD Coin | Gainer | -0.000100 |

We can see that the "Wrapped Bitcoin" is having the highest gain of 49874.41 USD whereas the "USD Coin" is having the least gain of -0.0001 USD. This obviously means that "USD Coin" was a risky investment option.

### 4.8 Maximum one-day loss and Maximum one-day gain

This question tells us the maximum one-day loss and gain for each coin from 1st January 2015 or the day of inception till 11th November 2021. The gain is calculated by subtracting the opening price from the closing price on that particular day and the day having highest one-day gain and loss is reported for each cryptocurrency.

This signifies that the investors who invested in a coin on on the day of maximum gain had the huge profit and the ones who invested on the day of maximum loss had a huge loss.

The output for this question is a comma separated values (CSV) file which gives the day of maximum loss and the day of maximum gain along with the respective loss and gain values for each coin.

| | Currency-Name | Maximum-loss | Loss-Date | Maximum-gain | Gain-Date |
|---|---|---|---|---|---|
| **83** | 0KB | 8.910000 | 19-05-2021 | 13.010000 | 01-05-2021 |
| **94** | Aave | 210.860000 | 19-05-2021 | 100.150000 | 02-04-2021 |
| **35** | Algorand | 0.990000 | 22-06-2019 | 0.650000 | 08-09-2021 |
| **44** | Amp | 0.023520 | 21-06-2021 | 0.017910 | 03-11-2021 |
| **68** | Ankr | 0.046200 | 19-05-2021 | 0.058200 | 27-03-2021 |
| **...** | ... | ... | ... | ... | ... |
| **98** | XRP | 0.900000 | 08-01-2018 | 0.770000 | 29-12-2017 |
| **30** | Zcash | 2248.900000 | 29-10-2016 | 1053.670000 | 31-10-2016 |
| **85** | Zilliqa | 0.063400 | 19-05-2021 | 0.049000 | 11-03-2021 |
| **93** | eCash | 0.000046 | 09-07-2021 | 0.000107 | 09-03-2021 |
| **12** | yearn.finance | 27021.390000 | 19-05-2021 | 20380.420000 | 11-05-2021 |

100 rows × 5 columns

### 4.9 Categorizing Cryptocurrencies as "less-risky" and "more-risky"

We have categorized each of the top 100 cryptocurrencies into two classes namely "less-risky" and "more-risky" using standard deviation on daily return as the deciding factor. The cryptocurrencies for which the standard deviation is greater than 8.0 are classified as "more-risky" and the ones having standard deviation less than 8.0 are classified as "less-risky".

An investor can take a look at how risky any cryptocurrency is before making any decision of investment.

The output consists of a comma separated values(CSV) file which gives the category of each cryptocurrency labelled as "less-risky" and "more-risky" along with the factor which is standard deviation for the investor to know the magnitude of risk involved.

| | Currency-Name | Risk-Type | Risk-factor |
|---|---|---|---|
| **18** | Binance USD | Less-Risky | 0.465628 |
| **9** | USD Coin | Less-Risky | 0.493687 |
| **3** | Tether | Less-Risky | 0.563089 |
| **96** | TrueUSD | Less-Risky | 0.615873 |
| **35** | Dai | Less-Risky | 0.962891 |
| **...** | ... | ... | ... |
| **74** | Celo | More-Risky | 12.568053 |
| **16** | Uniswap | More-Risky | 14.098867 |
| **90** | SushiSwap | More-Risky | 14.253672 |
| **10** | SHIBA INU | More-Risky | 32.673026 |
| **46** | Aave | More-Risky | 498.646494 |

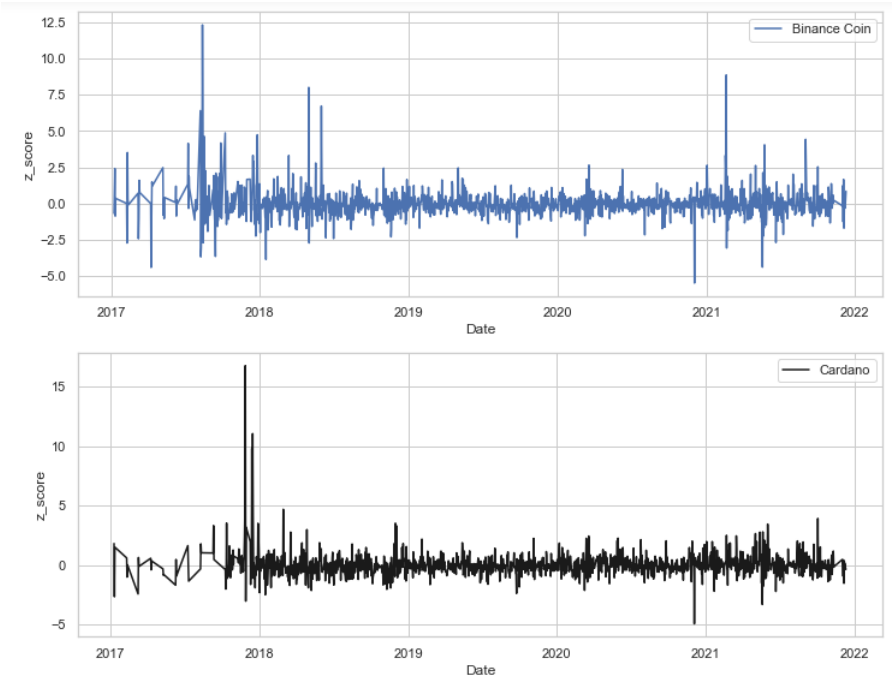
### 4.10 Risk Analysis of Top 4 Cryptocurrencies using Z-Score

Z-score is a metric that tells us how many standard deviations away a particular data point is from the mean. It can be negative or positive. A

positive z-score, like 1, indicates that the data point lies one standard deviation above the mean and a negative z-score, like -2, implies that the data point lies two standard deviations below the mean.

In this we have analysed the day-by-day returns of each of top 5 cryptocurrencies and we have calculated "z-score" for each day return and then we have categorized the daily return "z-score" into valid range and outliers. Now, this classification tells how much the cryptocurrency daily vary with respect to the mean return and the cryptocurrency with higher number of days as outlier will have more fluctuation in the daily returns and can be said as more risky cryptocurrency.

The output for this question is graph plotted with time on X-axis and z-score on Y-axis. It is plotted for "Bitcoin", "Ethereum", "Binance Coin", "Cardano" respectively as follows:




We have then calculated the number of days as outliers using these z-score values for all these four cryptocurrencies as follows:

```
In [39]: val1=bitcoin[bitcoin["z_score"]>=3].shape[0]
         val2=bitcoin[bitcoin["z_score"]<=-3].shape[0]
         print("No. of outlier in bitcoin",val1+val2)
         val1=ethereum[ethereum["z_score"]>=3].shape[0]
         val2=ethereum[ethereum["z_score"]<=-3].shape[0]
         print("No. of outlier in ethereum",val1+val2)
         val1=binance_Coin[binance_Coin["z_score"]>=3].shape[0]
         val2=binance_Coin[binance_Coin["z_score"]<=-3].shape[0]
         print("No. of outlier in binance_Coin",val1+val2)
         val1=cardano[cardano["z_score"]>=3].shape[0]
         val2=cardano[cardano["z_score"]<=-3].shape[0]
         print("No. of outlier in cardano",val1+val2)

         No. of outlier in bitcoin 39
         No. of outlier in ethereum 39
         No. of outlier in binance_Coin 26
         No. of outlier in cardano 17
```

As we can see above, “Bitcoin” and “Ethereum” both have highest number of outliers(39) which indicates the number of days on which the daily return was much deviating from the mean return. That means these currencies are comparatively risky on the time span of analysis.

## 4.11 Comparing Volatility of Top 5 Cryptocurrencies

In trading and finance, it is important to quantify the volatility of an asset. An asset’s volatility, unlike its return or price, is an unobserved variable.

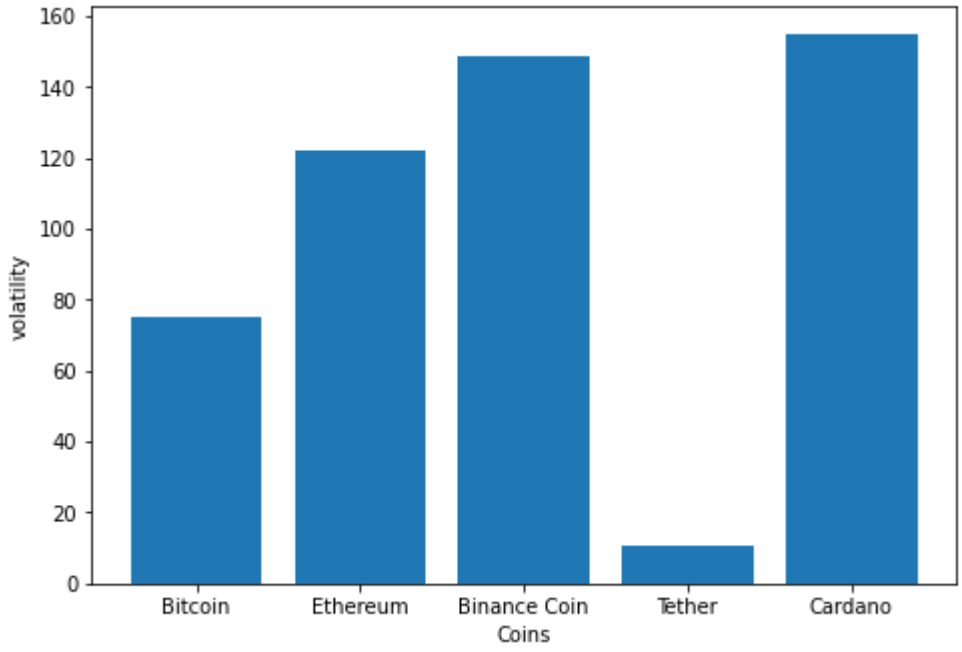
Standard deviation has a special significance in risk management and performance analysis as it is often used as a proxy for the volatility of a

security. For example, the well-established blue-chip securities have a lower standard deviation in their returns compared to that of small-cap stocks.

On the other hand, assets like cryptocurrency have a higher standard deviation, as their returns vary widely from their mean.

We have calculated the volatility of top 5 cryptocurrencies which indicates how risky a cryptocurrency is.

The output of this question is in the form of a Bar Graph which have Cryptocurrencies on X-axis and the measure of volatility on Y-axis and is as follows:




We can see in above graph than "Cardano" is very much volatile than the other 4 cryptocurrencies and "Tether" is having least volatility. High volatility means high risk but high returns where as less volatility means less risk but less returns.

## 4.12 Candlestick chart and Moving Average for Bitcoin

A candlestick chart is a way of displaying information about an asset's price movement. Candlestick charts are one of the most popular components of

technical analysis, enabling traders to interpret price information quickly and from just a few price bars.

The body represents the open-to-close range, the wick or shadow indicates the intra-day high and low, the colour,reveals the direction of market movement where a green body indicates a price increase, while a red body shows a price decrease.

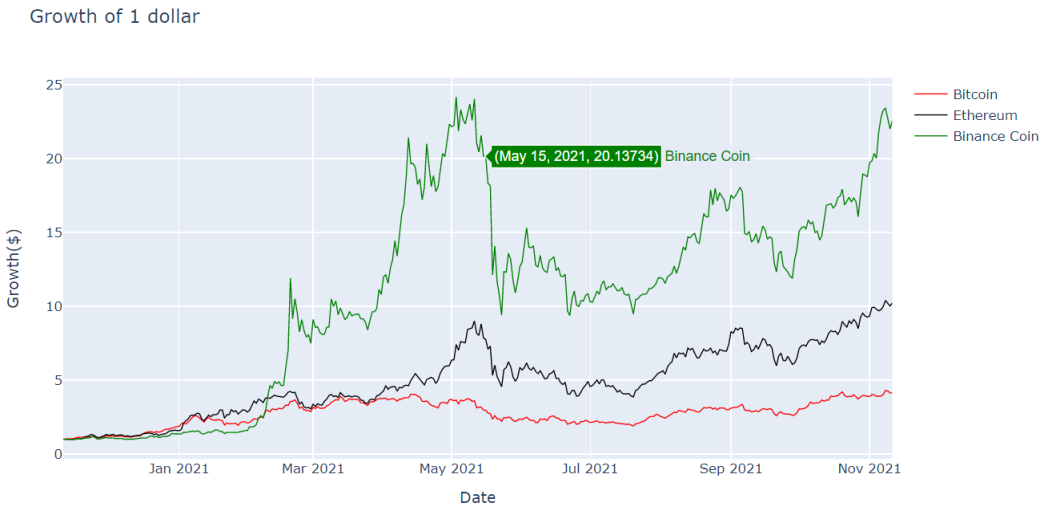
Moving averages are often-used technical indicators in the financial markets.A moving average is simply an indicator that shows the average value of a stock's price over a period and is usually plotted along with the closing price.

We have created a candlestick chart and calculated the moving averages of "Bitcoin" for 20 days, 45 days and 60 days.


Bitcoin
Price($)
70k
60k
50k
40k
30k
20k
Date
candles
20 moving avg
45 moving avg
60 moving avg
29-09-2021
open: 41.06498k
high: 42.54526k
low: 40.82967k
close: 41.56436k

## 4.13 Growth of 1$ in 1 year for Top 3 Cryptocurrencies

We have analyzed the growth of 1$ investment in 1 year for "Bitcoin","Ethereum" and "Binance Coin".
The output graph shows how 1$ of investment in all of these cryptocurrencies will vary for the past 1 year of time span. The graph reflects the fluctuations in the prices for these cryptocurrencies and 1$ investment will grow or shrink according to these fluctuations. It has time on X-axis whereas the number of US Dollars on Y-axis.




We can see in above graph that in the month of February the returns given by "Ethereum" were higher than the other two but from the month of March "Binance Coin" has emerged significantly and has outperformed the returns given by "Ethereum" and "Bitcoin".

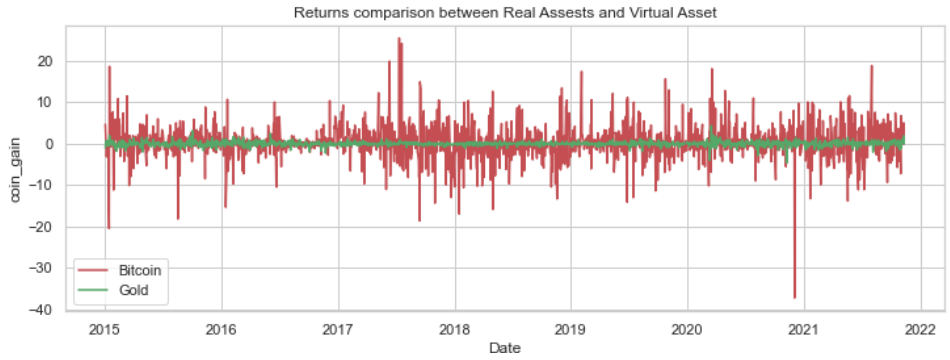
## 4.14 Comparing Virtual Asset with Real Assets

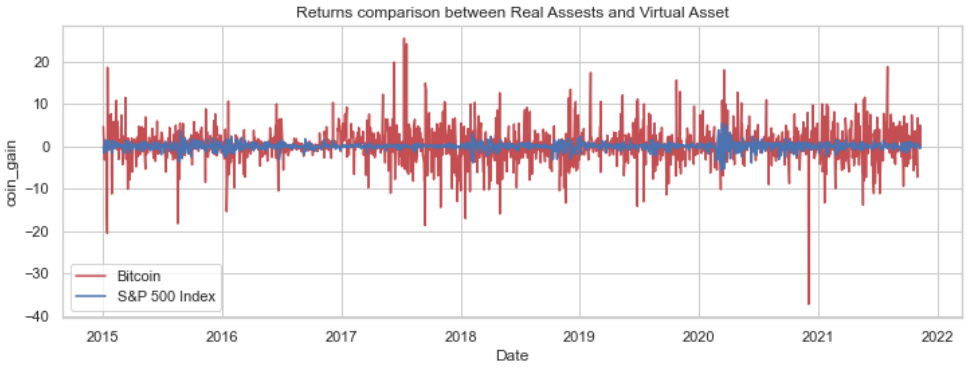
Even if Cryptocurrency is a virtual asset, it has given a tough competition to the traditional real assets like Gold and Stocks. Hence, it is necessary to compare these assets in terms of the growth.

We have compared the trending cryptocurrency "Bitcoin" individually with Gold and Stocks (US Stock Market) and analyzed how it performed against these investment options.

We have taken S & P 500 Index as the US Stock Market indicator in this case.

The output is in the form of a graph with time on the X-axis and daily returns on the Y-axis. The time period of analysis is taken from 1st January 2015 till 11th November 2021.

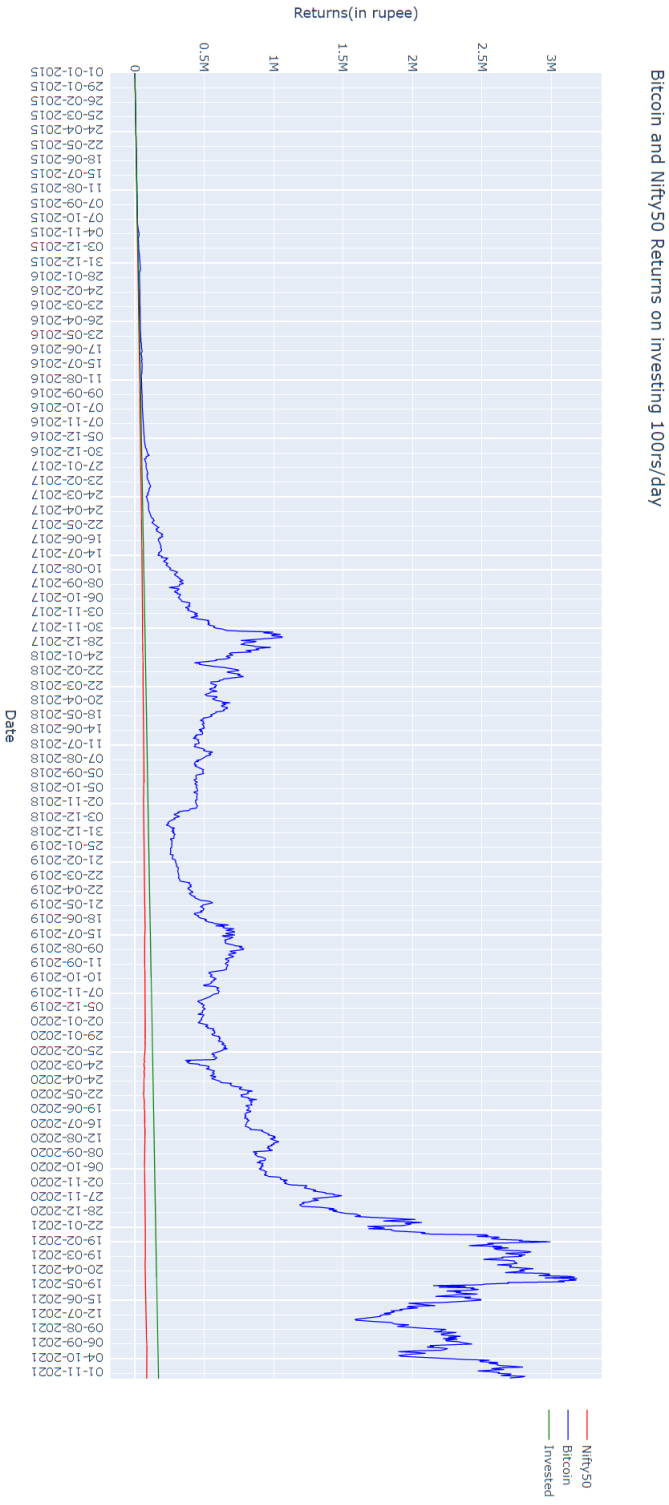



From the above graphs, we can see that Gold and Stocks are less volatile than the "Bitcoin"" which means these are having less risk but less return on investment than the "Bitcoin" whereas "Bitcoin" involves higher risk but has higher returns than these traditional assets.

## 4.15 Comparing "Bitcoin" and "Nifty 50"

We have considered a scenario where one invests 100 Rupees per day in both the "Bitcoin" and the stocks of "Nifty 50" index and analysed the growth of this investment over the period of 6 years. The output is a graph with time on X-axis and the returns in Rupees on the Y-axis.


Bitcoin and Nifty50 Returns on investing 100rs/day
Returns(in rupee)
0
0.5M
1M
1.5M
2M
2.5M
3M
Date
01-01-2015
29-01-2015
26-02-2015
25-03-2015
24-04-2015
22-05-2015
18-06-2015
15-07-2015
11-08-2015
07-09-2015
07-10-2015
04-11-2015
03-12-2015
31-12-2015
28-01-2016
24-02-2016
23-03-2016
26-04-2016
23-05-2016
17-06-2016
15-07-2016
11-08-2016
09-09-2016
07-10-2016
07-11-2016
05-12-2016
30-12-2016
27-01-2017
23-02-2017
24-03-2017
24-04-2017
22-05-2017
16-06-2017
14-07-2017
10-08-2017
08-09-2017
06-10-2017
03-11-2017
30-11-2017
28-12-2017
24-01-2018
22-02-2018
22-03-2018
20-04-2018
18-05-2018
14-06-2018
11-07-2018
07-08-2018
05-09-2018
05-10-2018
02-11-2018
03-12-2018
31-12-2018
25-01-2019
21-02-2019
22-03-2019
22-04-2019
21-05-2019
18-06-2019
15-07-2019
09-08-2019
11-09-2019
10-10-2019
07-11-2019
05-12-2019
02-01-2020
29-01-2020
25-02-2020
24-03-2020
24-04-2020
22-05-2020
19-06-2020
16-07-2020
12-08-2020
08-09-2020
06-10-2020
02-11-2020
27-11-2020
28-12-2020
22-01-2021
19-02-2021
19-03-2021
20-04-2021
19-05-2021
15-06-2021
12-07-2021
09-08-2021
06-09-2021
04-10-2021
01-11-2021
Nifty50
Bitcoin
Invested

# 5 Conclusion

All the questions that we tried to answer in this project helps an investor to take a look at the risk involved and the returns he/she can expect from investing in different cryptocurrencies. We have also compared this virtual asset with traditional investment options which helps to make a good trade-off between the risk and the returns on the capital invested.

Each analysis helps in some or the other aspect before making the final investment decision. We also compared the different cryptocurrencies so that one can diversify within this class of asset itself. After considering all the analysis collectively, one can make a decision suitable to his risk appetite.

## References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