

## Cryptocurrency Analysis by using Visualization

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## Abstract

Investing in Cryptocurrencies like Bitcoin, Cardano, Ethereum, Ripple etc is becoming more popular. I wanted to explore and understand more about cryptocurrency investment. A popular personality in investment, Mr. Warren Buffet once said, “ Never Invest In Something You Don’t Understand”, and I totally agree with him. Keeping that as motivation, I am doing this visualization project where I would like to analyze cryptocurrency data over a period of time and come up with a good strategy to invest in cryptocurrencies. As we all know, “A picture is worth a thousand words ”, visualization techniques provide us with a lot of insight to analyze the historical cryptocurrency data. This project consists of preparing and visualizing the data by using Tableau Desktop Stories, Dashboards and D3.js. History cryptocurrency, last 30 days cryptocurrency, and country cryptocurrency data used in this project to analyze cryptocurrencies. Using visualizations, I was able to understand how Bitcoin is a dominant crypto coin in the market and how it has evolved over a period of time. The visualizations also helped understand how various crypto currencies called altcoins (short for alternate coins, other than Bitcoin) are catching up with Bitcoin in the crypto market and also helped in understanding how a volatile coin like Dogecoin behaved in the current and the past market.

*Keywords:* Cryptocurrency, Tableau Desktop, D3.js, Stories, Dashboards

## 1. Introduction

### 1.1 Purpose of this document

The purpose of this document is to provide a detailed project description of the Analysis of Cryptocurrencies using visualization techniques, which is designed to help people to make informed decisions while investing in cryptocurrencies. This document includes details about data collections, data preparation, visualizations like stories And dashboards results (screenshots), and final summary and conclusion made on the visualization results.

### 1.2 Intended Audience

This document shall be used in all phases of the project as a guideline. Intended audiences of this project are :

- Project supervisor ( Andrew H. Bond)
- Project TA
- Myself

### 1.3 Scope

This document defines the project plan of the Cryptocurrency Analysis by using Visualization. The overview includes objectives of the project, Implementation of visualizations like stories / dashboards process that is going to be used during the project, case studies on each visualizations, conclusions and summary made on the visualizations, and project plan that includes time schedule and activity plan.

## 2 Background and Objective

### 2.1 Background

Before analyzing the cryptocurrencies data I wanted to know what is Cryptocurrency and the difference between normal Currency and Cryptocurrency. As we all know currencies are tokens used as money. For example metal coins, paper banknotes, checks drawn on bank accounts etc. These Currencies are operated by Centralized financial institutions like banks. Cryptocurrencies are digital currencies which are operated independently from the central bank [4].

Cryptocurrency is a digital currency in which transactions are verified and records maintained by a decentralized system using cryptography, rather than by a centralized authority. Instead of Centralized ledger it uses a decentralized ledger (Block chain) to keep the records of the transaction. Any entry to the ledger is secured using encryption. As shown in the Figure below Bitcoin was the first cryptocurrency, other cryptocurrencies are called ALT coins. There are around thousands of cryptocurrencies in the current market like Bitcoin, etherium, Monero, Ripple, Dash, etc. There are some interesting applications that use cryptocurrencies like distributed file system (ex: sia & filecoin) [4].

**Figure 1***Bitcoin and other Cryptocurrencies names*

Source:

[https://www.123rf.com/photo\\_88035112\\_bitcoin-cryptocurrency-golden-coins-icons-vector-isolated-symbols-and-different-types-of-virtual-dig.html](https://www.123rf.com/photo_88035112_bitcoin-cryptocurrency-golden-coins-icons-vector-isolated-symbols-and-different-types-of-virtual-dig.html)

Every application has it's pros and cons, here I am listing out some of them regarding Cryptocurrencies.

- **Pros of Cryptocoins**

- Decentralized so fault tolerance
- Software oriented
- Private transactions
- No restrictions on Global Transactions

- **Cons of Cryptocoins**

- Very low TPS, but new crypto do better
- Easily hacked, cannot recover lost crypto, hard to track

## **2.2 Objective of this project**

Objective of this project is to analyze cryptocurrencies using visualization techniques. This application introduces the user to the cryptocurrency dataset. It tries to identify the various parameters of cryptocurrencies and provide a way to visualize those parameters to understand the behaviour of the cryptocurrencies in the current and the past market. This inturn provides some amount of guidance for the users to make informed decisions while investing in Cryptocurrencies. To analyze Cryptocurrency data, in this project I am using Tableau desktop [6] and D3.js [7] as visualization tools. I am planning to create some Stories [9] and Dashboards [8] in Tableau to analyze both historical and current crypto data.

**Using these visualization techniques, I will attempt the following questions:**

1. Visualize Cryptocurrency data based on market parameters
2. Identify Dominant cryptocurrencies in the current and past market
3. Trend Analysis of different Cryptocurrencies over the years
4. Global Crypto adoption
5. Visualization Summary and Conclusion

### **3. Organization**

#### **3.1 Customer**

The customer or user of this project will be a beginner in Cryptocurrency investment who would like to understand the basics of cryptocurrency parameters and the market behaviour using Visualizations.

### **4. Data Collection and Preparation**

#### **4.1 Dataset Information**

After deciding the objective of this project, I have started to search data on Cryptocurrency. I am collecting already existing data which is available on the coinmarket website. The Coinmarket website contains all coins from past to till today. Decided to Collect last 30 days coins data by using Coinmarket website [2]. I have found Cryptocurrency historical price data on Kaggle website from 29 Apr 2013 to 21 Jul 2021 [1]. Kaggle dataset has one csv for each coin, this dataset has the historical price information of some of the top crypto currencies by market capitalization. From triple-a.io [3], I am collecting Global Cryptocurrency Ownership data. Which includes

data about Country name, Number of Crypto owners in each country, Crypto owners with respect to Percentage of the population. I have listed all the data sources below:

- **Kaggle Dataset** (its free) [1]
  - <https://www.kaggle.com/sudalairajkumar/cryptocurrencypricehistory>
  - Cryptocurrency Historical Prices (29 Apr 2013 to 21 Jul 2021)
- **Coinmarketcap** (its free) [2]
  - <https://coinmarketcap.com/>
  - Collected Last 30 days data for top 10 coins
- **Triple-a.io** (its free) [3]
  - <https://triple-a.io/crypto-ownership/>
  - Global ownership data

### **Content of the Kaggle and Coinmarketcap Data:**

1. Date : date of observation
2. Open : Opening price of the Cryptocurrency on the given day
3. High : Highest price of the Cryptocurrency on the given day
4. Low : Lowest price of the Cryptocurrency on the given day
5. Close : Closing price of the Cryptocurrency on the given day
6. Volume : Volume of transactions of the Cryptocurrency on the given day
7. Market Cap : Market capitalization of the Cryptocurrency in USD

### **4.2 Data Preparation**

After collecting all the data from different sources, our next step is to prepare data accordingly to achieve this project goals. This phase includes steps like union files,

delete unwanted columns, change data types of the attributes, renaming columns, and creating calculated fields.

The data collected from Kaggle were having each csv file for each crypto coin. So I did union all the crypto coins data and formed a file called “Coin History Data” in Tableau Desktop. Coinmarketcap's website has crypto data for individual files. After downloading those files, I have unioned them by using Tableau Desktop and formed a file name called “Cryptocurrency Data”. Changing the **Date** attribute data type to **Date** which was originally in the string. After combining all crypto coin data we found a column named Binance Coin (BNB)+ (Crypto) which was renamed to **Crypto Data**. Renamed the Name column to **Coin Name** for better understanding. Also, I have created a file named “Global Crypto Adoption” from triple-a.io in Tableau Desktop. I have prepared three files in Tableau Desktop and kept ready for the next step which is visualization. Below list represents the three prepared data sources in Tableau Desktop.

- Prepared Data Sources in Tableau
  - Cryptocurrency Data
  - Coin History Data
  - Global Crypto Adoption

## 5. Implementation and Case study

To achieve the objective of this project, I have created three dashboards and one story in tableau desktop with that I also integrated D3.js interactive dashboard in tableau desktop. Analysing all the dashboards based on metrics like Market cap, Volume, High, Low, Open Price, and Close Price and also based on different types of coins. In this

section, I will cover all these implementation processes in detail. I have listed all tableau [6] dashboards and stories which are created in this project.

- Story Book
  - Historical Crypto coin analysis based on different factors
    - Currencies Dominance based on prices ( Close, Open, High, low)
    - Currencies Dominance on Market Cap metric
    - Overall in depth Market Cap trend of top 10 coins over the years
    - Relative market cap change for a given year with respect to previous year of each coin
    - Overall Volume trend for top 5 coins
    - Summary and Conclusion of this story book
- Dashboard 1
  - Cryptocurrency Analysis of last 30 days
    - Daily trading Prices
    - Daily trading Volumes
    - Daily trading Market Cap
- Dashboard 2
  - Historical Cryptocurrency Analysis
    - Selected metric price trends over the year for selected coins
    - Selected metric price Price vs moving avg for selected coin within the year
    - Trade volume by year for selected coins
- Dashboard 3

- Top 5 Countries owning Crypto and Top 5 Crypto currencies
  - Top 5 countries owning crypto assets based on number of crypto owners and percentage of the population
  - Top 5 coins based on selected metric price from last 30 days
  - Crypto Adoption by countries by using Geo Map
- Dashboard 4
  - Crypto currency analysis based on metrics using D3.js
    - Radio buttons to select metrics (Market cap, Volume, Price, and Circulating Supply) to analyze coin trends

### **5.1 Story Book (Historical Crypto coin analysis based on different factors)**

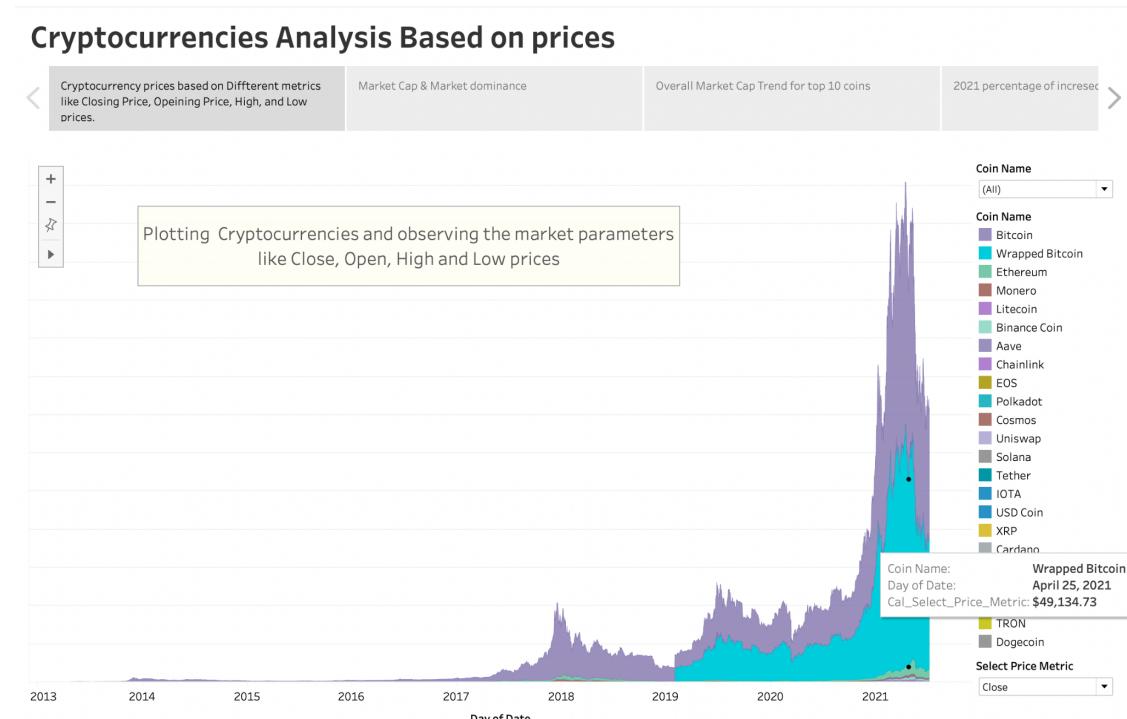
In this story, I am analyzing historical Cryptocurrency data based on several metrics [9].

#### **Story 1:**

The first story shows a density plot of the major crypto coins based on their average monthly closing prices. The plot shows this data over a period of years from 2014 to 2021. The majority of the plot is dominated by Bitcoin since it is the most popular crypto in the market with its price peaking in 2021 and then following a downward trend.

## Figure 2

*Currencies Dominance based on prices ( Close, Open, High, low)*



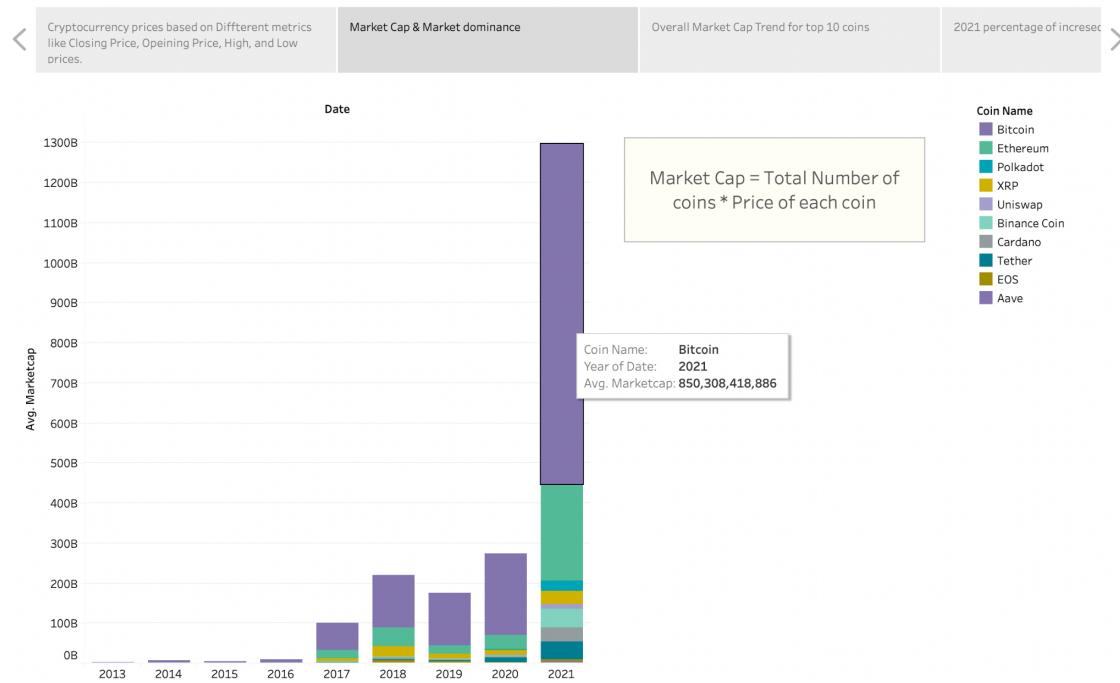
## Story 2:

In general, the beginners in the crypto investment will tend to mistake the price of the coin with its market dominance. This is not true since the price of the coin gives an incomplete picture of how dominant the coin is with respect to other coins. In order to understand the true value of the coin one must look at the market cap of the coin which is the product of the price and the total number of the coins in circulation in the current market. A coin might have a very high price but only a few coins are in active circulation. As a result, that coin's market cap might be much lower than another coin whose price is lower but with a large volume in active circulation. The stacked bar graph plot in this story tries to depict the importance of visualizing market cap for the coins to understand their net worth or dominance in the market.

### Figure 3

*Currencies Dominance on Market Cap metric*

#### Cryptocurrencies Analysis Based on prices

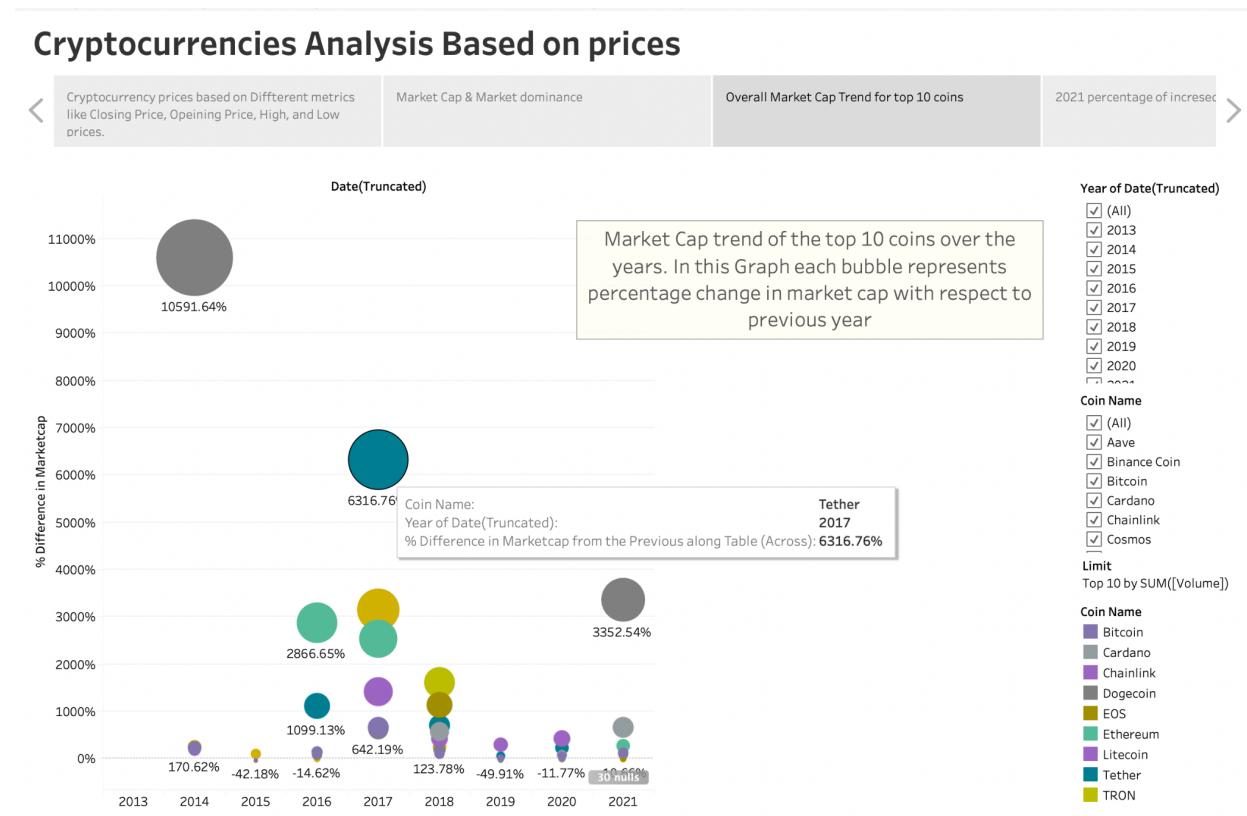


#### Story 3:

This story presents a bubble graph plot of the market caps of the crypto currencies plotted over a period of years. The bubble plot shows the difference plot where the bubble on any given year represents the increase or decrease seen in the market cap for a given coin compared to the previous year. The size of the bubble shows the net magnitude increase or decrease in the value.

## Figure 4

*Overall in depth Market Cap trend of top 10 coins over the years*

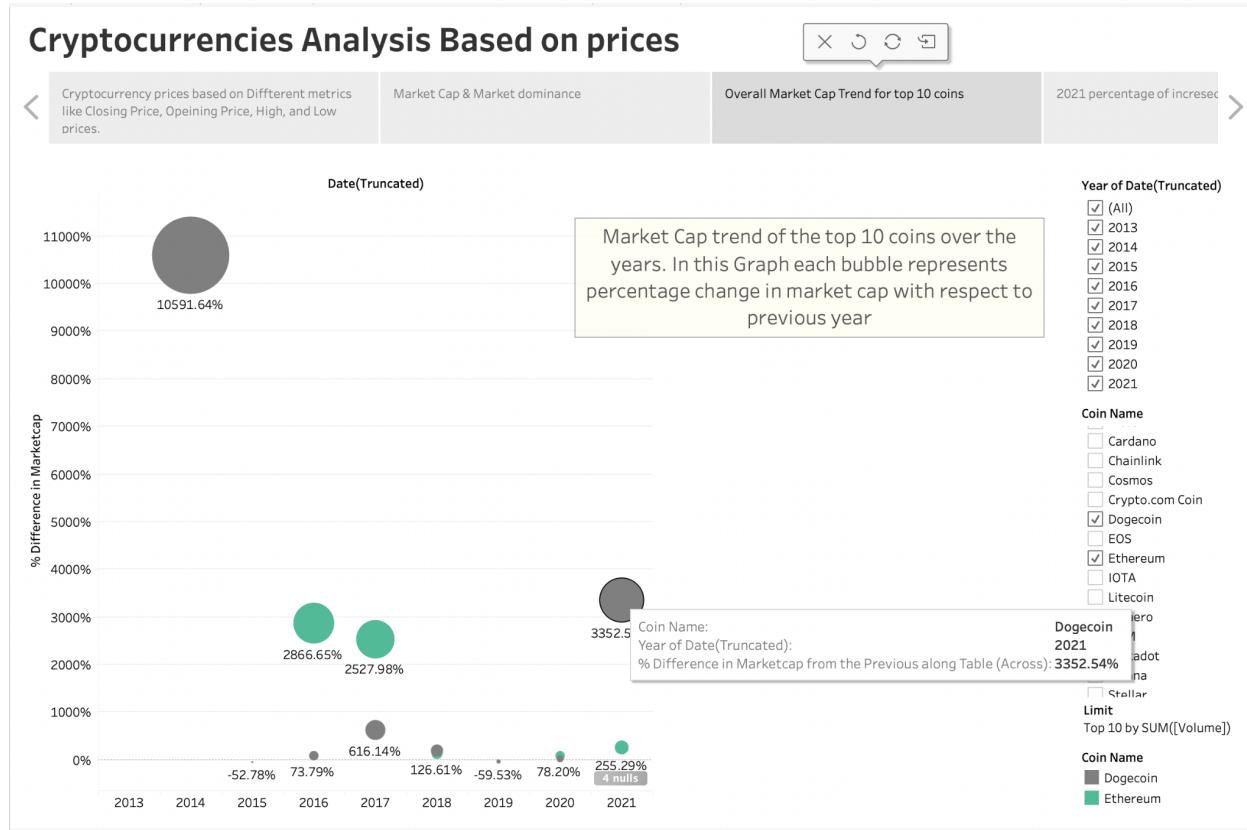


## Story 4:

In this story, we show a bubble plot similar to the previous one. Here, we select only 2 coins called Dogecoin (grey) and Ethereum (green). Both of these coins show a downward trend in the size of the bubbles over a period of years. For those years where the bubble sizes are decreasing but are positive indicates that the market cap is increasing but the rate of increase is decreasing. For 2019, the Ethereum bubble has a negative value indicating that the market cap has decreased from the previous year.

## Figure 5

*Overall in depth Market Cap trend of two selected coins over the years*

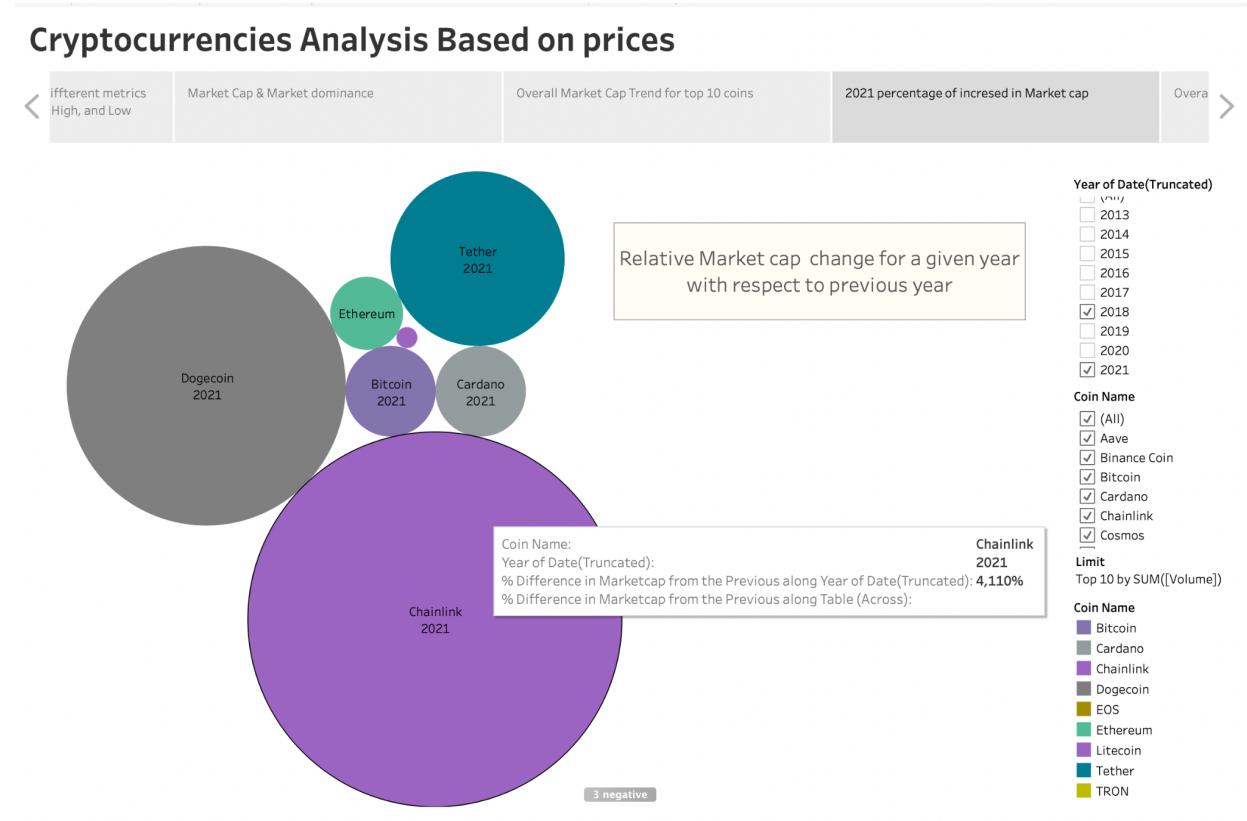


## Story 5:

This story shows a slightly different bubble graph where the market caps of the coins are shown in the bubble on a given year. The bubble sizes are relative to the past year selected in the select parameter. This is useful to see the change in market caps for a given year with respect to any year in the past and also gives an overall picture of the market caps of all the coins during that year.

**Figure 6**

*Relative market cap change for a given year with respect to previous year of each coin*



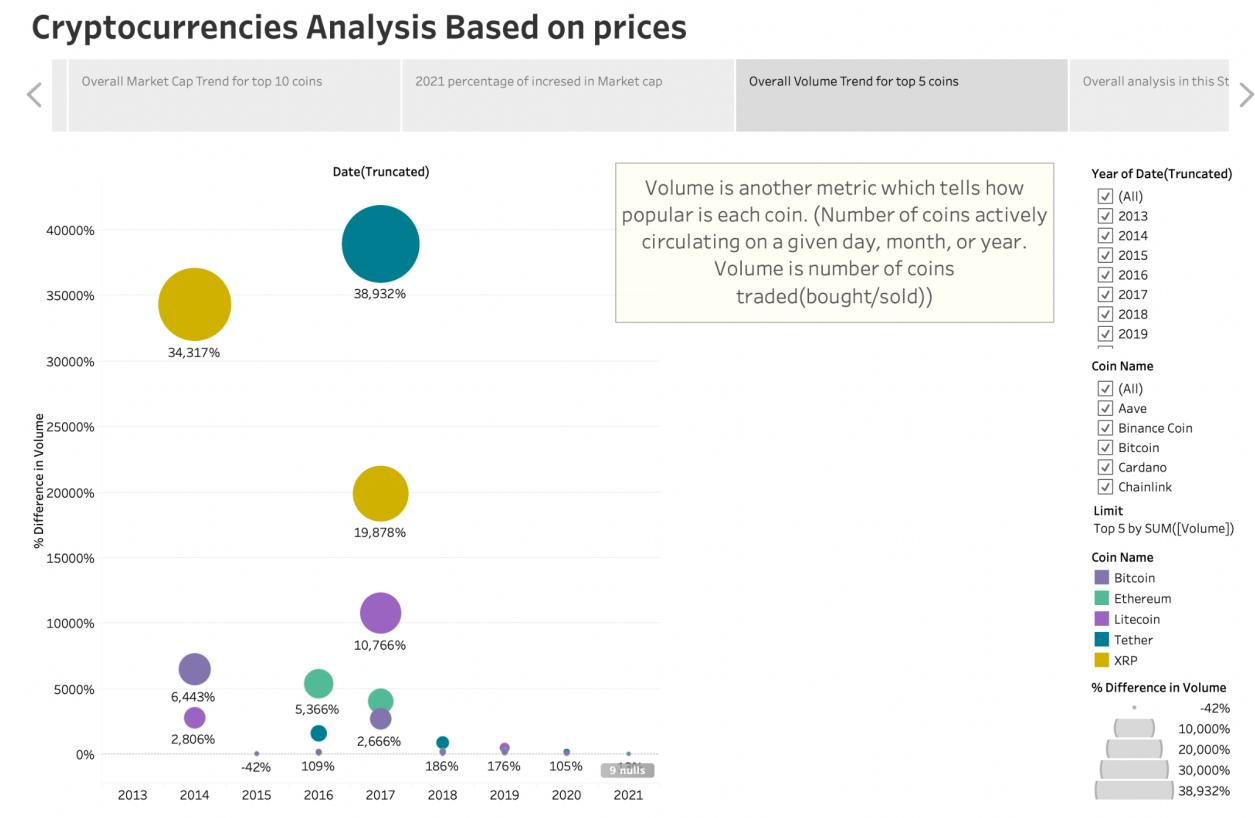
### Story 6:

The plot in this store is also a relative bubble graph for the cryptocurrencies but the only difference is that it plots the traded volume of the coins instead of their market caps.

The volume represents the total buy and send volumes of a given coin. The higher the volume indicates that the coin is more popular in the market and actively traded or circulated.

**Figure 7**

*Overall Volume trend for top 5 coins*



## 5.2 Dashboard 1 ( Cryptocurrency Analysis of last 30 days )

This dashboard contains three graphs. One is a candlestick chart which tells about daily trading prices. Second and third graphs are line charts which tell about daily trading volume and daily trading market cap for selected coins. I have created a hide and show card to select coins to analyze the trading price, volume, and market cap of the coin. To create this dashboard, I have created some parameters and calculated fields like **Close-Open** ( $\text{SUM}([\text{Close}**]) - \text{SUM}([\text{Open}^*])$ ) which tells the difference between closing price of the coin and opening price of the coin on the given day. **Low-High** ( $\text{SUM}([\text{Low}]) - \text{SUM}([\text{High}])$ ) parameter which tells the difference between Low

and high price of the coin on the given day. Figures below show the overall dashboard for cryptocurrency analysis of the last 30 days.

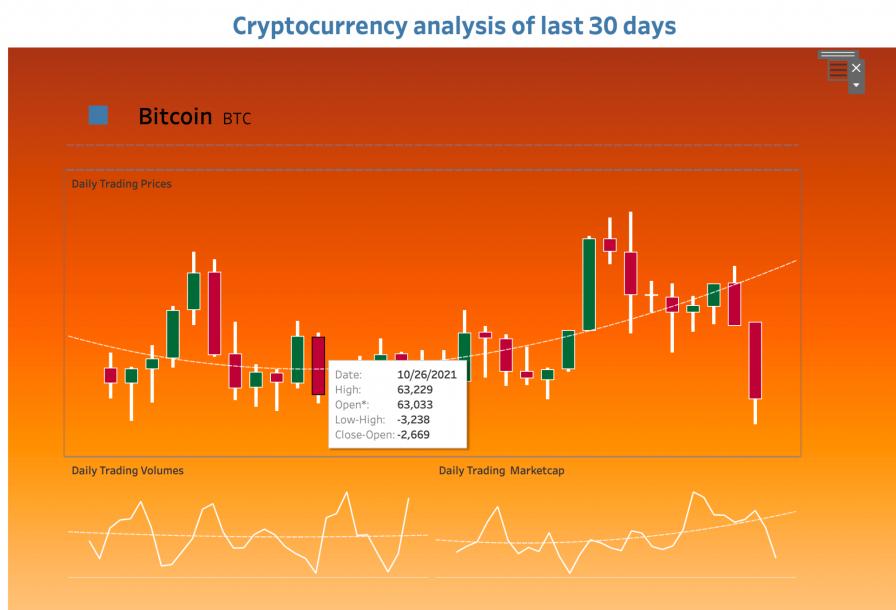
**Figure 8**

*Bitcoin Analysis of last 30 days showing select coin card*

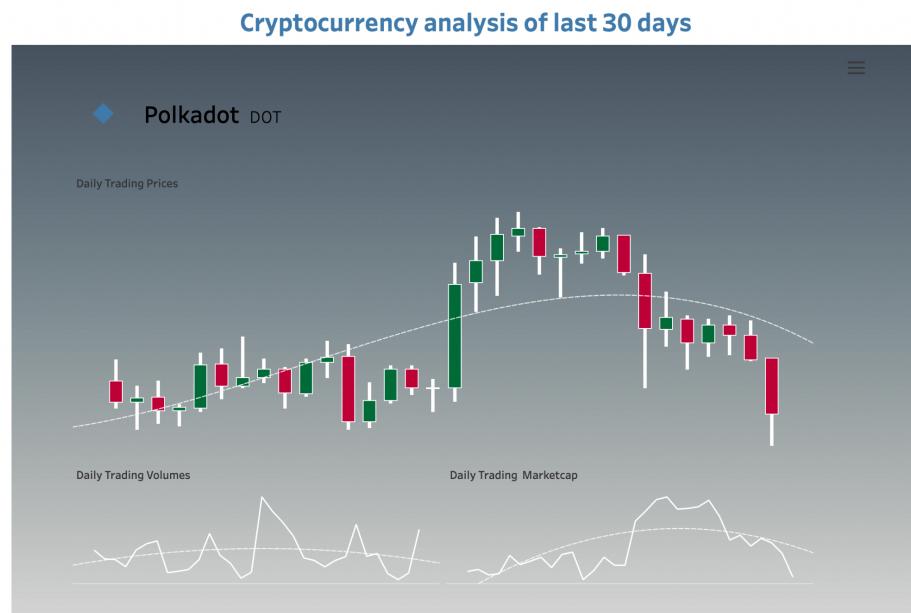


**Figure 9**

*Bitcoin Analysis of last 30 days*

**Figure 10**

*Polkadot Analysis of last 30 days*



## Daily Trading Prices (Graph 1)

To analyze daily trading prices of crypto coins, I have used the Candlestick chart. Most people have used candlestick charts to analyze financial data. Even I wanted to use that to analyze crypto currency data in my project. Candlestick chart describes high, low, open, and close price movements of cryptocurrencies for a specific period (last 30 days). The colors and contents of the candlestick graph are explained below:

Green Body: Upward movement over previous position (Positive difference)

Red Body : Downward movement over previous position (Negative difference)

Long Body: Heavy trading in one direction and strong buying or selling of the coin

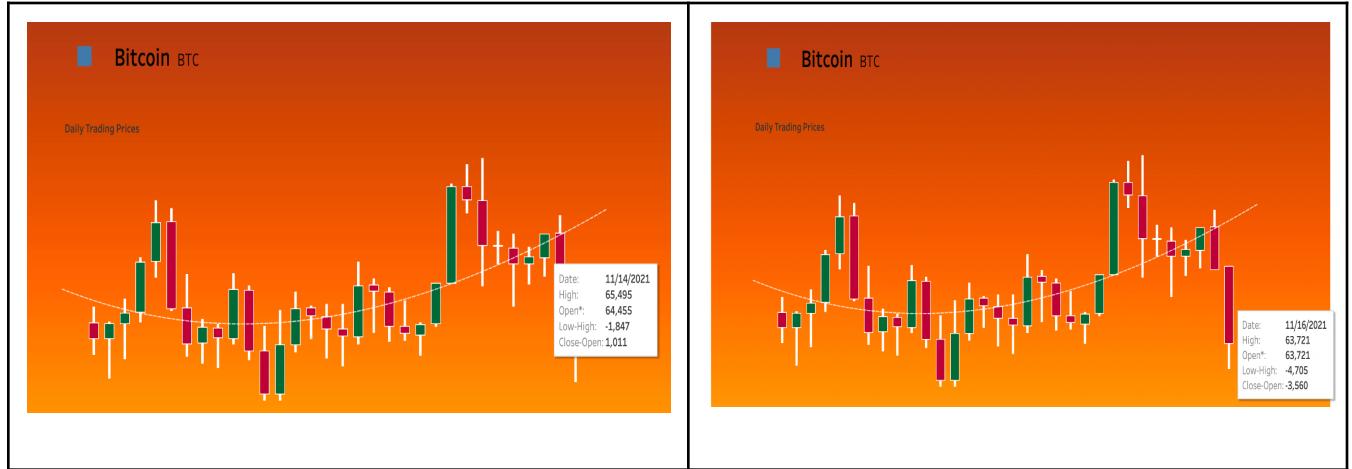
Small Body: Lighter trading and little buying or selling activity of the coin

Green filling: Closes at higher than opening price of the coin

Red filling: Closes at lower than the opening price of the coin

### **Case 1: Analysis of Bitcoin**

The Figure below shows the daily market price analysis of a coin. Here I have selected Bitcoin from the select card. As we can see in the right side of the graph the Bitcoin Close-Open price on 11/14/ 2021 is positive, that is why the candlestick body is in green color (upward movement). From the right side of the Figure we can see that on the day 11/16/2021, the Close-Open price is negative means the closing price of the Bitcoin on that day is lower than the opening price that is why the body is in red color. From this graph we can analyze how the coin trend is moving for 30 days.

**Figure 11***Daily Trading prices***Daily Trading Volumes and Market Cap (Graph 2 and Graph 3)****Case 2:**

To analyze daily trading volumes and Market cap, I have created two line graphs which show the Volumes and Market cap trend of the selected coin for a given period of days.

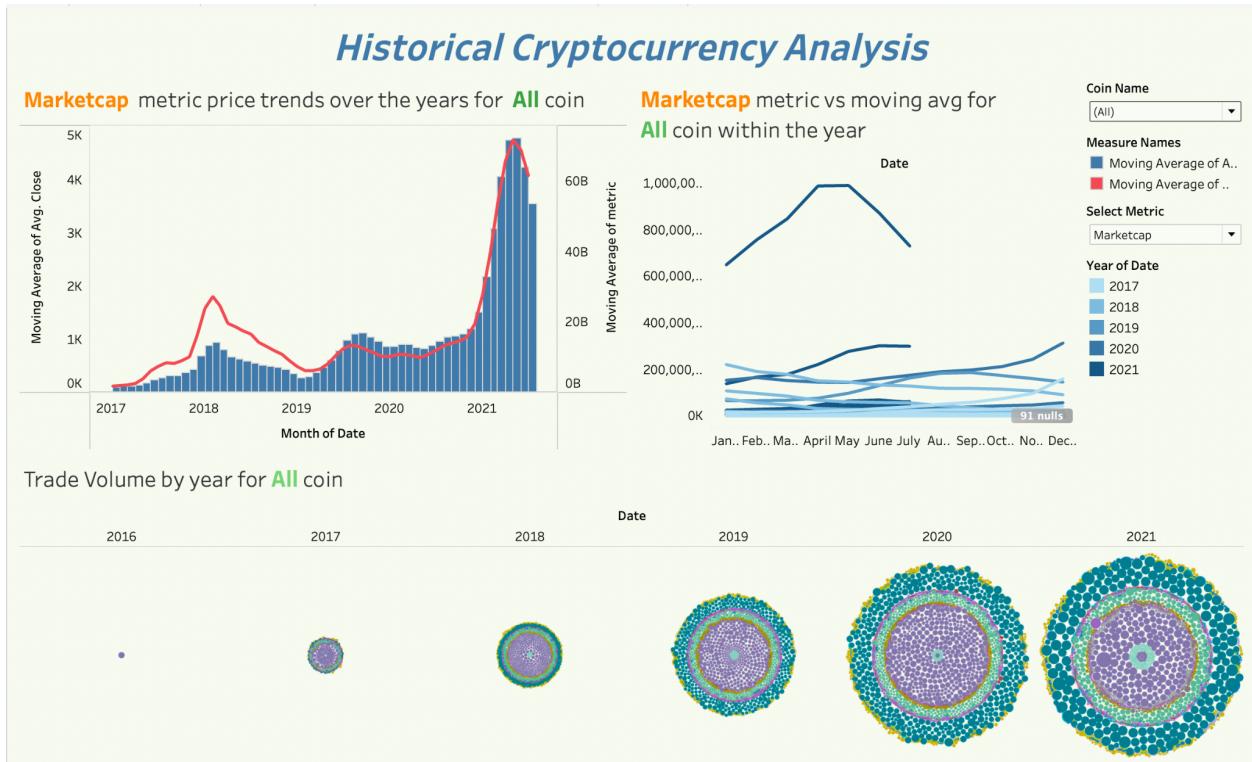
**Figure 12***Daily Trading Volumes and Market Cap*

### 5.3 Dashboard 2 ( Historical Cryptocurrency Analysis )

The second dashboard is about analyzing historical cryptocurrency data from 29 Apr 2013 to 21 Jul 2021 and checking the trend of each coin and also figuring out volatility and stability of coins. To implement this dashboard, I have created some parameters and calculated fields like “select metric”. By using it we can select metrics like Market Cap, Volume, Close, Open, High, and Low to analyze the whole dashboard. The second Calculated field is “select Coin” by using this select parameter we can select one of 23 coins and analyze the whole dashboard. Figures below show the overall dashboard look for this analysis.

**Figure 13**

*Historical Cryptocurrency analysis of all coins*

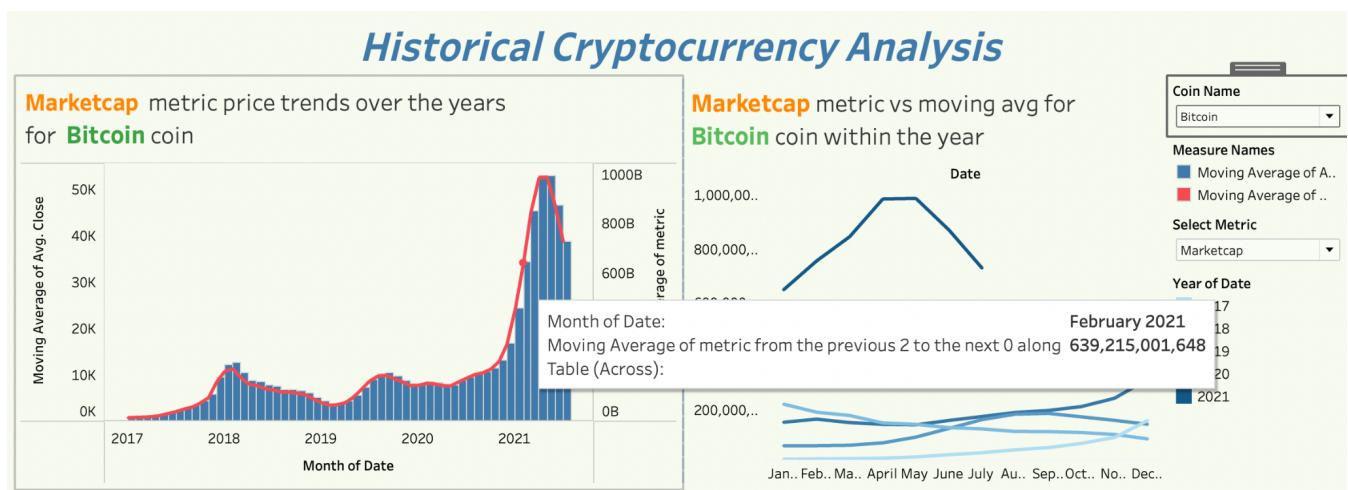


### Case1:

To analyze metric trends over the years for a given coin. I have created a dual graph which includes line graph and bar graph. Line graph shows the trend of moving average close price vs year. Bar graph shows Moving average close price and selected metric price (Market cap, Volume, Open, High, and Low) vs year. Below figures detailed information explains about these prices. As of now in the below graph I have selected a metric Market cap and All Coins, the closing price and the Market cap of all the coins are proportional to each other over the years. We can also see the trend of all the Crypto coins increasing day by day.

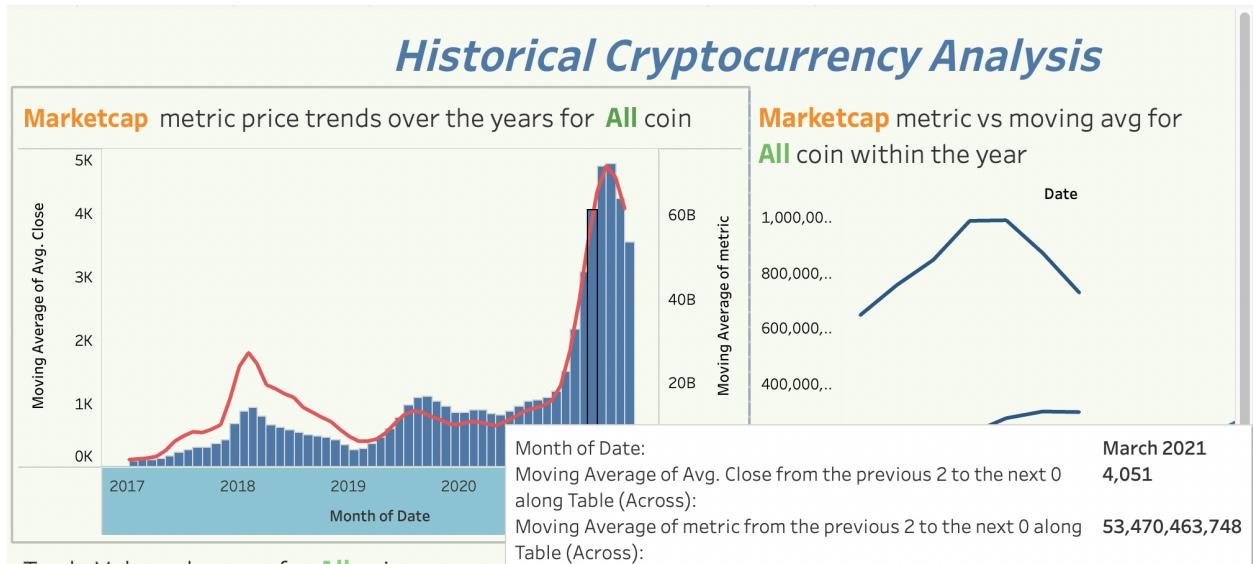
**Figure 14**

*Figure showing line graph detail of dual graph for all years*



**Figure 15**

*Figure showing bar graph detail of dual graph for all years*

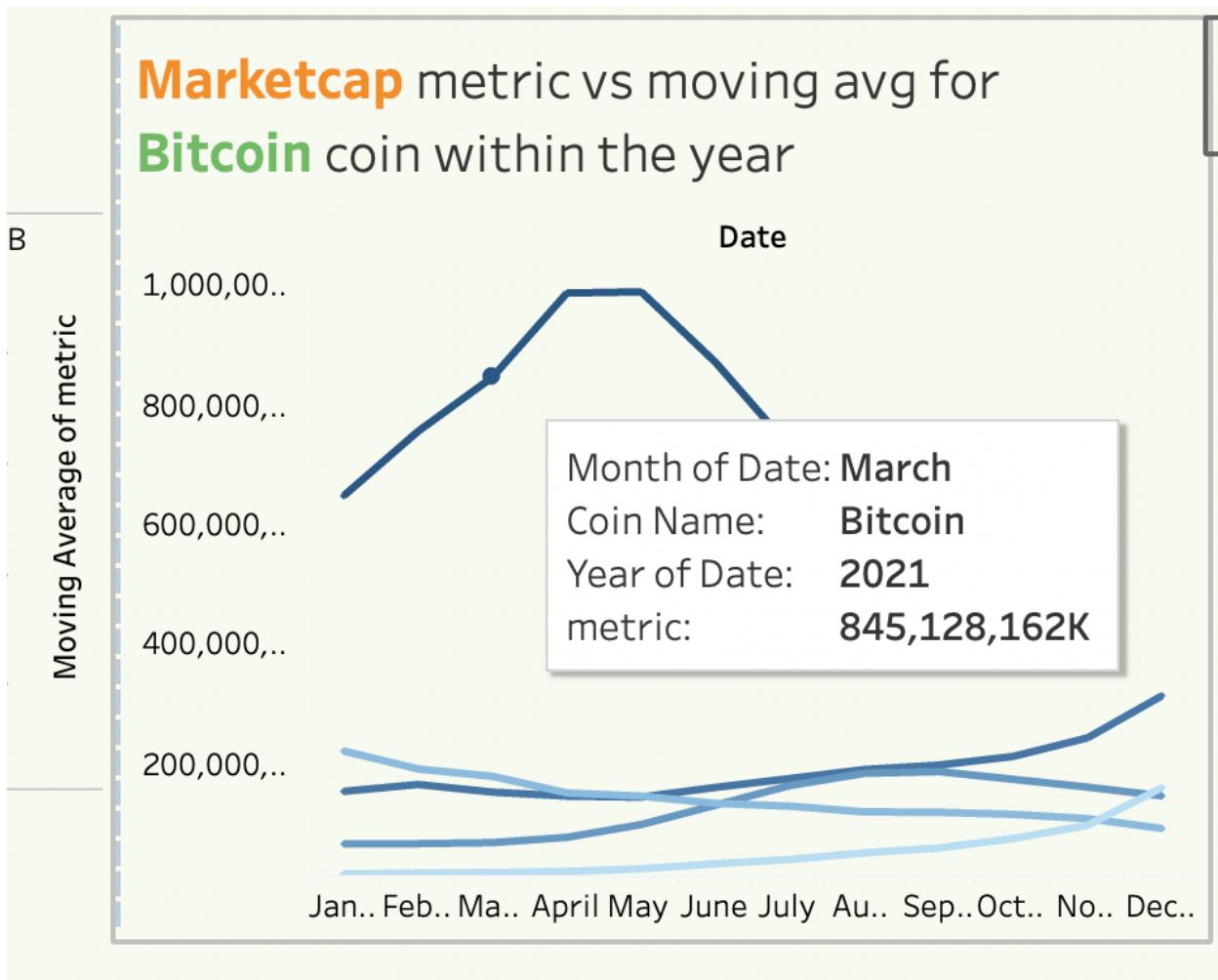


### Case2:

By using the above graph, we have analyzed the coin trend over the years. Now let's analyze how they will behave within the year. The below figure shows the trend of a coin within the year. The below graph lines indicate the yearly trend of a coin. As of now, I have selected a Bitcoin, The Bitcoin trend is declining from January to December in the year 2021. The details about this information is shown in the below graph.

**Figure 16**

*Figure showing coin (Bitcoin) trend behaviour within the year*



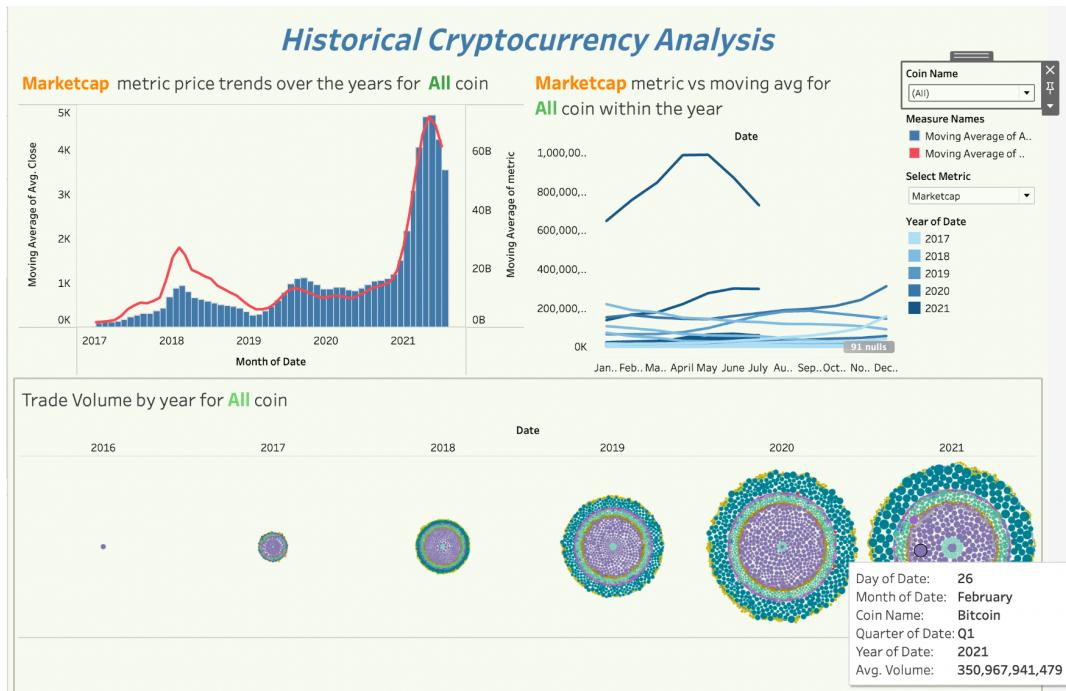
### Case 3:

The third graph of this dashboard shows a cluster plot of traded volume of each year from 2016 up until 2021. The cluster consists of all the coins and the plot gives an overall trend of the traded volume of these coins over the years. As we can see in the below graph, each coin trend is arranged in the form of concentric circles. For a given coin, the quarters of the year are arranged radially with the inner circles representing

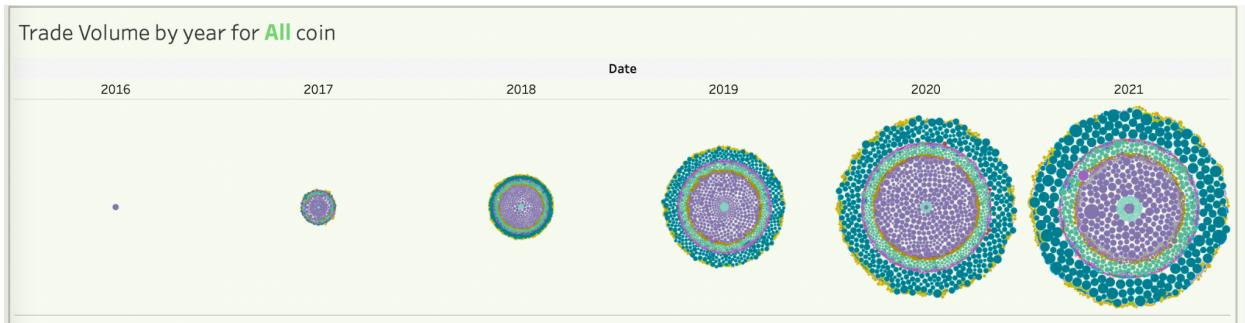
the first quarter of the year. The increase in the net cluster size gives a very good representation of how the crypto industry is gaining more popularity over the years and is being traded more and more in volume.

**Figure 17**

*Cluster graph shows its detailed information*



### Case study for Cluster graph (Trade Volume by year for coins):

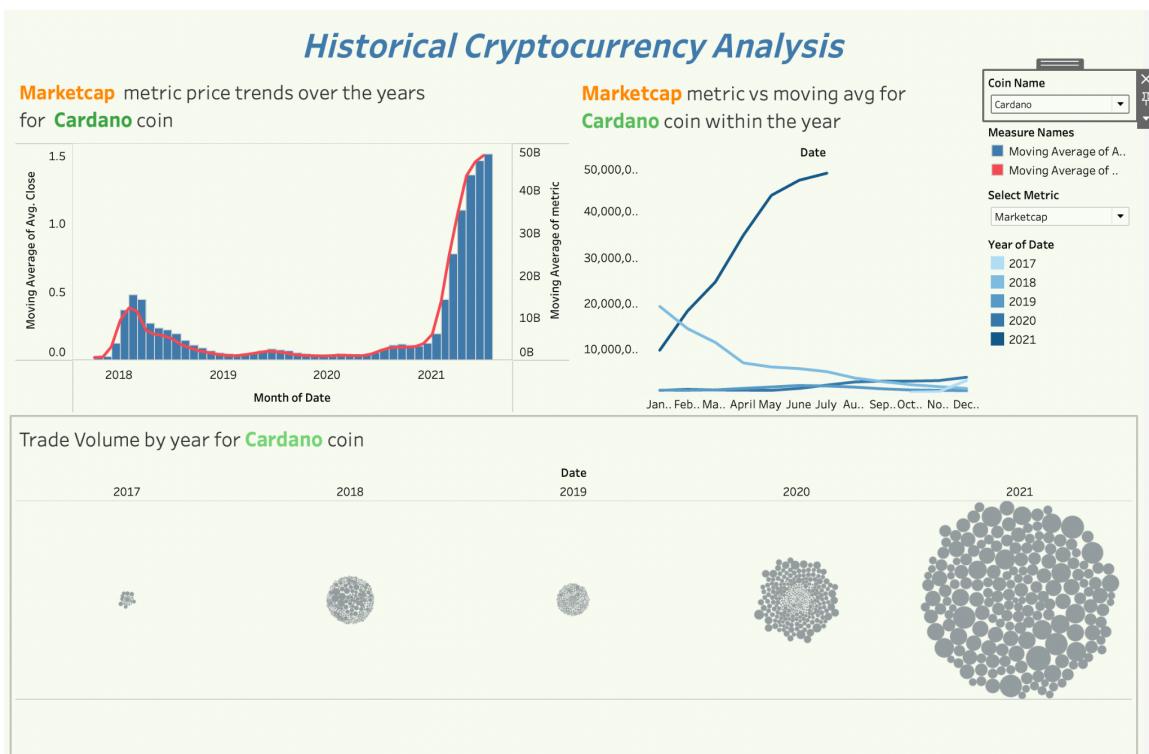


#### Case 1:

The figure below shows the traded volume plots for Cardano crypto. As it can be seen, the volume increased in 2018 but decreased significantly in 2019. However, from 2020 onwards, it made a great comeback showing significant increase in the trading volume indicating its increasing popularity.

**Figure 18**

*Cluster graph shows Cardano coin information*

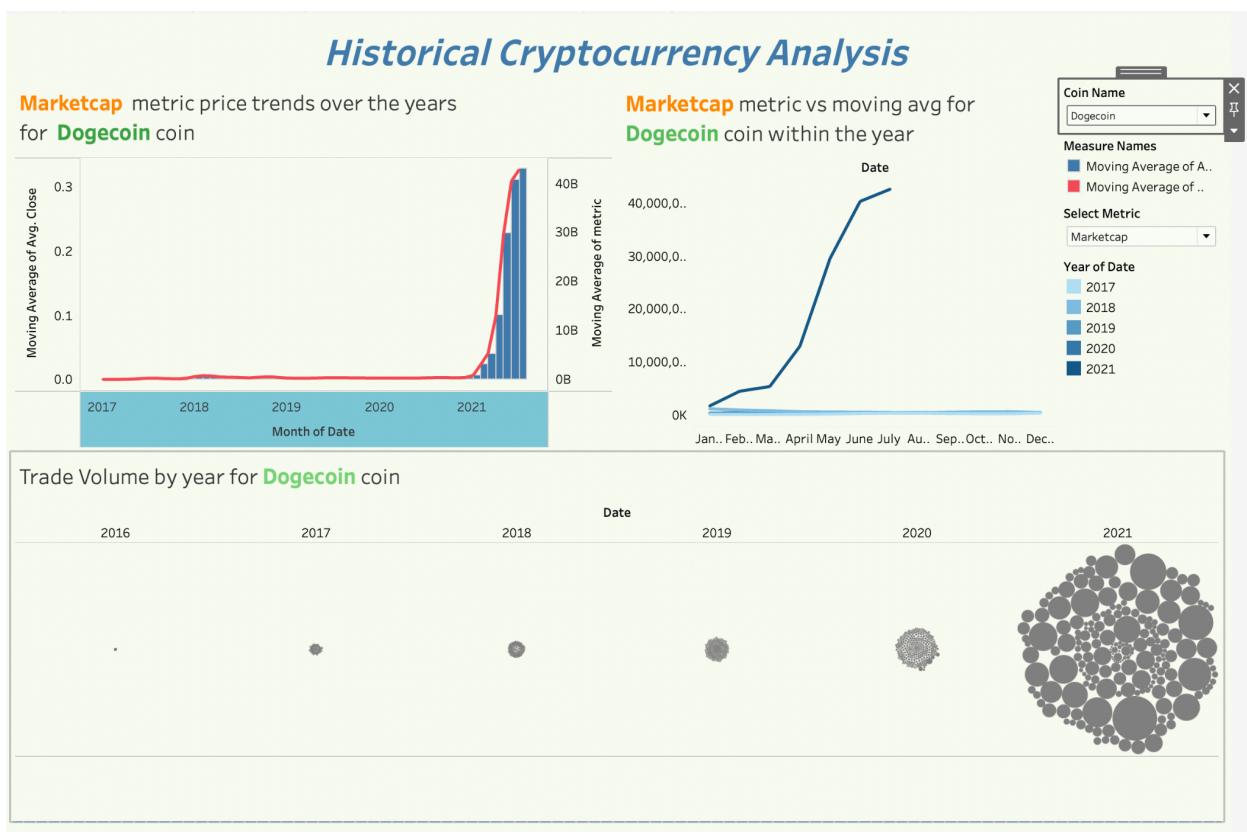


## Case 2:

The figure below shows the plot of Dogecoin crypto. As it can be seen, the increase in volume is not so great until 2020 but there is a huge spike in 2021, this may be attributed to a tweet from Elon Musk about this coin. In general, for coins to be considered as a stable long term investment, the trend should increase in a uniform manner without random fluctuations. Similar to Cardano in previous case study. The huge spike for Dogecoin in just one year indicates that it might be a volatile behaviour and it might not sustain in the long term.

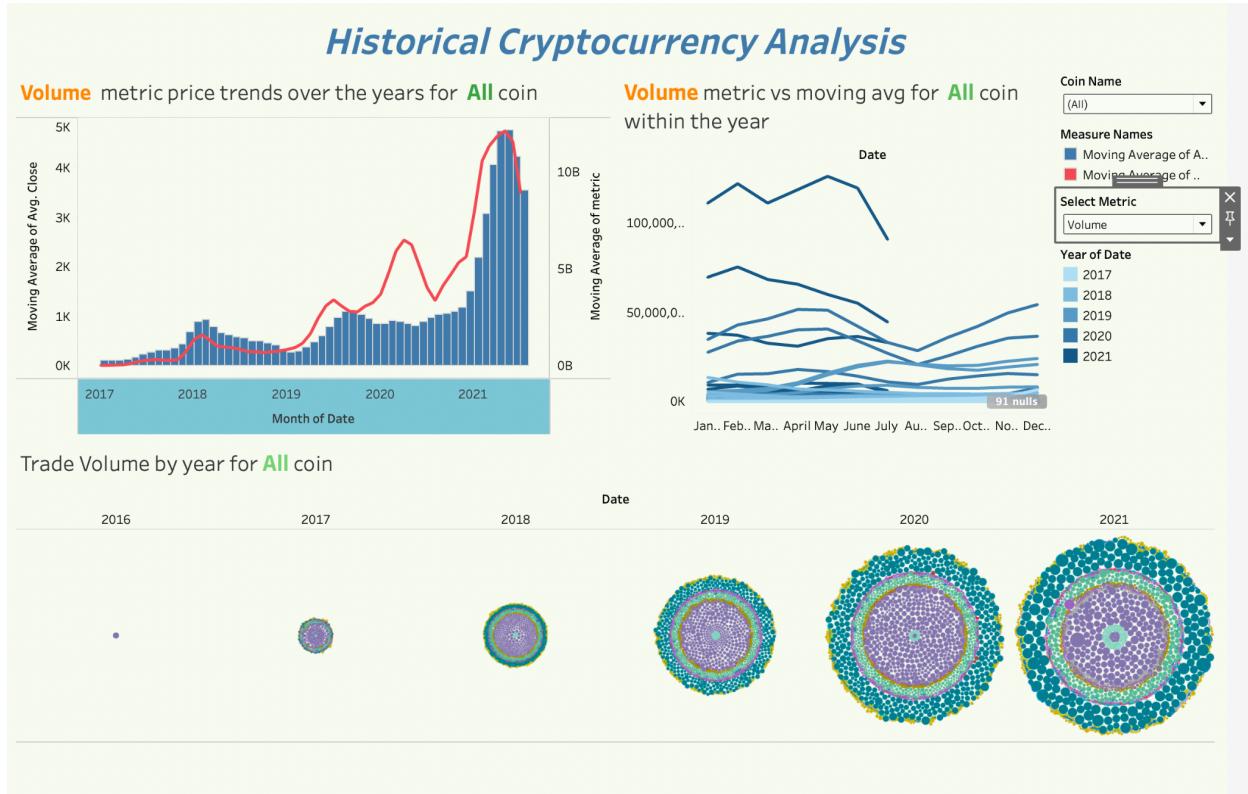
**Figure 19**

*Cluster graph shows Dogecoin information*



**Figure 20**

*Overall Historical Cryptocurrency analysis on Volume metric*



#### 5.4 Dashboard 3 (Top 5 Countries owning Crypto and Top 5 Crypto currencies)

In the third Dashboard, I am analyzing Top 5 Countries owning Crypto and Top 5 Crypto currencies. I have created two select parameters. One is for selecting metrics. Second one is to select the number of crypto owners and percentage of the population options. The below Figures show the Overall dashboard of top 5 Countries owning Crypto and Top 5 Crypto currencies.

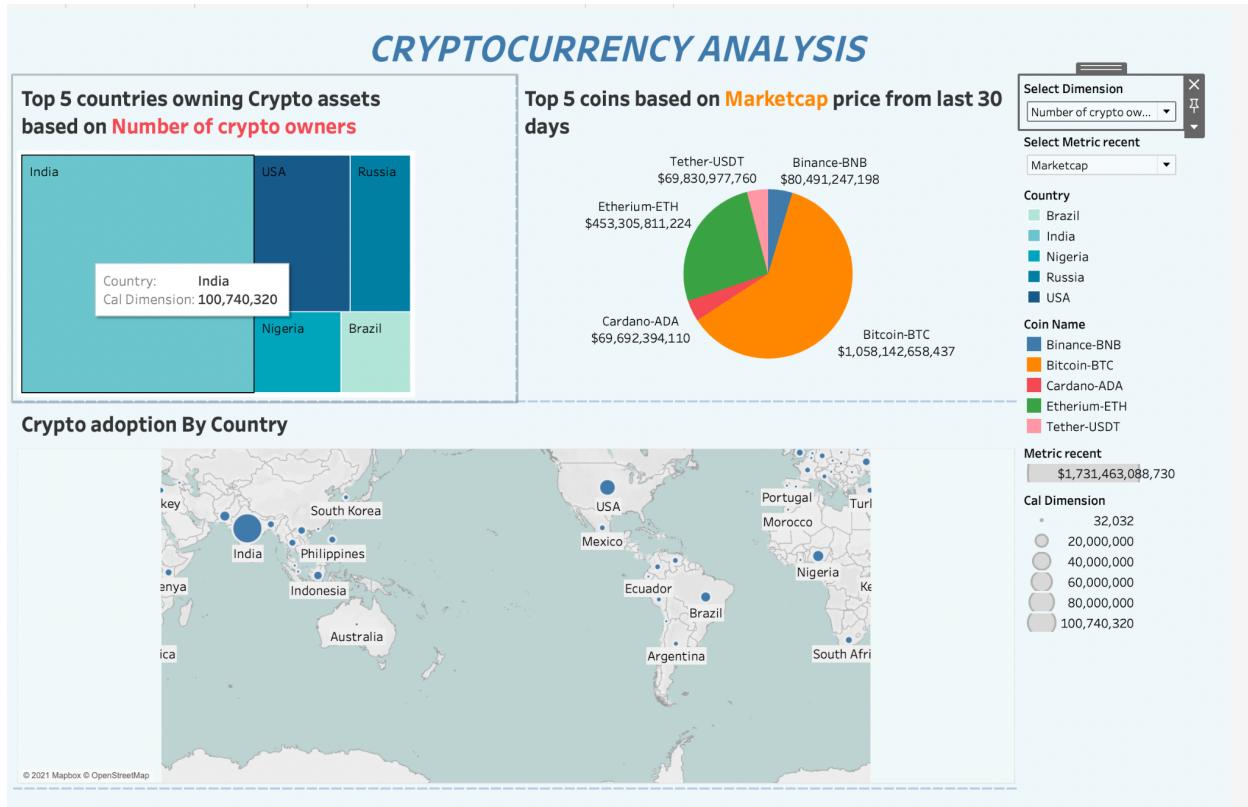
##### Case 1:

As we can see in the below right side of the graph shows the top 5 countries owning crypto assets based on the number of crypto owners. Based on the number of

crypto owners India is taking first place with 100 million crypto owners and followed by the USA. But we can see in the below graph, only 7% of the Indian population has owned crypto. Let's analyze this data based on Percentage of the population.

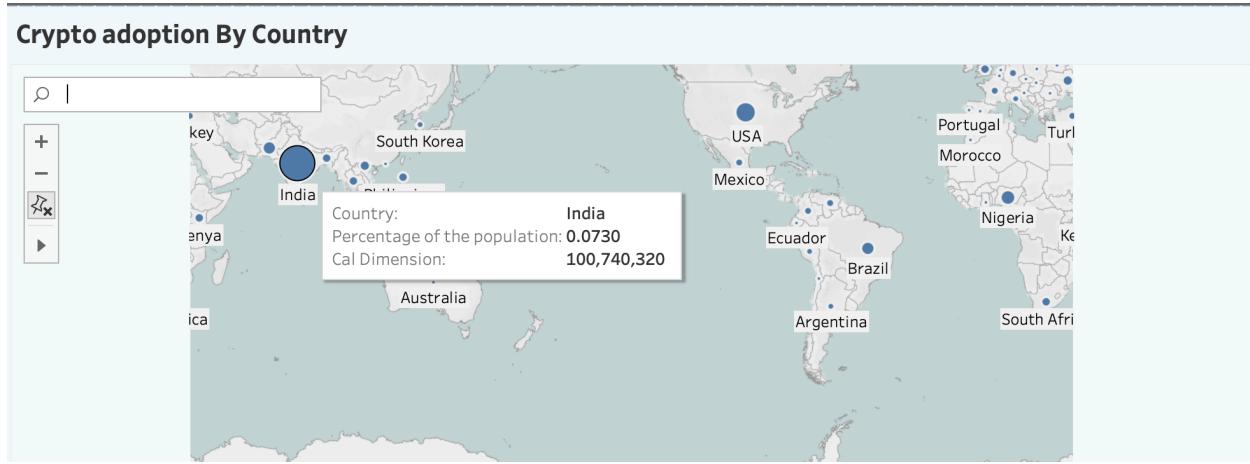
**Figure 21**

*Top 5 countries owning crypto assets based on number of crypto owners*



**Figure 22**

*Top 5 countries owning crypto assets based on number of crypto owners Geo graph*

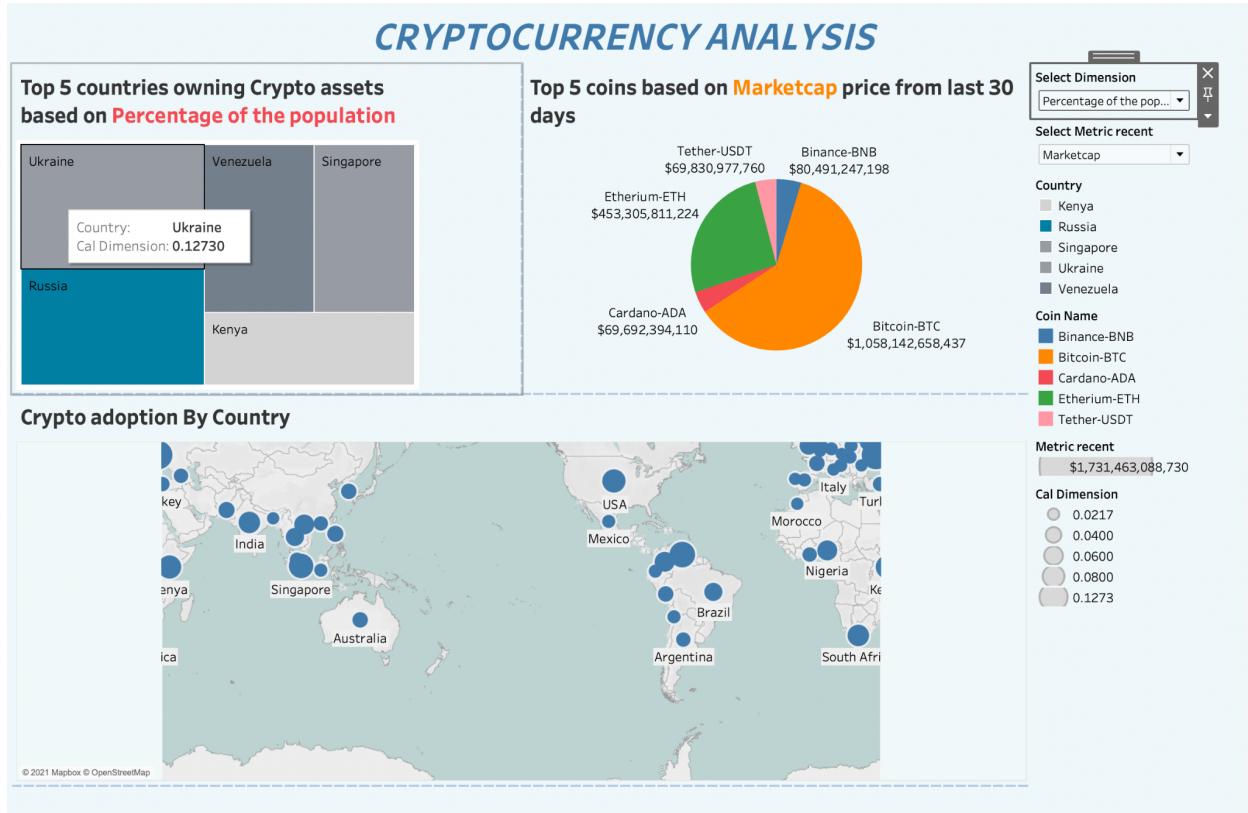


### Case 2:

To analyze the same data on percentage of the population, I selected a different option for the select parameter (percentage of the population) in the below dashboard Figure. If we analyze the same graph based on percentage of the population, we can see 12.7 % of the Ukraine population has owned Crypto and it is in first place followed by Russia. In the below Geo Map, the same thing is explained.

**Figure 23**

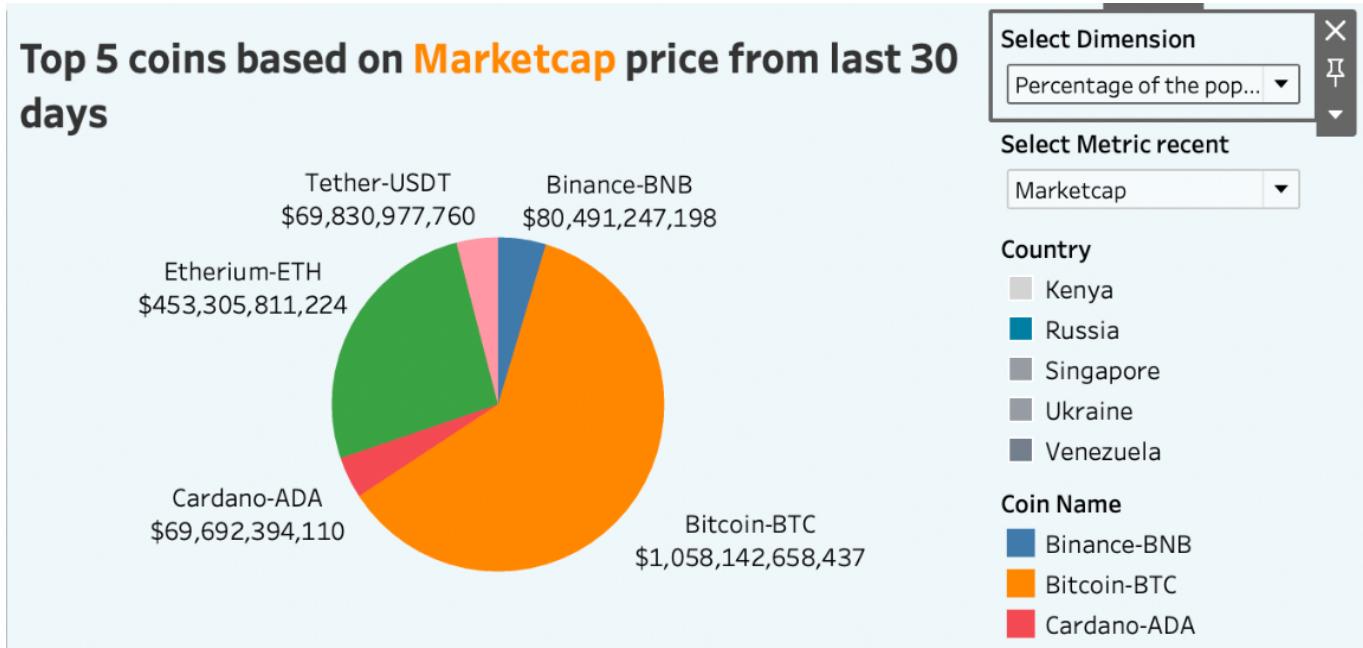
*Top 5 countries owning crypto assets based on percentage of the population*



The below pie chart is used to analyze the top 5 coins in the current market based on different metrics. As of now I have selected the Market cap metric to analyze the top 5 coins. As always, bitcoin is in first place with the highest market cap followed by Etherium. But we can see others catching up slowly.

**Figure 24**

*Pie chart shows top 5 coins based on Market Cap price from last 30 days using*



## 5.5 Dashboard 4 (D3.js)

Using D3.js which is a famous javascript library to build an interactive Dashboard. After doing all the coding in MAMP, integrating this html d3.js file into the Tableau dashboard [10] . In this assignment, I am using Cryptocurrency data from <https://marketcap.com/> which is free and publicly downloaded June 4 2021 data is used to analyze Cryptocurrency trends. Bubble charts are used in this dashboard to analyze the data. This chart is created by using HTML, CSS and JavaScript, using the library d3.js [7]. You can find detailed coding about this dashboard in my github account which I have given in this project.

### Goal of this D3.js dashboard

“Analyze Different Cryptocurrencies based on selected metrics like Market cap, Volume, Price, and Circulating Supply “

## Dashboard icons:

- 1) Each color of the bubbles represent each Crypto coin.
- 2) Radio buttons are created to select different metrics.
- 3) Based on selected radio buttons the bubble graph of the crypto coin data changes.
- 4) Size of the bubbles are based on the magnitude of the selected metrics.

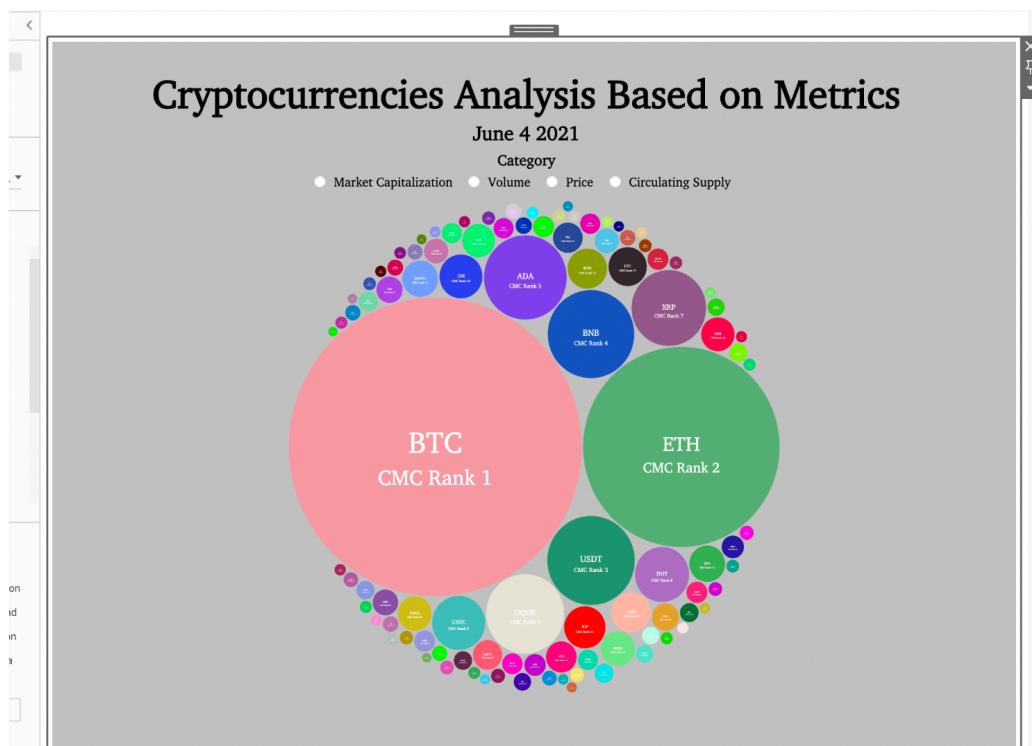
## Interactivity of the Tableau dashboard

### Case 1:

Screenshot of the Cryptocurrencies Analysis Based on metrics (Market capitalization, Volume, Price, and Circulating Supply). Here, no metric has been selected yet.

**Figure 25**

*Overall Bubble chart dashboard*



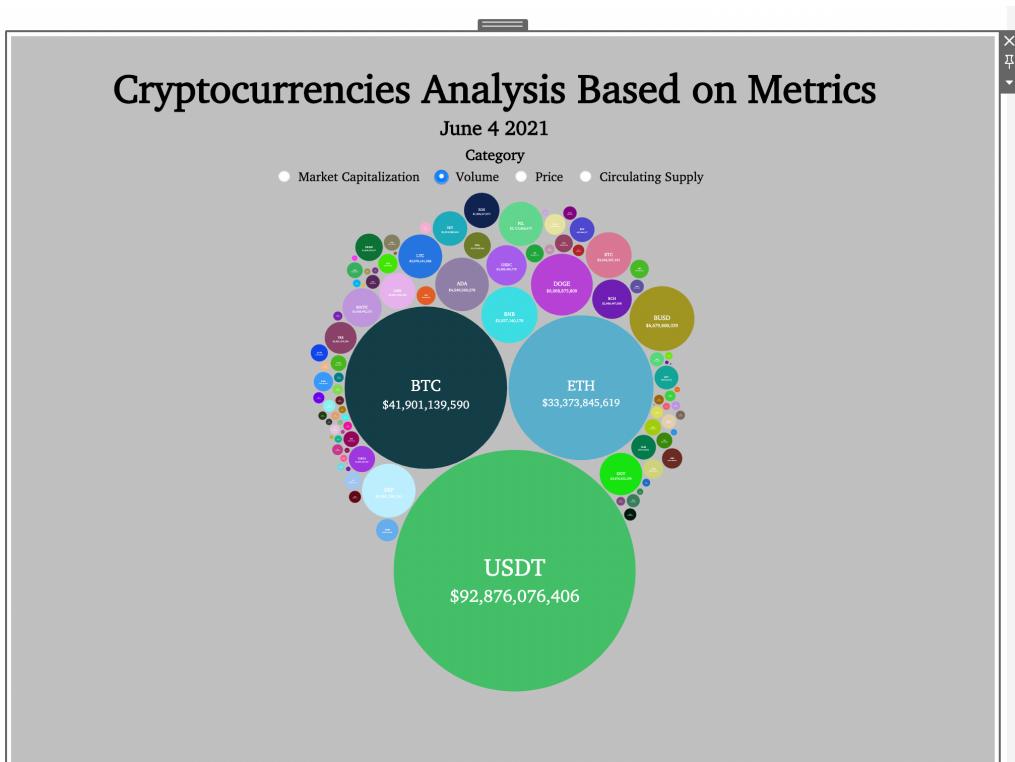
### Case 2:

In this step, I have selected a radio button “Volume” based on the Volume price of the Cryptocurrencies the bubbles size will change.

Based on Volume metric, the USDT coin is in higher magnitude than the BTC (Bitcoin) on june 4th 2021.

**Figure 26**

*Bubble chart dashboard showing coin trend for Volume metric*

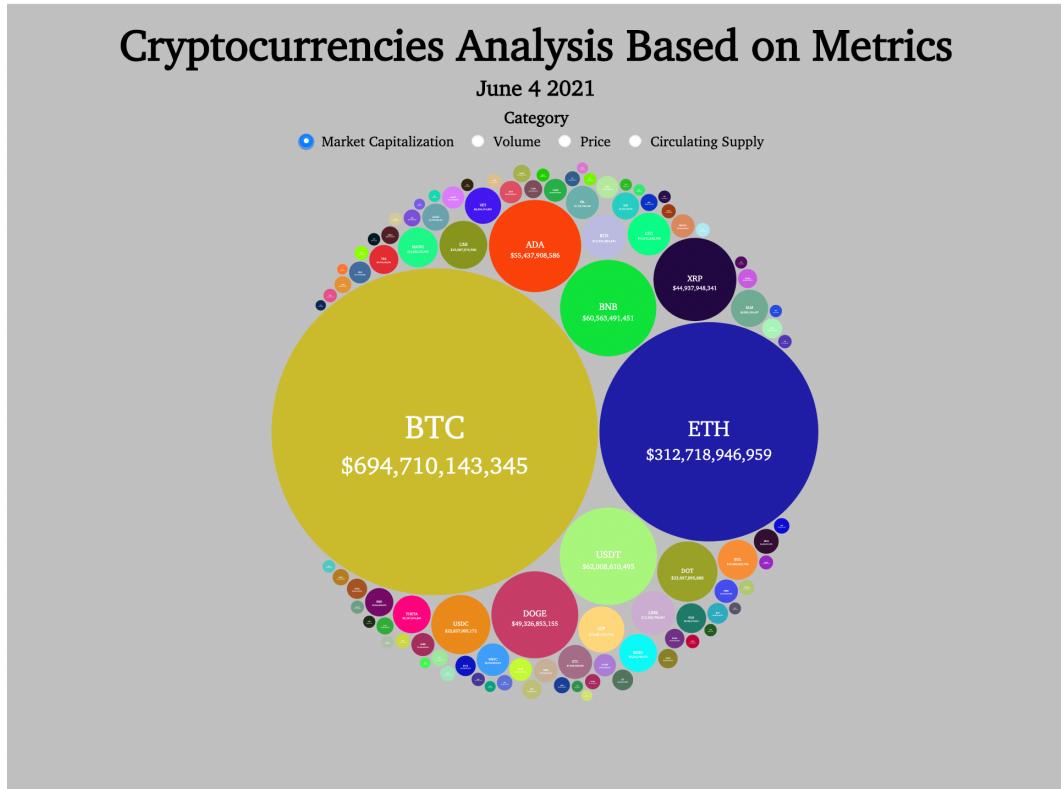


### Case 3:

In this step, I have selected a radio button “Market Capitalization” based on the Volume price of the Cryptocurrencies the bubbles size will change. Based on Market cap metric, the BTC (Bitcoin) is in higher magnitude and Followed by the coin ETH (Etherium) on june 4th 2021. Other coins are catching up slowly.

## Figure 27

## Bubble chart dashboard showing coin trend for Market cap metric

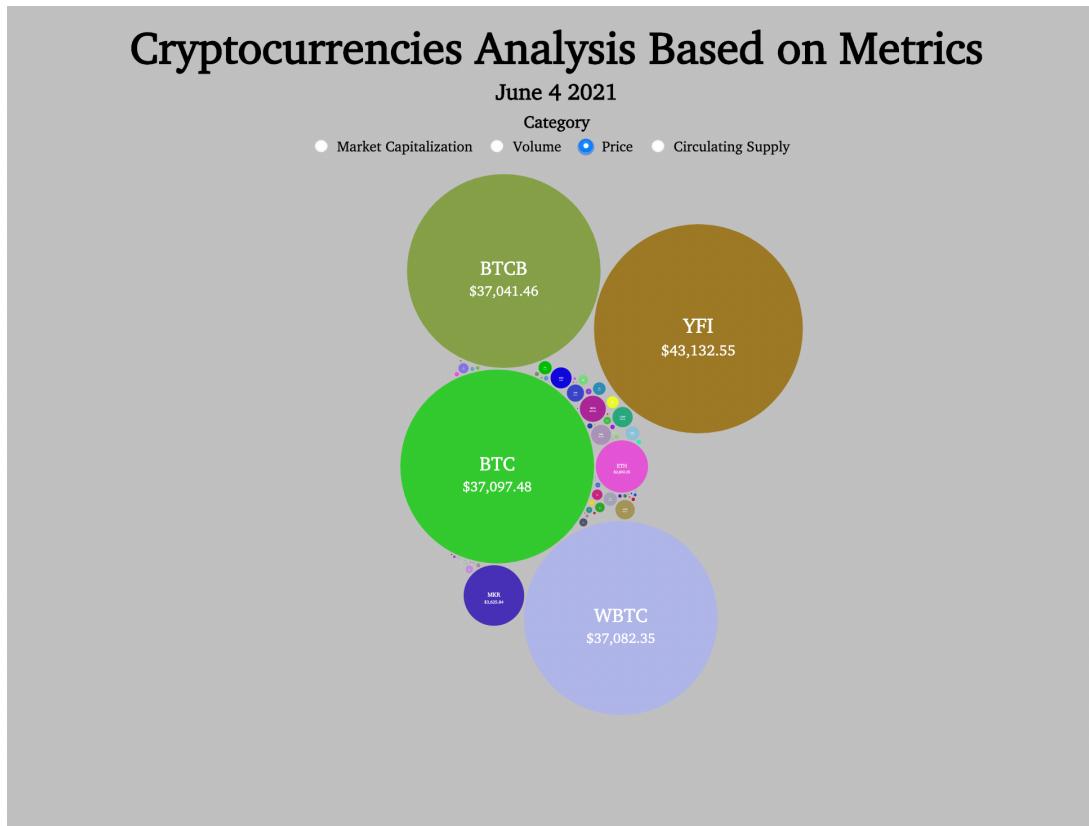


## Case 4:

In this step, I have selected a radio button “Price” based on the price of the Cryptocurrencies the bubbles size will change. Based on Volume metric, the BTC (Bitcoin) is in higher magnitude and Followed by the coin BTCB, and YFI on june 4th 2021. Other coins are catching up slowly.

**Figure 27**

*Bubble chart dashboard showing coin trend for Price metric*

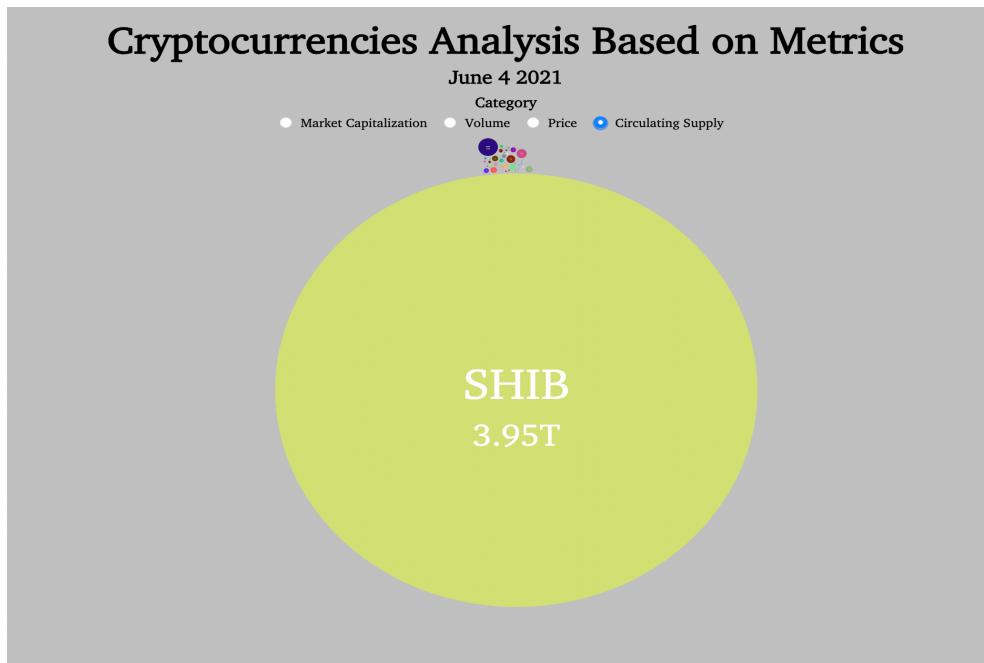


### Case 5 :

In this step, I have selected a radio button “Circulating Supply” based on the Circulating Supply price of the Cryptocurrencies the bubbles size will change. Based on this metric, the SHIB ( Shiba Inu) coin is in higher magnitude 3.5T and Followed by other coins on june 4th 2021. Other coins are catching up slowly. From this graph, we can analyze which coin is circulating more on the given day. Circulating means trading (Buying and Selling) of that coin.

**Figure 27**

*Bubble chart dashboard showing coin trend for Circulating Supply metric*



## 6 Summary And Conclusion

- Price of the coin alone will not give any information about how well the coin is doing.
- Market Cap is a better metric to understand the value of a coin.
- The Volume Indicates how trending the coin is.

### Things to Consider before investing in Crypto based on above analysis:

- Check Market cap rather than the price of the coin
- Follow the Trading Volume, Popular coins usually have higher Volumes
- Check for Volatility. Good coins usually have steady increases in market cap but volatile coins have random extreme highs and lows.

- Be cautious on new coins because they come with higher risk and there is not much market data available.

## **7. Deliverables**

- The Deliverables of this project includes:
- Tableau workbook which contains one Story Book and Three Dashboards.
- D3.js detailed Javascript, Html, Css codes which are in my github account.
- Detailed written report on this project which contains implementation details, screenshots, results, case studies, and conclusion of the project.
- The powerpoint ppt of the project.

## **8. Communication**

### **8.1 Canvas**

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### **8.2 Git**

I have uploaded D3.js dashboard code in my Github account, you can check this out here:

[https://github.com/Shwetavi5/Crypto\\_Analysis](https://github.com/Shwetavi5/Crypto_Analysis)

## 9. Project plan

### 9.1 Time schedule

Below table shows the detailed task phases and how I organized them to achieve the project goal which is “Cryptocurrency Analysis by using Visualizations”.

**Table 1**

*Project plan and time Schedule*

Task	Phase	Start Date	End Date
Task 1	Study the dataset and understand. Install Tableau Desktop and Tableau prep builder.	11 Sep 2021	17 Sep 2021
Task 2	Find Problems to solve based on the dataset.	18 Sep 2021	27 Sep 2021
Task 3	Collect data, Study how to prepare(cleaning and joining csv files) a dataset in Tableau Prep Builder and apply it in this project.	28 Sep 2021	29 Oct 2021
Task 4	Solve problems by Visualization By using Tableau Desktop and D3.js. Create a final dashboard.	30 Oct 2021	20 Nov 2021
Task 5	Prepare a final Report and PPT	20 Nov 2021	8 Dec 2021

## References

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