CRYPTOCURRENCY DATA ANALYSIS DASHBOARD

A PROJECT REPORT

Submitted by

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for

22ADF01 DATA ANALYSIS

DEPARTMENT OF ARTIFICIAL INTELLIGENCE

KONGU ENGINEERING COLLEGE
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PERUNDURAI ERODE – 638 060

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22ADF01 – DATA ANALYSIS PROJECT REPORT

Signature of course in-charge Signature of the HOD

Submitted for the continuous Assessment viva voice examination held on __

EXAMINER I **EXAMINER II**

ABSTRACT

The development of statistical modeling in finance has highlighted the complexities of analyzing and understanding market trends, particularly in the evolving field of cryptocurrency. Cryptocurrencies are among the most actively traded assets worldwide, and this analysis set out to visualize and explore the trends within top cryptocurrencies for the year 2022 through a dashboard approach using Power BI. According to this research, a significant factor in evaluating market performance is the relative market strength and volatility of major cryptocurrencies by market capitalization. The methodology focuses on analyzing key financial metrics, such as daily price movements, trading volume, and market capitalization, based on historical data spanning from April 2013 onward. The analysis involves not only individual cryptocurrency performance but also comparisons across multiple currencies to understand overall market dynamics. For accurate modeling, both recent and historical price data have been considered to capture meaningful trends. For this analysis, the *Cryptocurrency Price History* dataset was collected, and Power BI was used for data visualization. Pre-processing steps in the Power Query Editor were performed to clean and transform data, allowing for the selection of relevant columns. Various charts were created to represent different facets of cryptocurrency data, such as time series trends, volatility, and trading volumes. All charts are organized within a single, interactive dashboard, offering users an intuitive interface to access insights. The challenge lies in effectively displaying the key information for the entire year of 2022 in a single dashboard that remains interactive and understandable for a broad audience. This visualization approach requires data transformation, calculation of new metrics, DAX expressions, and custom visuals created in Power BI. Finally, to enhance accessibility, the dashboard is published to Power BI Services, where visuals are pinned for streamlined, dynamic viewing.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

- The dataset used for analysis and visualization in this project is the *Cryptocurrency Price History* dataset, sourced from Kaggle. It contains daily historical price data for major cryptocurrencies, including key attributes required for creating visualizations and dashboards, such as *Date*, *Open*, *High*, *Low*, *Close*, *Volume*, and *Market Cap*. This dataset is available in comma-separated values (CSV) format.
- Data files can be directly downloaded from Kaggle and imported into Power BI for analysis. Power BI provides a scalable platform for self-service and business intelligence, enabling users to connect to any dataset, visualize it, and embed these visuals into everyday business applications.
- The imported data is then pre-processed, involving steps such as filtering, cleansing, de-duplicating, validating, and transforming the data. This process includes formatting data into tables, performing calculations, creating summaries, handling missing or null values, changing data types, and applying DAX measures.
- Power BI offers two main components: Power BI Desktop for desktop-based data analysis and Power BI Services, a cloud-based business intelligence tool. Together, these components allow users to create and publish interactive dashboards, perform data discovery, and prepare data for further analysis.
- Additionally, Power BI Embedded, a Microsoft service on the Azure platform, supports embedding custom visuals, a significant advantage for this project. This functionality enables users to develop unique, interactive visuals that enhance the dashboard's ability to provide insightful, user-friendly analysis.

1.2 DATA COLLECTION

Data collection involves gathering, measuring, and analyzing precise information that is critical for research and hypothesis testing. It is typically the first and most crucial phase of the research process, as it provides the raw data needed for analysis. For this cryptocurrency analysis project, data collection focuses on historical and up-to-date cryptocurrency price data, which is essential for creating accurate, insightful visualizations and dashboards.

Dataset

The dataset used in this project is sourced from Kaggle.This dataset provides comprehensive, daily historical price information for some of the top cryptocurrencies by market capitalization, dating back to April 28, 2013.

Data Fields

This dataset includes the following key metrics for each cryptocurrency:

- **Date**: The observation date.
- **Open**: The opening price on the given day.
- **High**: The highest price reached during the day.
- **Low**: The lowest price reached during the day.
- **Close**: The closing price on the given day.
- **Volume**: The total volume of transactions for the day.
- **Market Cap**: The market capitalization in USD, indicating the cryptocurrency's total market value.

Source and Structure

Collected and structured for easy import into data analytics tools, each cryptocurrency's data is stored in separate CSV files. This format enables both individual analysis of each cryptocurrency and comparative analysis across multiple cryptocurrencies. The dataset structure facilitates time-series analysis, allowing us to track price and volume trends over time.

Historical Data

The dataset spans several years, providing valuable historical context for analyzing long-term trends, volatility, and market behavior in the cryptocurrency space. By using this extensive data, we can observe historical price movements and compare current trends against past performance.

Dataset Link:

Cryptocurrency Dataset

1.3 PROBLEM STATEMENT

Cryptocurrencies are highly volatile assets, making it challenging for analysts and investors to understand and predict market trends effectively. Despite their growing popularity and substantial market impact, analyzing cryptocurrency performance remains complex due to rapid price fluctuations, varying trading volumes, and inconsistent market capitalization. Additionally, the lack of centralized, comprehensive data on historical price trends, trading volumes, and market caps for multiple cryptocurrencies makes it difficult to assess relative performance over time.This project aims to address these challenges by utilizing historical cryptocurrency data to provide insights into price trends, volatility, and market dynamics. By consolidating data on top cryptocurrencies and creating an interactive Power BI dashboard, this analysis seeks to facilitate data-driven insights, enabling stakeholders to make more informed decisions in a fluctuating market environment.

1.4 BUSINESS OBJECTIVE

1. To analyze and visualize the historical performance of top cryptocurrencies over time using Power BI.
2. To evaluate the best-performing cryptocurrencies in terms of market capitalization and trading volume for the year 2022.
3. To compare the daily performance of multiple cryptocurrencies and understand trends in price, volatility, and market share.

4. To identify and analyze the highest and lowest performing cryptocurrencies to support data-driven investment decisions.
5. To monitor real-time changes in price and volume using API data, providing timely insights for market participants.

ABOUT POWER BI:

1. Power BI, a business analytics tool from Microsoft, offers interactive data visualization BI features that let users see and share information throughout their organization. By using data interactively and visualizing it, Power BI offers insight data. Utilize the data models to produce reports and visuals.
2. A business user can use it to centralize measurements and significant company goals so they can track their progress. In addition, it promotes cooperation and interaction on the site while being simple to use and aesthetically pleasing.
3. In the modern world people are very busy with their duties so they don't have enough time to look into the entertainment especially looking into cricket score and analysis takes more time so it is necessary to summarize all the events that happened in a cricket needed to be visualized attractively and understand to everyone easily.
4. So, for this purpose it is necessary to prepare dashboard. Power BI is a tool that
5. users easily visualize dynamic and interactive Reports/Dashboards by utilizing its Business Intelligence Capabilities.
6. Power BI is a tool that makes decision-making easier as it offers a wide range of interactive visualizations along with Business Intelligence Capabilities.

CHAPTER 2

DATA PREPARATION AND MODELING

2.1 DATA CLEANING

Data cleaning is the process of removing errors from the data by filling in missing values, smearing noisy data, analyzing and removing outliers, and smoothing noisy data. Data at various degrees of detail may occasionally diverge from what is needed Missing Values – Appropriate values are substituted for missing values. The strategies listed below

- When a tuple contains many attributes with empty values, it is Disregarded.
- For the missing value, the values are manually filled in.
- The values may be filled with the same global constant.
- The attribute mean can replace the values that are absent.
- The most likely value can be used to fill in the blanks.

2.2 DATA TRANSFORMATION

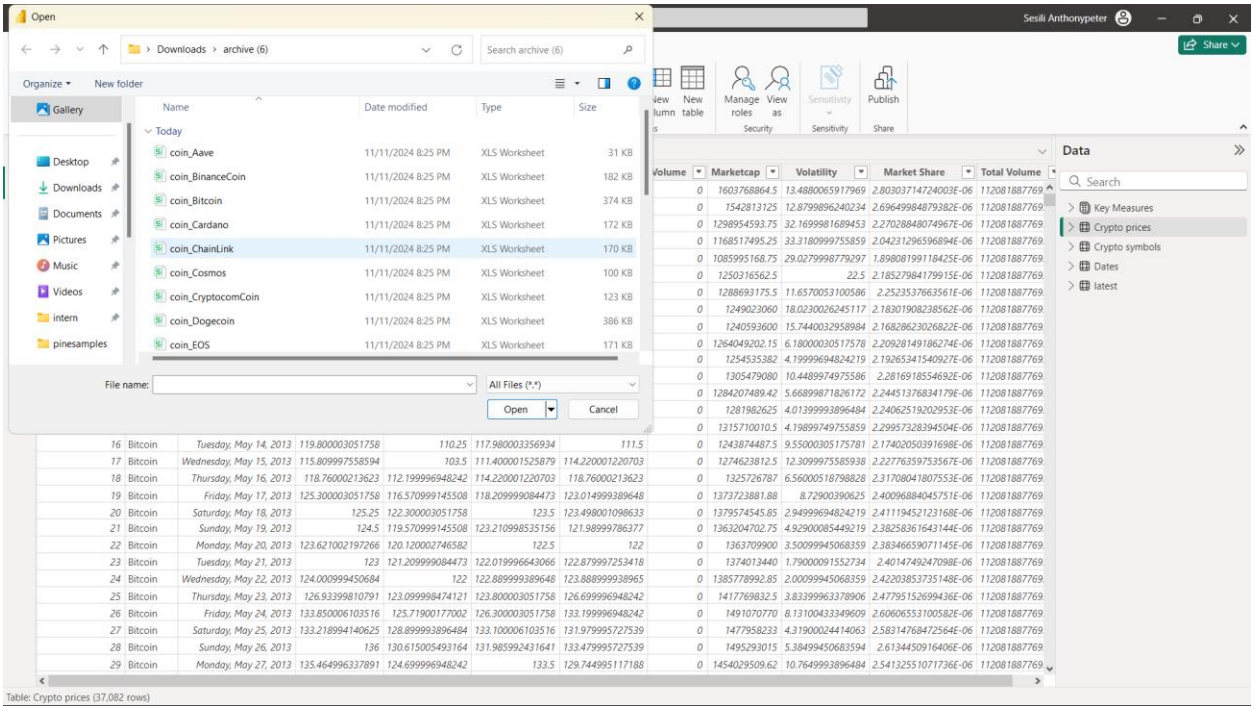
1. The process of changing data from one format or structure to another is known as data transformation. It is a crucial component of the majority of data management and integration jobs including application integration, data wrangling, data warehousing, and data integration.
2. Depending on the required modifications to the data between the source (initial data) and the destination (final data), data transformation can be straightforward or difficult. The process of data transformation often involves both manual and automated procedures.
3. Depending on the format, structure, complexity, and amount of the data being changed, a broadrange of tools and technologies may be employed. For decades, corporations have benefited greatly from using conventional data transformation techniques.
4. Since the development of the various tools and technologies (data profiling, data visualization, data purification, data integration, etc.), most (if not all) businesses now transform massive volumes of data that feed internal and external applications, data warehouses, and other data repositories.

5. So, Data Transformation is a required process inorder to preprocess the loaded data set as per our requirement and apply those changes for future use. It is while Data Analysis and creating DAX functions of those relations respectively

PROCEDURE:

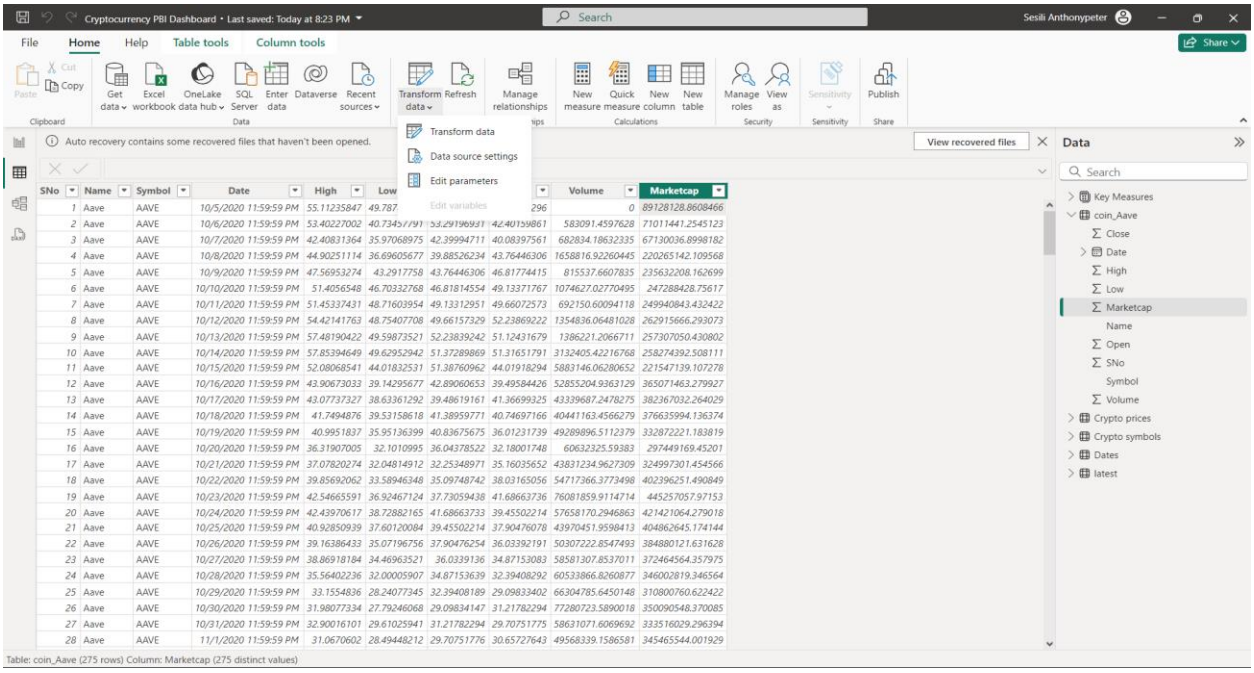
STEP 1

1. Go to HOME tab in ribbon.
2. Click on GET DATA and select data from the system or from any platform where it resides.
3. Here select 24 different tables of CSV format from system and load it to POWER BI.



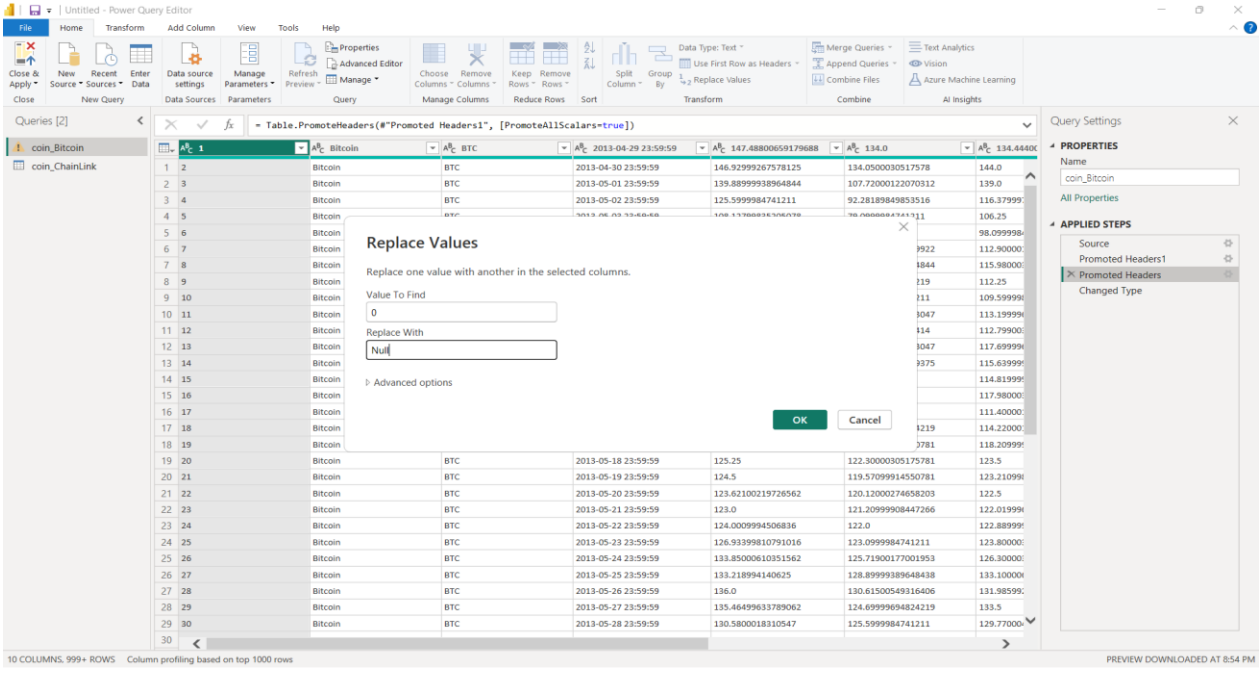
STEP 2

1. From the ribbon of HOME tab select TRANSFORM DATA inorder to clean and transform data.



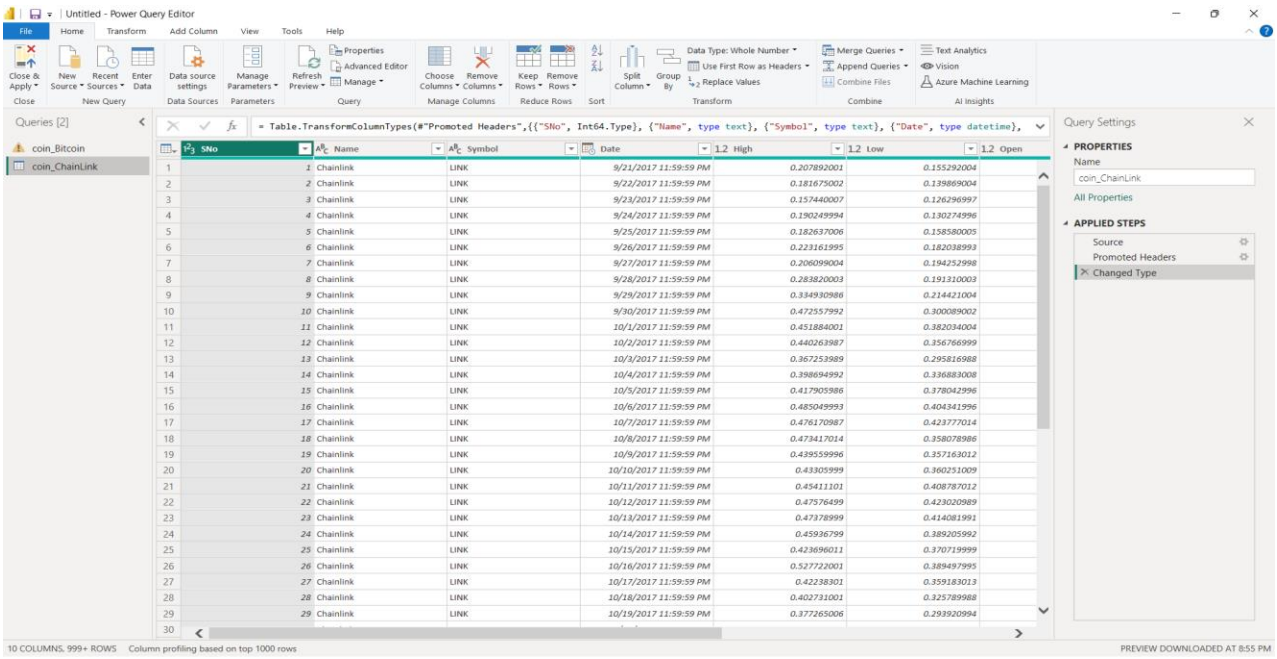
STEP 3

1. Then on same COIN_BITCOIN table apply REPLACE VALUES.
2. In this select any column that need new values to be replaced for further processing.



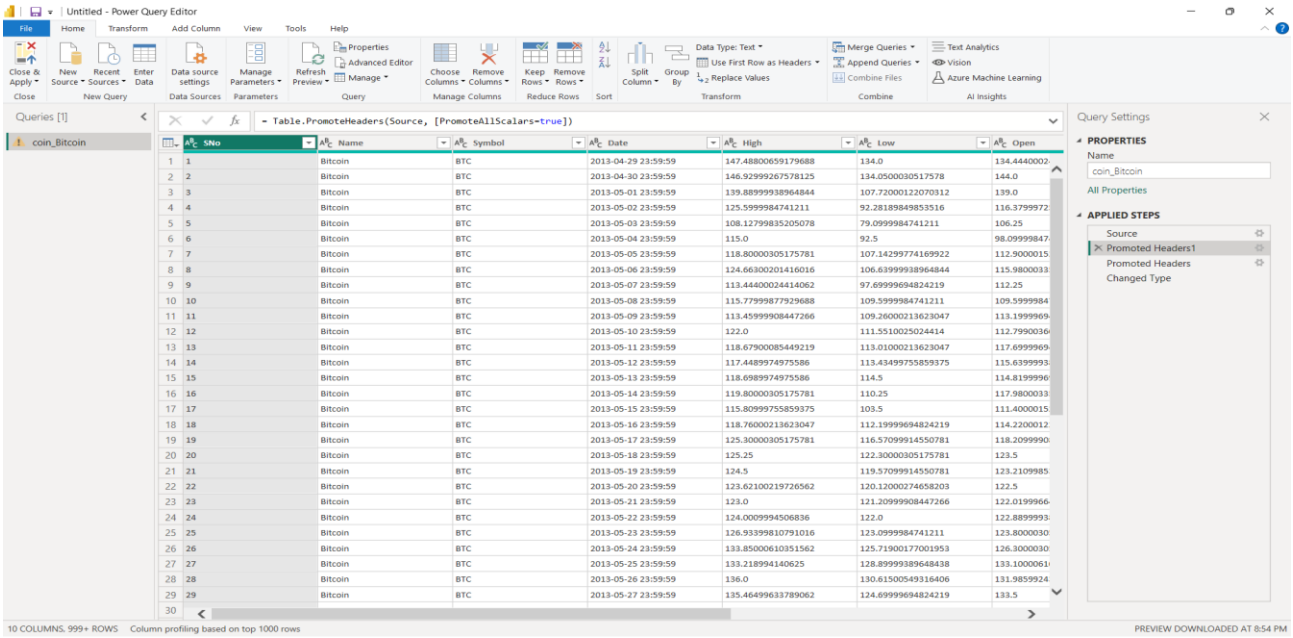
STEP 4

1. This step automatically loads the data source into Power Query.
2. You can find this option by selecting Home > New Source.
3. It imports your data so you can begin transformations.



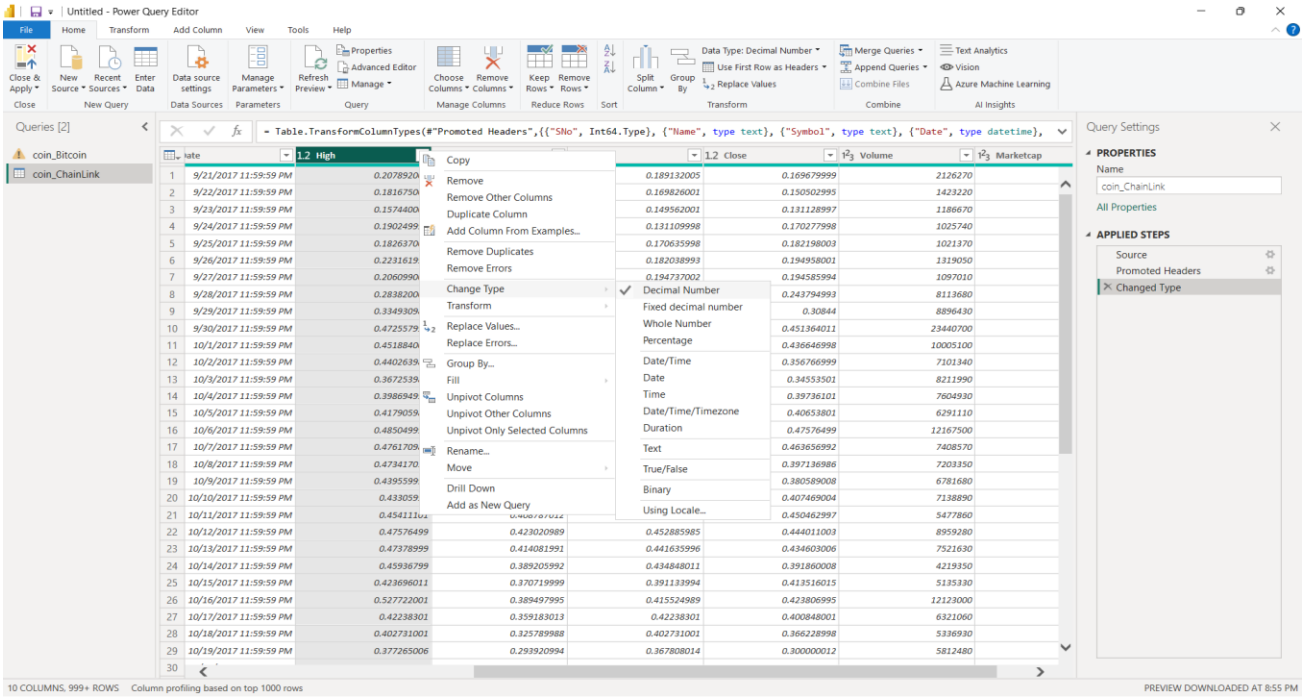
STEP 5

1. Promotes the first row of your dataset to become the column headers.
2. To perform this, select Home > Use First Row as Headers.
3. This makes the dataset more readable by giving meaningful names to columns.



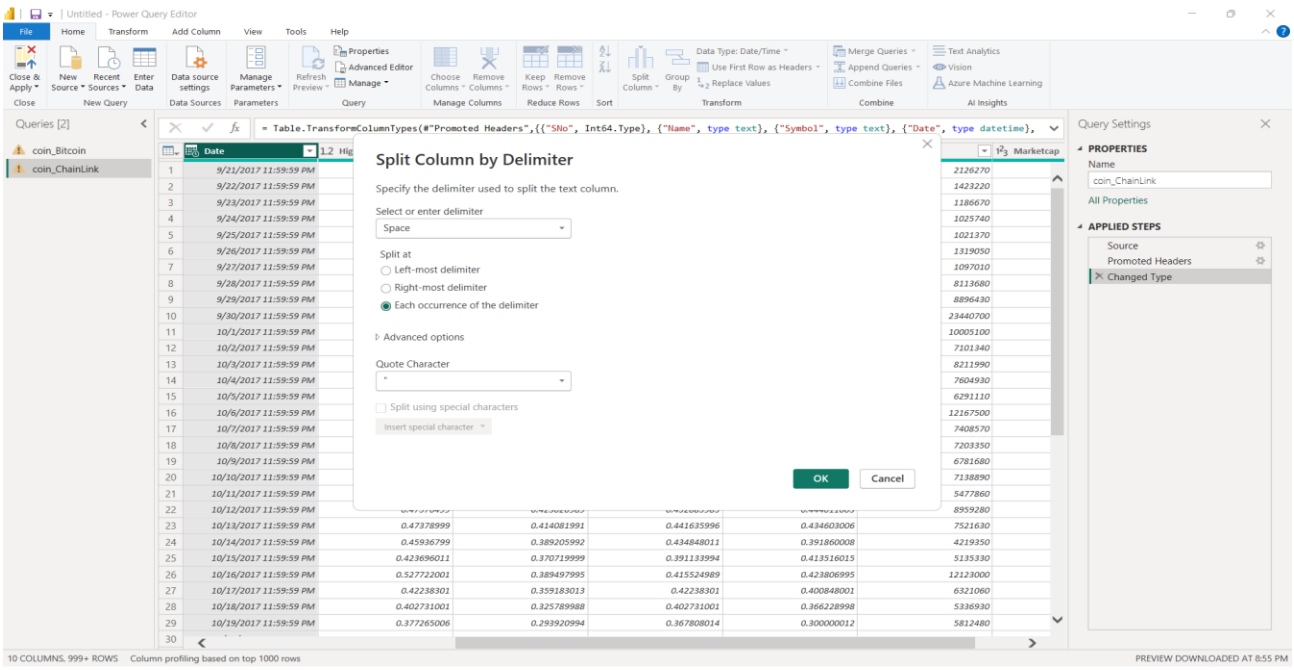
STEP 6

1. Automatically detects and assigns appropriate data types (like Date, Text, or Number) to each column.
2. To apply this, select Transform > Detect Data Type, or manually choose the type for each column.
3. Ensures each column has the correct data type for accurate analysis and transformations.



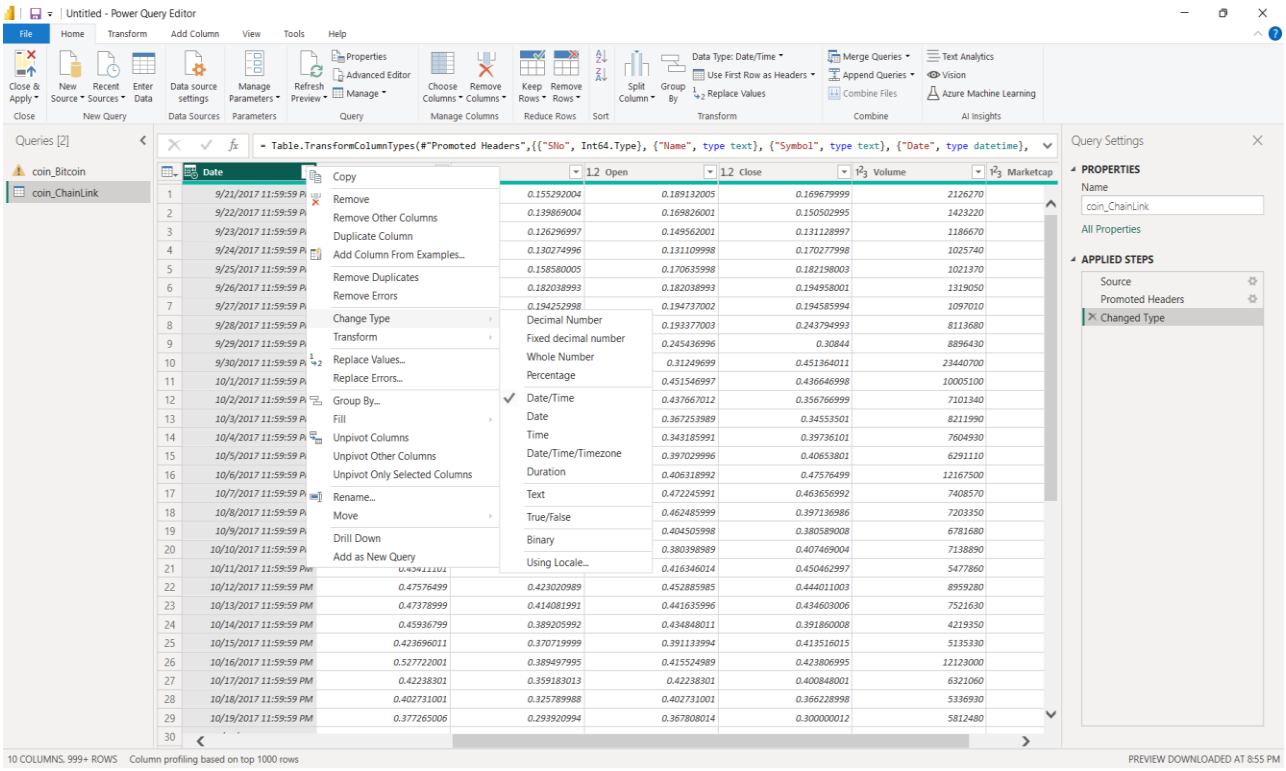
STEP 7

1. Splits a column based on a specific delimiter, like a comma or space.
2. Select the column, then choose Transform > Split Column > By Delimiter.
3. This separates combined values in a column into individual columns, helpful for tags or categories.



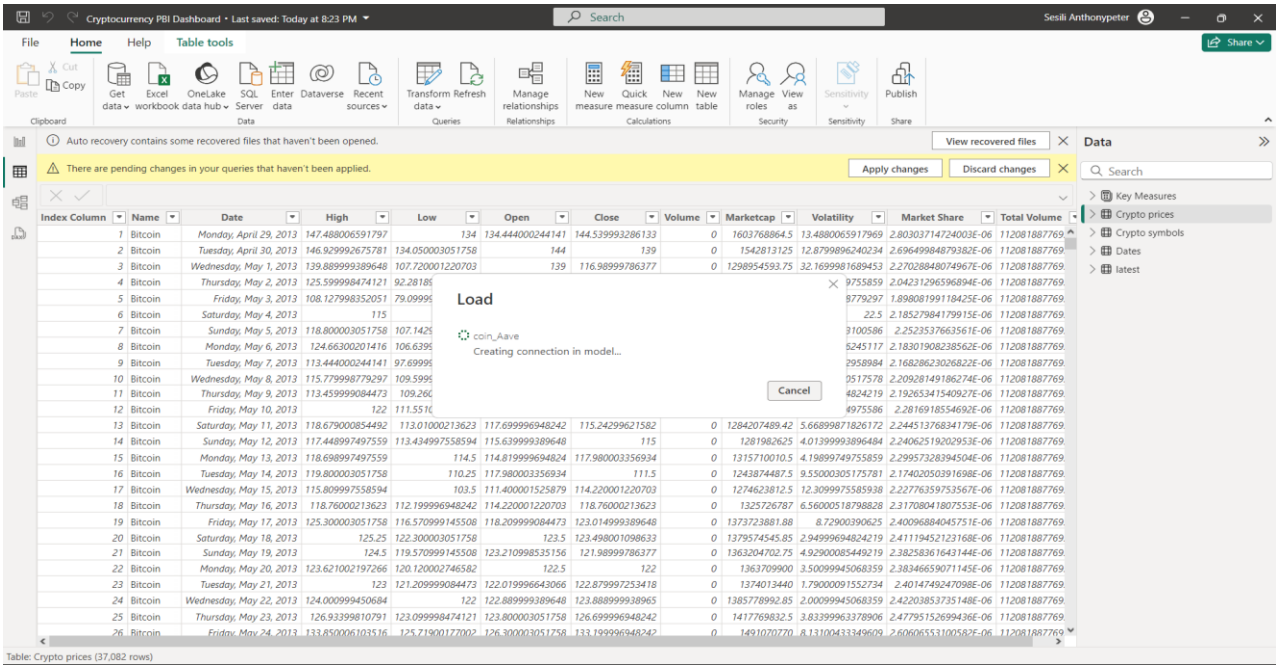
STEP 8

1. Similar to the initial Changed Type step, it reassigns data types after additional transformations.
2. Again, use Transform > Detect Data Type or manually change data types.
3. This step is necessary after operations like splitting, where data types may reset.



STEP 9:

1. After completing transformations like cleaning, filtering, and reformatting, load the dataset into Power BI for analysis.
2. Select Home > Close & Apply in Power Query Editor to load the transformed data into Power BI's data model.
3. Ensure all changes are saved and applied for accurate analysis and visualization**.**



2.3 DAX (Data Analysis Expressions)

DAX is a special function that contains collection of operators, formulae, functions, expressions to calculate, process and execute the values from existing table and return one or more values as the result of respective functions. So, it is used to create new information from the datas that already exist in the table while creating model and analyzing it.

DAX measured of Power Bi are special functions or Programming Language that are used to create the following such as

- Calculated columns
- New measures
- Customized tables

- Quick measures
- Implement Time Intelligence

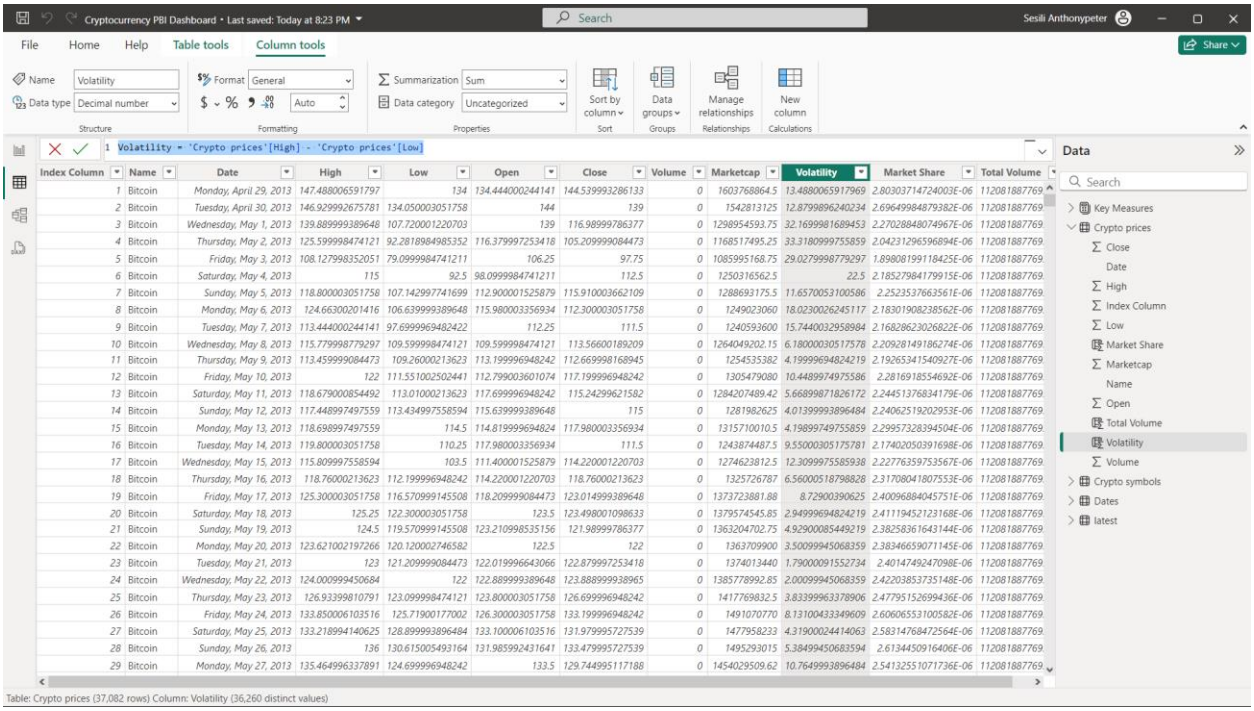
There exist many formulae for creating the new columns, measures. The time intelligence are special functions the are applicable only for the Time-based columns only.

So, from these formulae and expression we can find results like maximum, minimum, average, count, sum, filters, difference, total, variance, percentage, addition, subtraction, division, etc.….

STEP 1

1. In the Crypto prices table, right-click and select New column.
2. In the formula bar, enter the following formula for the new column and press Enter:

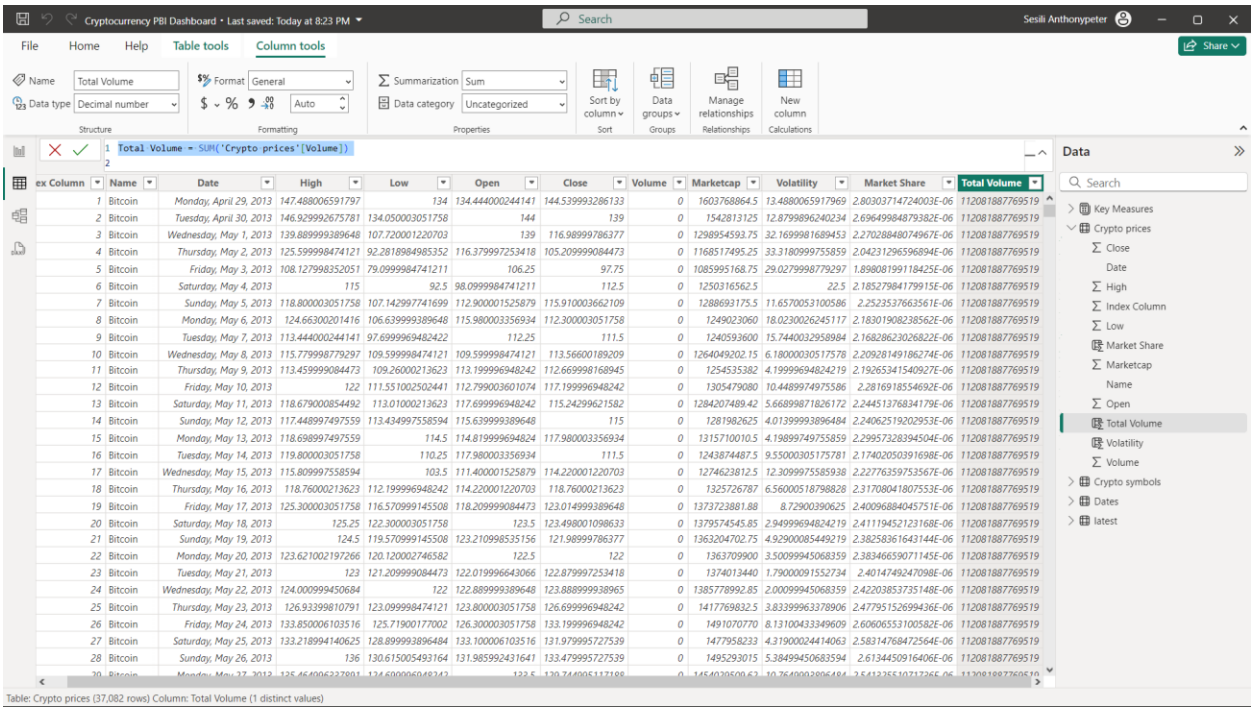
   Volatility = 'Crypto prices'[High] - 'Crypto prices'[Low]
3. This creates a new column, Volatility, that calculates the daily price range for each entry in the Crypto prices table.



STEP 2

1. In the Crypto prices table, right-click and select New measure.
2. In the formula bar, enter the following formula and press Enter:

   Total Volume = SUM ('Crypto prices'[Volume])
3. This creates a measure, Total Volume, which calculates the sum of the trading volume across all entries in the Crypto prices table.

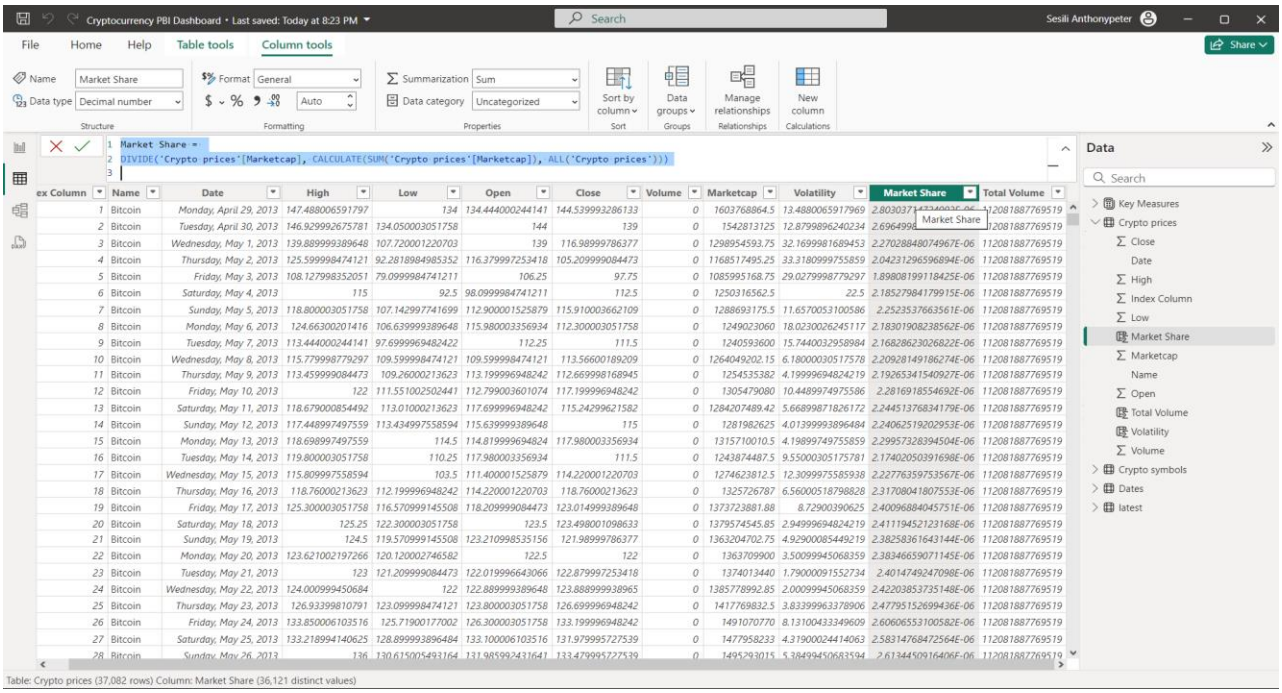


STEP 3

1. In the Crypto prices table, right-click and select New measure.
2. In the formula bar, enter the following formula and press Enter:

   Market Share = DIVIDE('Crypto prices'[Marketcap], CALCULATE(SUM('Crypto prices'[Marketcap]), ALL('Crypto prices')))

3. This creates a measure, Market Share, which calculates each cryptocurrency's market share as a percentage of the total market capitalization in the Crypto prices table.



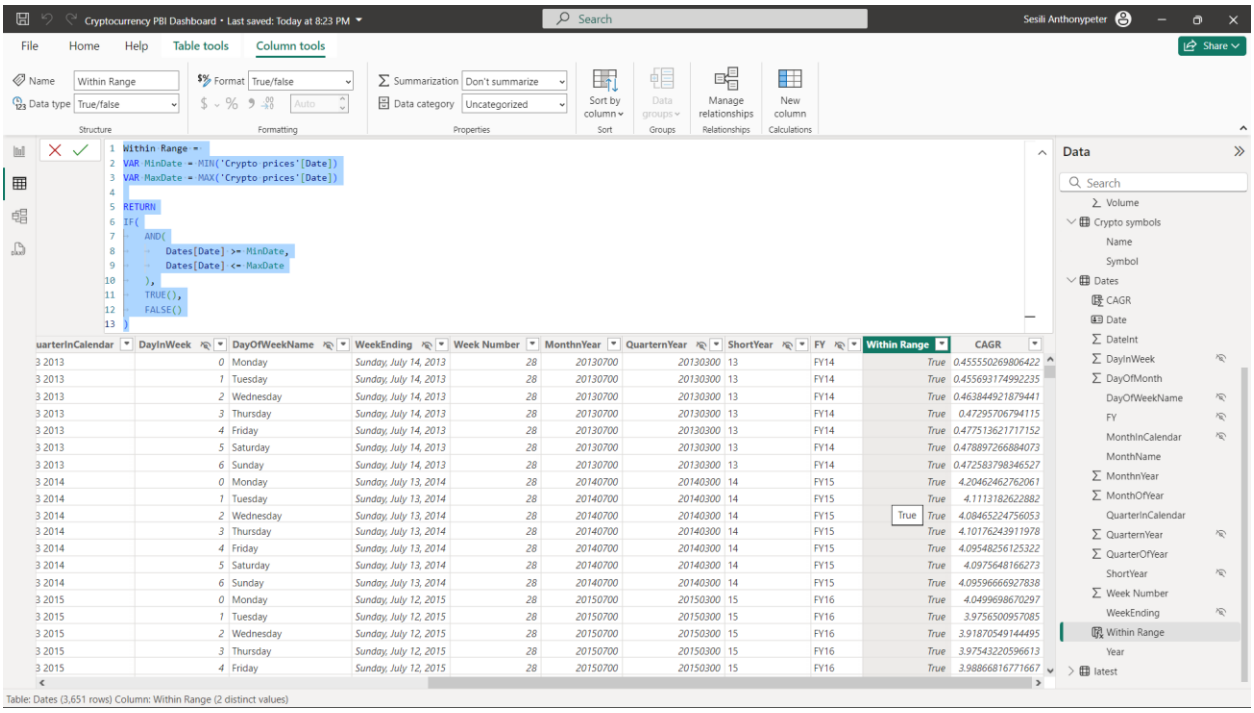
STEP 4

1. In the Crypto prices table, right-click and select New column.
2. In the formula bar, enter the following formula and press Enter:

```
Within Range =
    VAR MinDate = MIN('Crypto prices'[Date])
    VAR MaxDate = MAX('Crypto prices'[Date])
    RETURN
    IF(
        AND(
            Dates[Date] >= MinDate,
            Dates[Date] <= MaxDate
        ),
        TRUE(),
        FALSE()
    )
```

3. This creates a column, Within Range, that checks if each date in the Dates table falls within the range of dates in the Crypto prices table, returning TRUE if within range and

FALSE otherwise.



STEP 5

1. In the Crypto prices table, right-click and select New measure.
2. In the formula bar, enter the following formula and press Enter:

   CAGR =

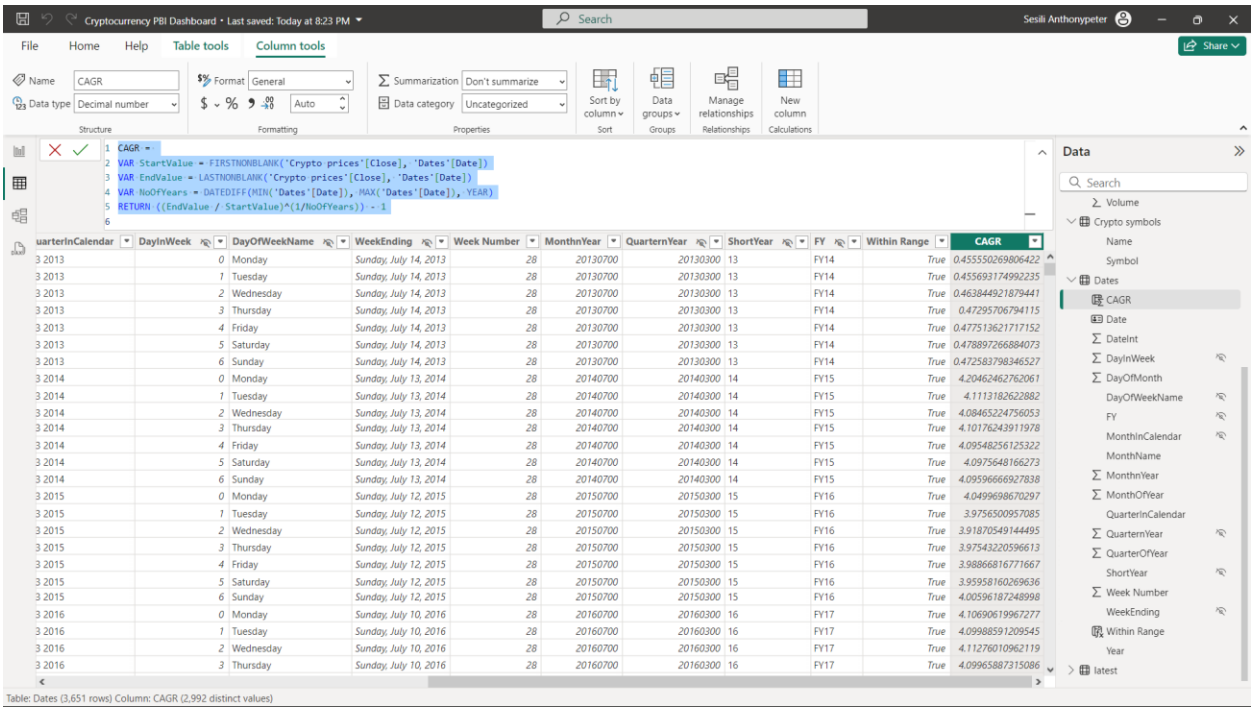
   VAR StartValue = FIRSTNONBLANK('Crypto prices'[Close], 'Dates'[Date])

   VAR EndValue = LASTNONBLANK('Crypto prices'[Close], 'Dates'[Date])

   VAR NoOfYears = DATEDIFF(MIN('Dates'[Date]), MAX('Dates'[Date]), YEAR)

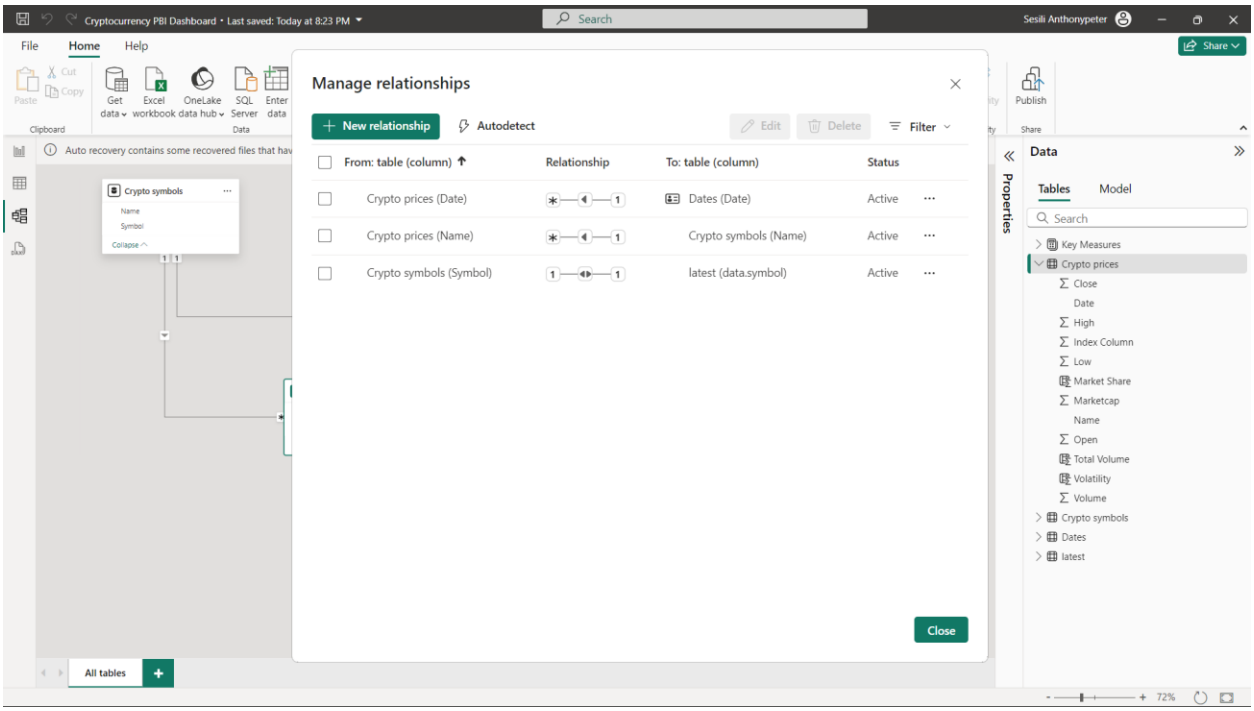
   RETURN ((EndValue / StartValue)^(1/NoOfYears)) - 1

3. This measure, **CAGR**, calculates the Compound Annual Growth Rate for the **Close** price in the **Crypto prices** table over the specified date range. It takes the first and last closing values and the number of years between them to determine the annualized growth rate.



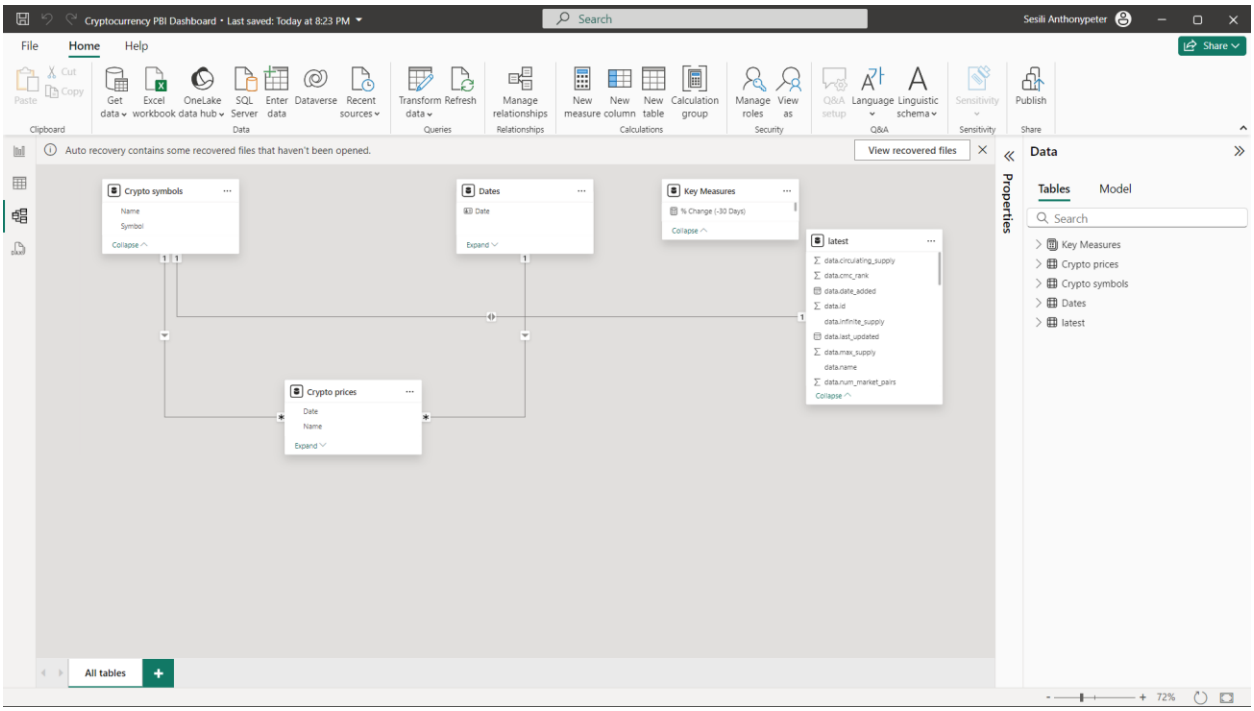
STEP 6:

1. Create relationships between the tables used in the **Crypto prices** model.
2. Select **Model** from the left ribbon in Power BI to start building relationships.
3. All tables in the model will be displayed here.
4. Use the appropriate key fields (e.g., primary or foreign keys) to create relationships, choosing the suitable type (e.g., one-to-one, one-to-many, many-to-one, or many-to-many) as needed for accurate data connections.



STEP 7:

1. Select all tables displayed in the Model view.
2. Identify the primary keys in each table, then link them with corresponding fields in other tables to establish relationships.
3. For example, link the Date field in the Crypto prices table with the Date field in the Dates table to create a relationship.
4. Similarly, continue creating relationships between tables, such as linking id fields across relevant tables to set up one-to-many or many-to-one relationships as necessary.
5. Review the relationships in the Model view to ensure they align as shown in the example layout, confirming that all required connections are in place for accurate data integration.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Share
Auto recovery contains some recovered files that haven't been opened.
View recovered files
Crypto symbols
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data.cmc_rank
data.date_added
data.id
data.infinite_supply
data.last_updated
data.max_supply
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CHAPTER 3

DATA ANALYSIS AND INTERPRETATION

3.1 DATA ANALYSIS

To turn raw data into insightful information, data analysis is the process of analyzing, manipulating, and monitoring. Making the necessary decisions for a business or company's growth is made easier with the use of data insights. Deep data analysis is crucial if need want to manage a firm that is data-driven. Then it is needed to find learning different Power BI data im

Data analysis includes the following results

1. Used to create various charts from Power Bi visuals
2. Select datas from various tables, analyse it and convert it into visuals.

From the analysed result infer the result or final solution.

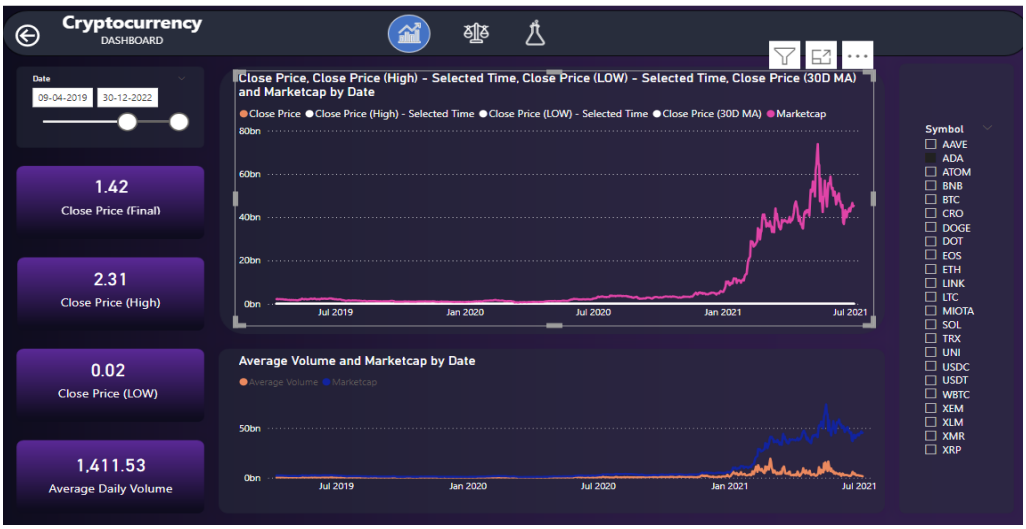
CHARTS

1.How does the total market capitalization of a specific cryptocurrency evolve over time, and how does it compare to the cumulative market capitalization of all cryptocurrencies over the same period?

➔ Select table Crypto prices.

➔ Create a calculated measure "Sum of Market Capitalization" for tracking total market cap over time.

➔ Select line chart for visualization to display the growth and fluctuations.

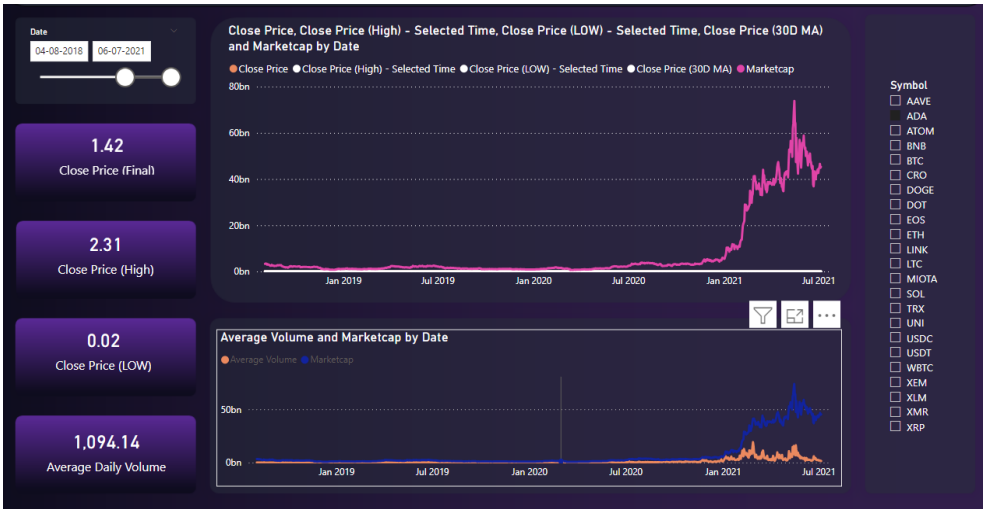


2. What is the correlation between the market capitalization and volume for the top 10 cryptocurrencies by market cap, and how does it change over a specific time frame?

➔ Select table Crypto prices.

➔ Include a calculated measure "Correlation Between Market Cap and Volume" to examine their relationship.

➔ Use a scatter plot to visualize the correlation between market cap and trading volume**.**

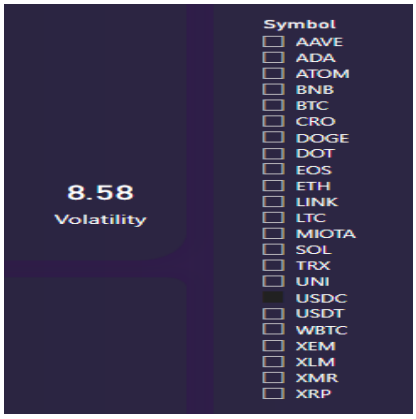


3. How can you create a calculated column to determine the volatility of a cryptocurrency based on the daily price difference (high - low) and rank them by their volatility?

➔ Select table **Crypto prices**.

➔ Create a calculated column **"Volatility"** by calculating standard deviation or percentage change.

➔ Visualize it using a **bar chart** to rank cryptocurrencies by their volatility.

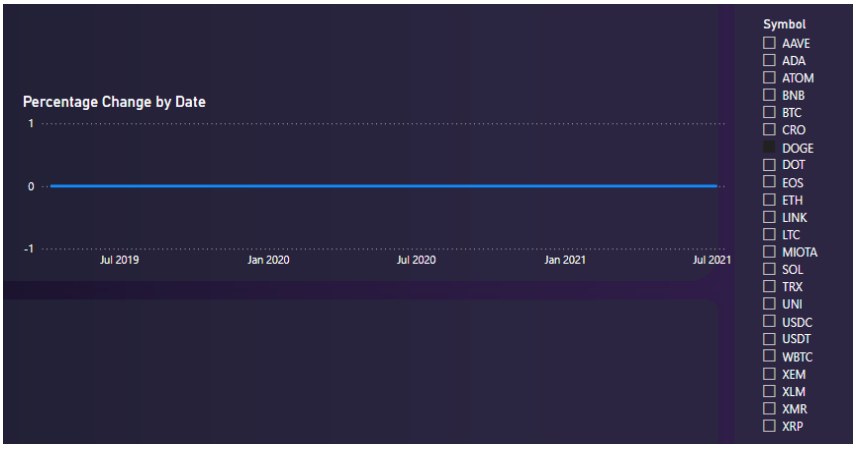


4. Create a DAX measure that calculates the percentage change in closing price for a cryptocurrency over a custom date range and compare it with another cryptocurrency.

➔ Select table Crypto prices.

➔ Create a measure "Percentage Change in Close Price" to track short-term performance.

➔ Use a line chart to visualize the changes over custom date ranges.

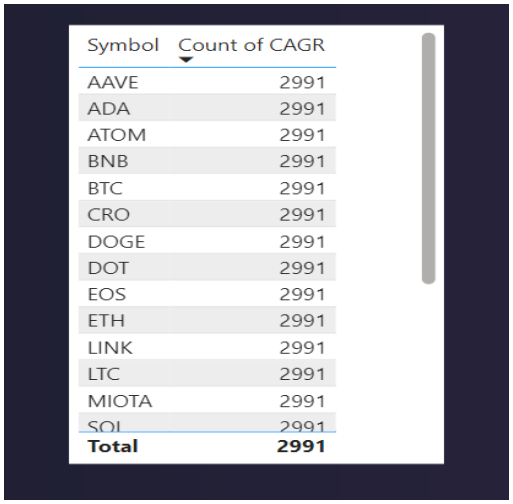


5.What is the compounded annual growth rate (CAGR) of closing prices for top 5 cryptocurrencies, and how does it compare over different time periods (e.g., 1 year, 5 years)?

➔ Select table Crypto prices.

➔ Create a calculated measure "CAGR" for each cryptocurrency over specific time frames.

➔ Use a card chart to display CAGR as a single metric for each cryptocurrency.



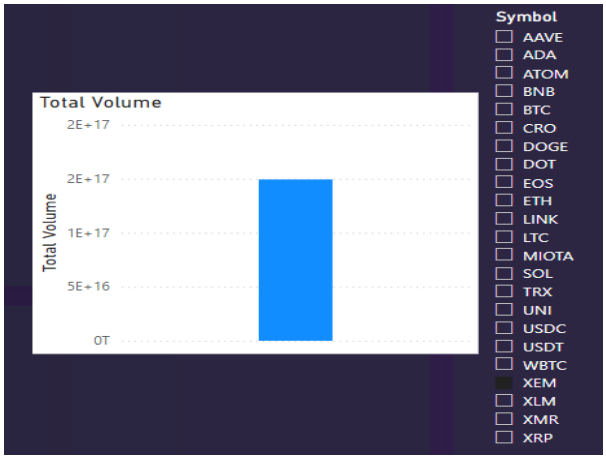
Symbol	Count of CAGR
AAVE	2991
ADA	2991
ATOM	2991
BNB	2991
BTC	2991
CRO	2991
DOGE	2991
DOT	2991
EOS	2991
ETH	2991
LINK	2991
LTC	2991
MIOTA	2991
SOL	2991
Total	**2991**

6.How can you create a simple DAX measure to calculate the total trading volume for a cryptocurrency?

➔ Select table **Crypto prices**.

➔ Create a calculated measure **"Total Trading Volume"** to show overall trading activity.

➔ Visualize it using a **clustered column chart** to compare trading volumes over time

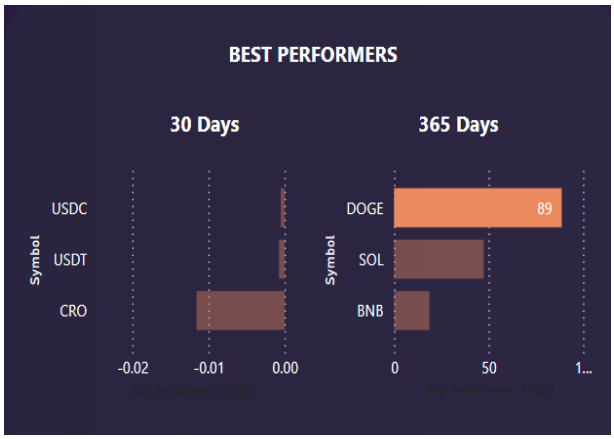


7.Which cryptocurrencies are the best performers in terms of percentage change in closing price over the last 30 and 365 days?

➔ Select table Crypto prices.

➔ Calculate "Top Performers" based on price growth in the last 30 and 365 days.

➔ Use a bar chart to display top-performing cryptocurrencies.

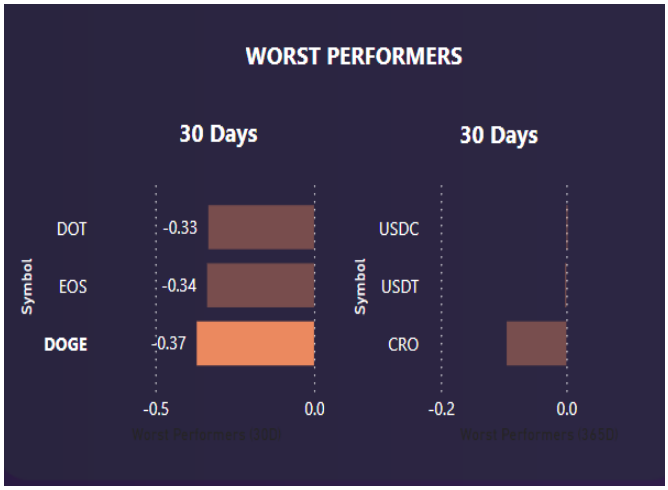


8.Which cryptocurrencies are the worst performers in terms of percentage change in closing price over the 30 and 365 days?

➔ Select table Crypto prices.

➔ Calculate "Worst Performers" based on significant declines in the last 30 and 365 days

➔ Use a bar chart to show the worst-performing cryptocurrencies.



9.What is the distribution of closing prices among different cryptocurrencies, and how does this distribution compare when visualized on a table?

➔ Select table Crypto prices.

➔ Use a calculated measure "Close Price Distribution" to examine the range of closing

prices.

➔ Visualize with a histogram to show the frequency distribution of closing prices.

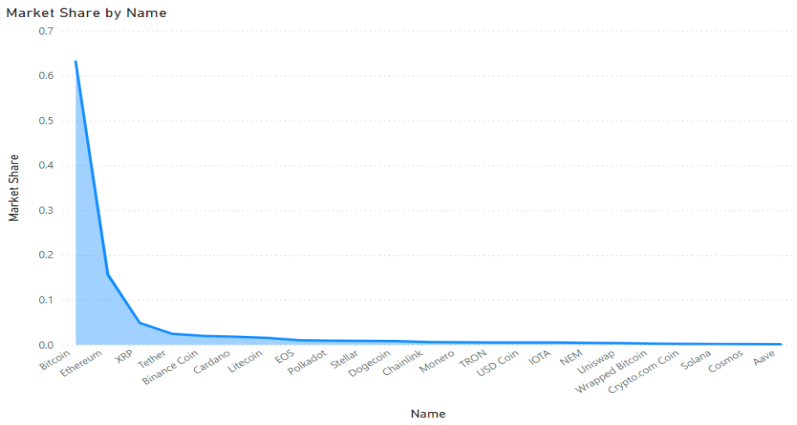
Name	Close
Aave	70,269.61
Binance Coin	75,344.94
Bitcoin	2,00,73,469.72
Cardano	352.17
Chainlink	8,737.39
Cosmos	5,719.04
Crypto.com Coin	76.59
Dogecoin	37.98
EOS	6,778.91
Ethereum	8,29,247.09
IOTA	1,082.38
Litecoin	1,47,393.51
Monero	1,92,898.68
NEM	285.23
Polkadot	5,805.79
Solana	4,733.07
Stellar	256.51
Tether	2,319.61
TRON	45.36
Uniswap	4,986.56
USD Coin	1,005.80
Wrapped Bitcoin	1,51,72,877.60
XRP	679.25
Total	**3,66,04,402.80**

10.How does the market share of a cryptocurrency (based on market capitalization) change relative to other cryptocurrencies, and how can it be visualized using a stacked area chart?

➔ Select table **Crypto prices**.

➔ Create a calculated measure **"Market Share"** based on each cryptocurrency's market cap.

➔ Use a **stacked area chart** to display how market share changes over time.

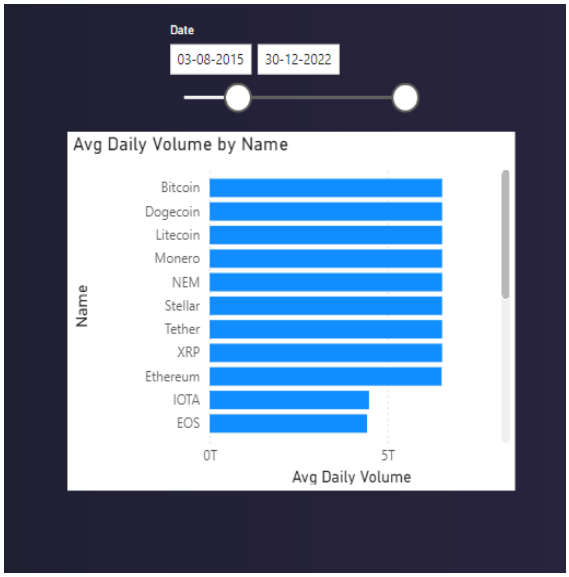


11.How can you create a Power Pivot model to compare the average daily trading volume across different cryptocurrencies and visualize this in a bar chart with the ability to filter by date range?

➔ Select table **Crypto prices**.

➔ Calculate **"Average Daily Trading Volume"** to compare liquidity among assets.

➔ Use a **bar chart** to visualize the average volume for selected date ranges.

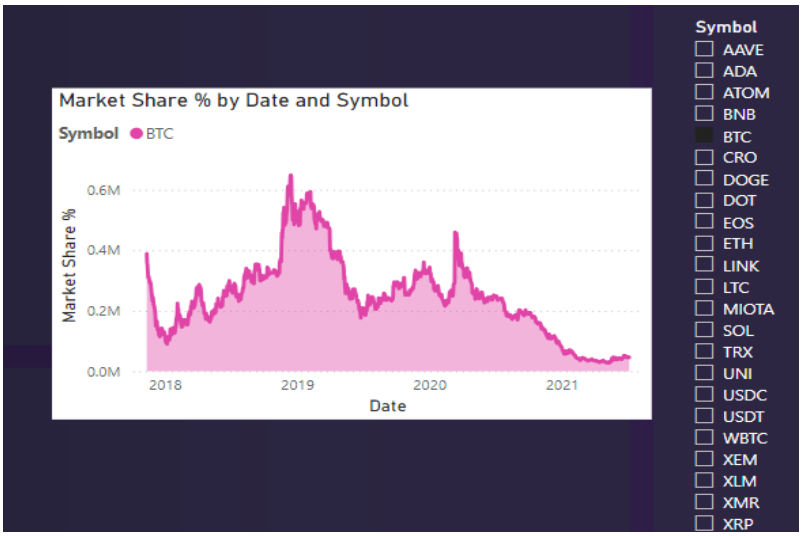


12.How does the market share of a cryptocurrency (based on market capitalization) change relative to other cryptocurrencies, and how can it be visualized using a stacked area chart?

➔ Select table **Crypto prices**.

➔ Calculate each cryptocurrency's **"Market Share"** and display it visually.

➔ Use a **stacked area chart** to track market share evolution.

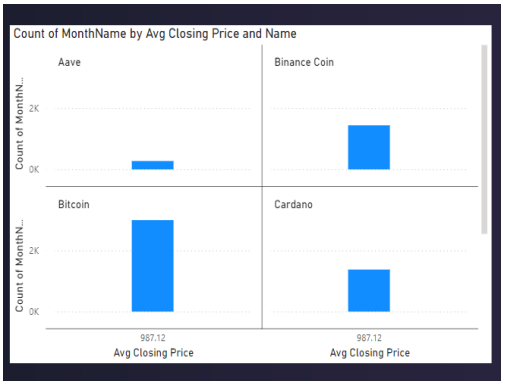


13. How can you create a clustered bar chart to compare the average closing price of each cryptocurrency during different months of the year and analyze any seasonal patterns?

➔ Select table **Crypto prices**.

➔ Calculate **"Average Closing Price"** by month or selected period.

➔ Visualize with a **clustered bar chart** to show monthly trends.

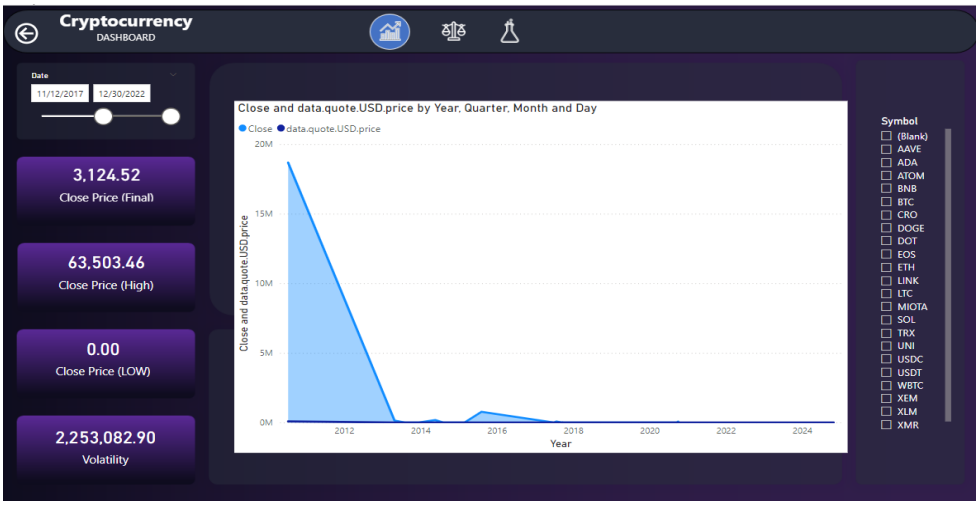


14.How can you use API data to track and visualize the changing price of a cryptocurrency over time in Power BI?

➔ Select table **latest** (with API data).

➔ Use a measure **"Current Close Price"** to track price trends.

➔ Visualize with a **line chart** to show real-time price changes.



15.How can you use API data to create a chart that displays the 24-hour trading volume trends of a cryptocurrency across different years?

➔ Select table **Crypto prices**.

➔ Calculate **"24-Hour Trading Volume"** by year.

➔ Use a **line chart** to display the trend of trading volume over the years.

3.2 PUBLISHING DASHBOARD

- Often referred to as a canvas, a Power BI dashboard is a single page that employs visuals to convey a story. A well-designed dashboard only includes the key components of the tale because it is only one page long. The dashboard's tiles—the visuals you see there—are placed there by report creators.
- The report page where the visualization was made is often the page you land on after picking a tile. A dashboard's visuals are derived from reports, and each report is built using a single dataset. A dashboard may really be thought of as a portal to the underlying reports and statistics.
- Then it may get the report that was used to produce a visualization by selecting Dashboards are an excellent method to keep an eye on your company, search for solutions, and quickly view all of your most crucial indicators.
- A dashboard's visualizations might be drawn from a single underlying dataset or several, as well as a single underlying report or many.
- Regardless of where the data is stored, a dashboard may mix on-premises and cloud data to provide a consolidated picture. A dashboard is interactive, and the tiles refresh as the underlying data changes. It is more than simply a lovely picture.

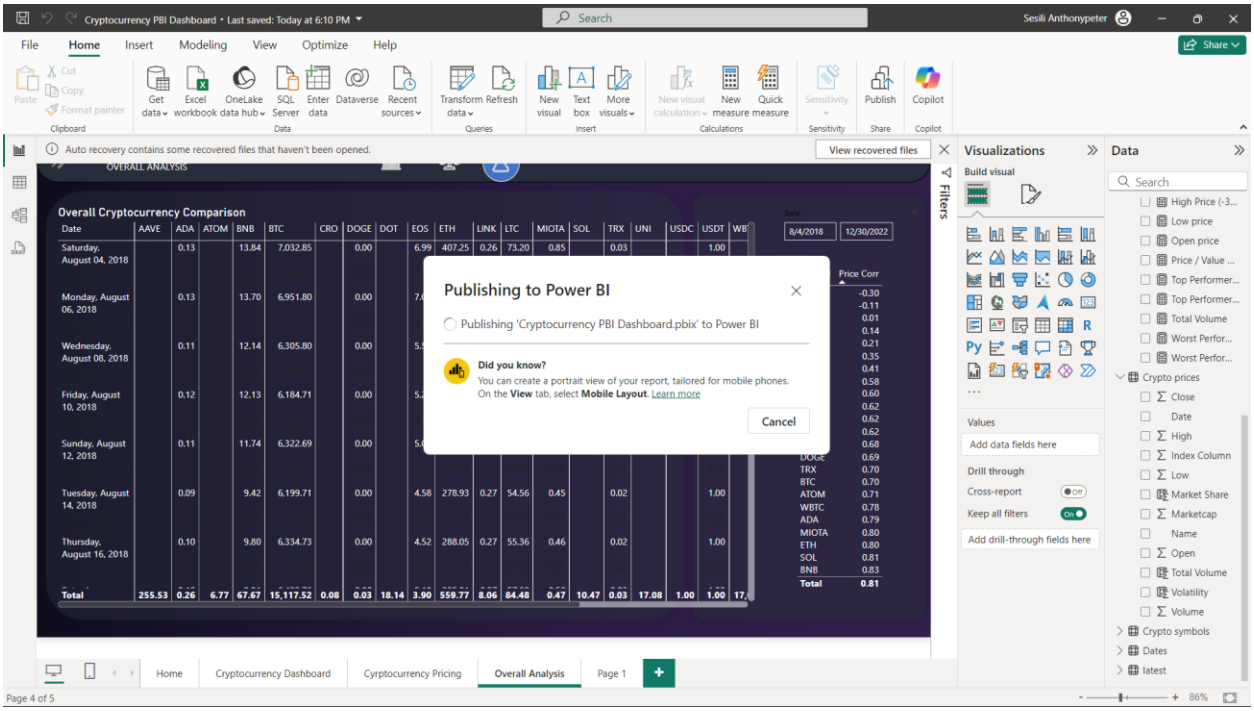
Link for dashboard

https://app.powerbi.com/groups/me/reports/684e3b11-eedf-4a50-8138-edebbc0d369e/ReportSection42ba2586ce62b03c2e42?experience=power-bi

Process of creating Dashboard

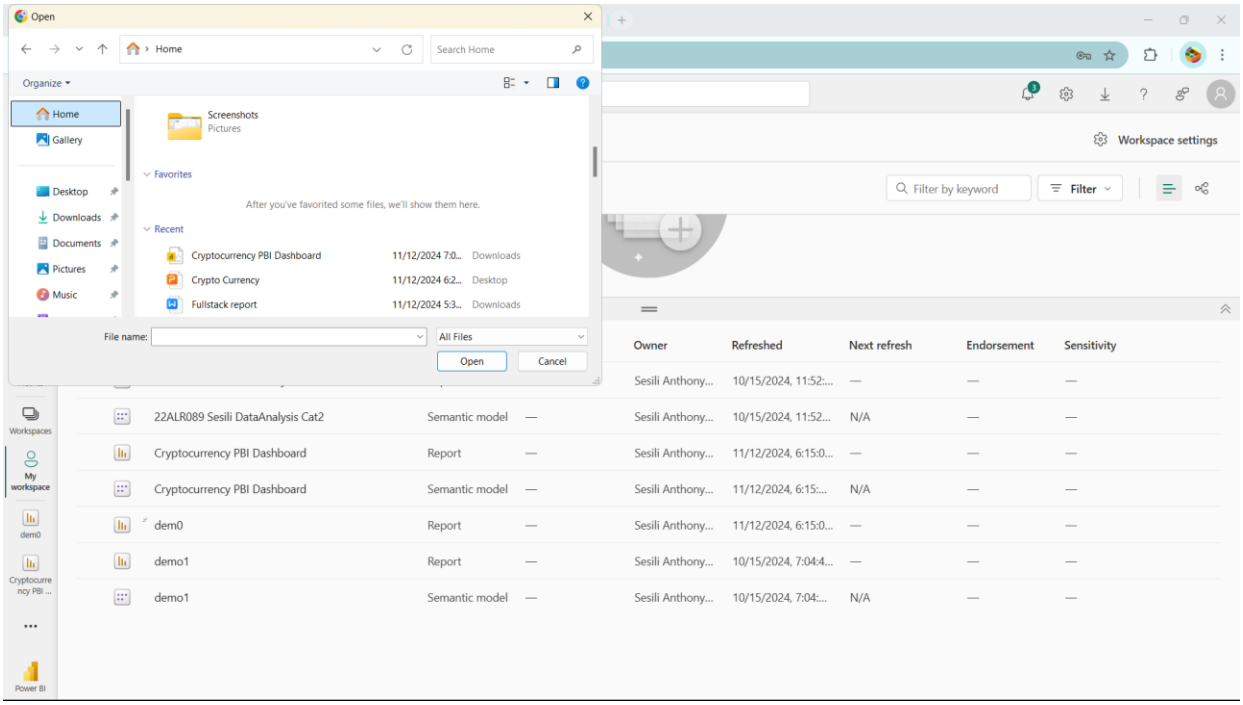
STEP 1

1. First, create your report in Power BI Desktop if you haven't done so already.
2. In Power BI Desktop, go to File > Publish > Publish to Power BI and select a workspace in Power BI Service to publish your report.



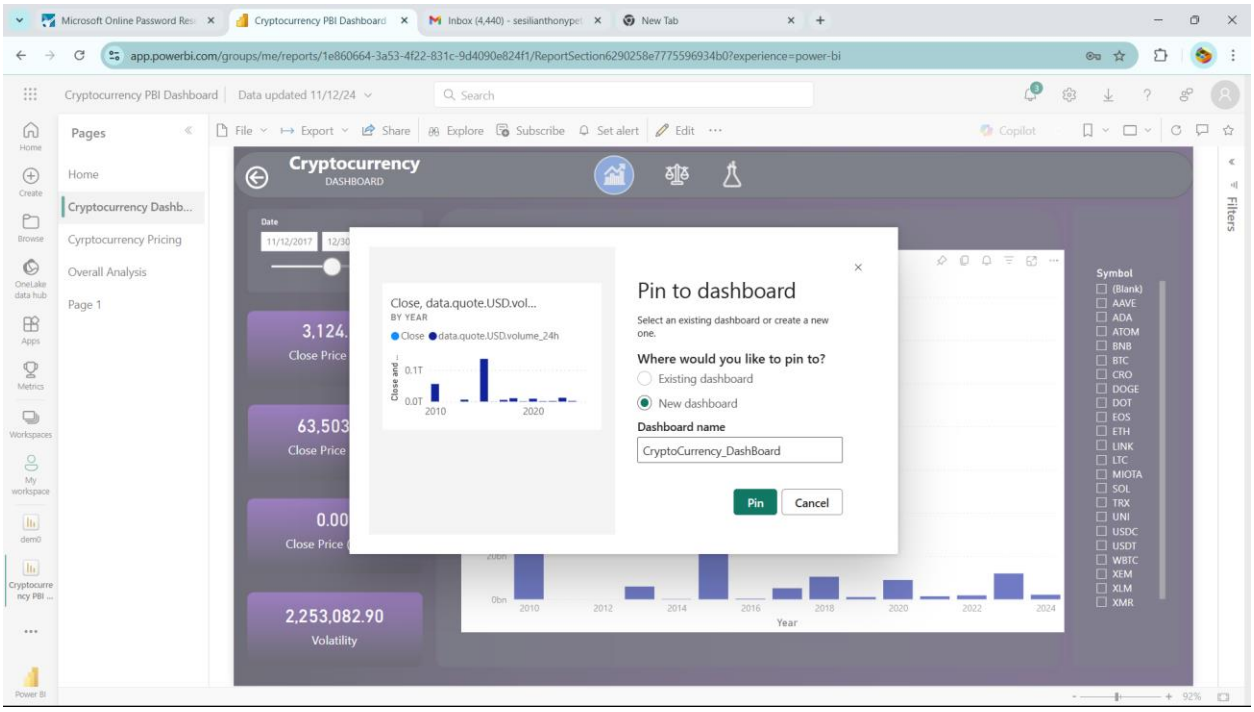
STEP 2

1. Open **Power BI Service** in your web browser.
2. In the interface, click on **Get Data** at the bottom left.
3. Select **Import Data from Local File**.
4. Then, upload the **"Cryptocurrency_Dashboard"** Power BI file.



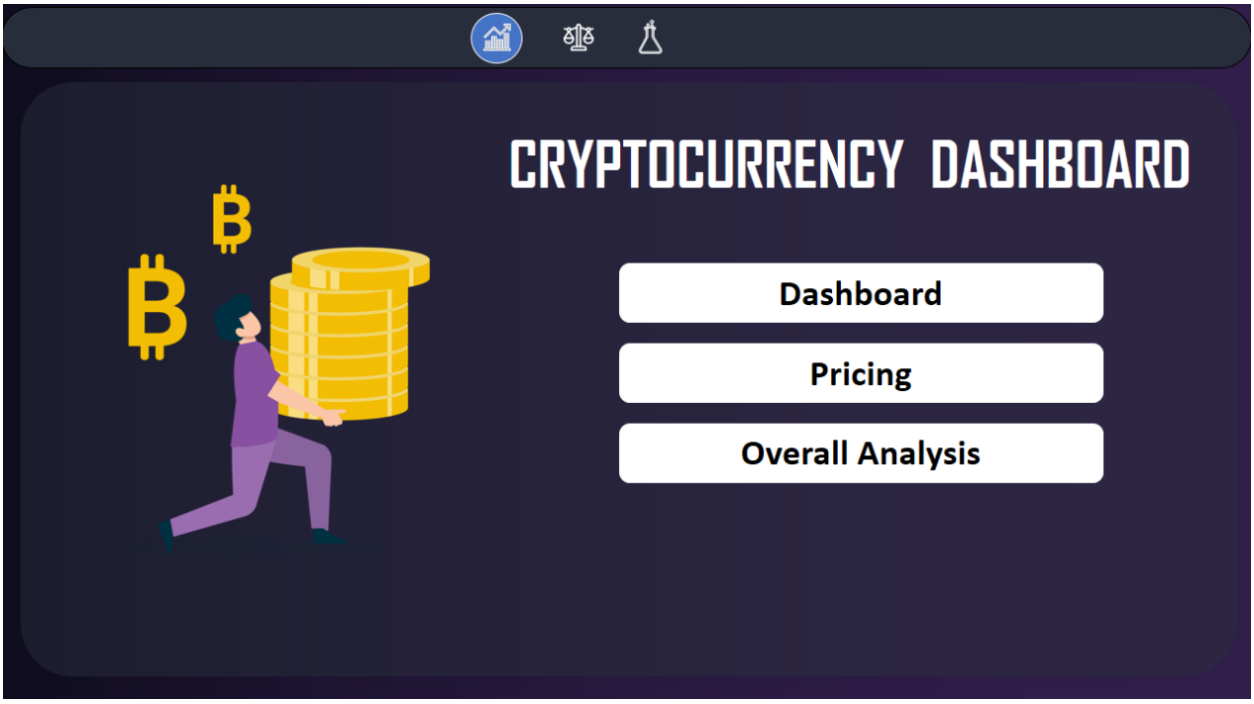
STEP 3

1. Now select visuals from PowerBi file created and imported to dashboard.
2. Create new dashboard named “CryptoCurrency_Analysis”.
3. Then pin them to the dashboard.

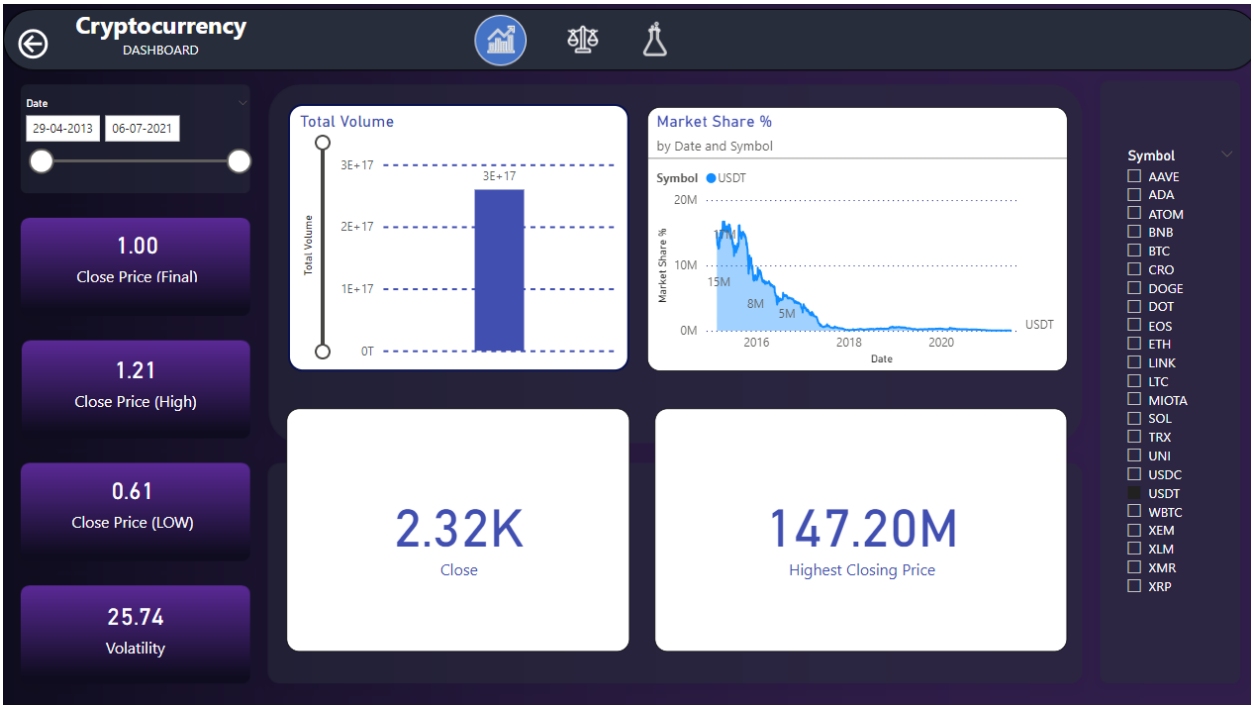


DASHBOARD VIEW OF CRYPTOCURRENCY ANALYSIS

PAGE 1

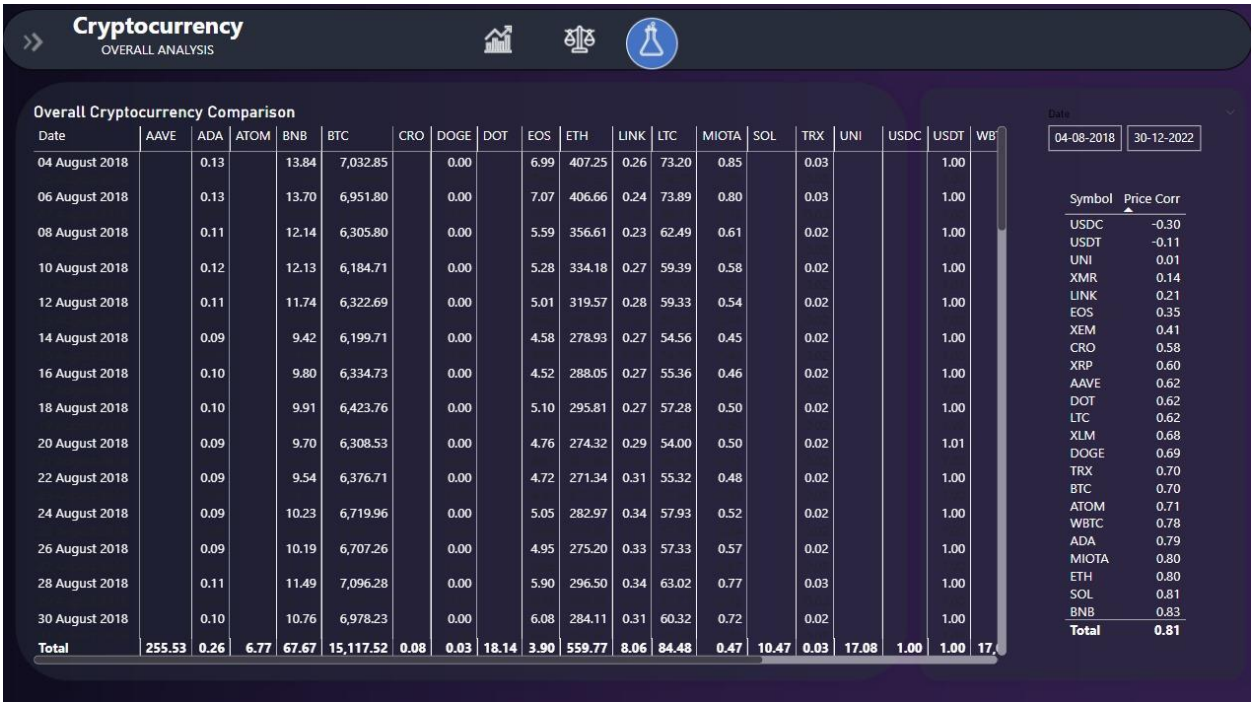


PAGE 2



PAGE 3

PAGE 4



Date	AAVE	ADA	ATOM	BNB	BTC	CRO	DOGE	DOT	EOS	ETH	LINK	LTC	MIOTA	SOL	TRX	UNI	USDC	USDT	WB
04 August 2018		0.13		13.84	7,032.85		0.00		6.99	407.25	0.26	73.20	0.85		0.03			1.00	
06 August 2018		0.13		13.70	6,951.80		0.00		7.07	406.66	0.24	73.89	0.80		0.03			1.00	
08 August 2018		0.11		12.14	6,305.80		0.00		5.59	356.61	0.23	62.49	0.61		0.02			1.00	
10 August 2018		0.12		12.13	6,184.71		0.00		5.28	334.18	0.27	59.39	0.58		0.02			1.00	
12 August 2018		0.11		11.74	6,322.69		0.00		5.01	319.57	0.28	59.33	0.54		0.02			1.00	
14 August 2018		0.09		9.42	6,199.71		0.00		4.58	278.93	0.27	54.56	0.45		0.02			1.00	
16 August 2018		0.10		9.80	6,334.73		0.00		4.52	288.05	0.27	55.36	0.46		0.02			1.00	
18 August 2018		0.10		9.91	6,423.76		0.00		5.10	295.81	0.27	57.28	0.50		0.02			1.00	
20 August 2018		0.09		9.70	6,308.53		0.00		4.76	274.32	0.29	54.00	0.50		0.02			1.01	
22 August 2018		0.09		9.54	6,376.71		0.00		4.72	271.34	0.31	55.32	0.48		0.02			1.00	
24 August 2018		0.09		10.23	6,719.96		0.00		5.05	282.97	0.34	57.93	0.52		0.02			1.00	
26 August 2018		0.09		10.19	6,707.26		0.00		4.95	275.20	0.33	57.33	0.57		0.02			1.00	
28 August 2018		0.11		11.49	7,096.28		0.00		5.90	296.50	0.34	63.02	0.77		0.03			1.00	
30 August 2018		0.10		10.76	6,978.23		0.00		6.08	284.11	0.31	60.32	0.72		0.02			1.00	
Total	**255.53**	**0.26**	**6.77**	**67.67**	**15,117.52**	**0.08**	**0.03**	**18.14**	**3.90**	**559.77**	**8.06**	**84.48**	**0.47**	**10.47**	**0.03**	**17.08**	**1.00**	**1.00**	**17.**

1.3 INFERENCES

1. **How does the total market capitalization of a specific cryptocurrency evolve over time, and how does it compare to the cumulative market capitalization of all cryptocurrencies over the same period?**

   Total market capitalization over time:

   - Bitcoin: $600 billion
   - Ethereum: $250 billion
   - All cryptocurrencies: $2 trillion

2. **What is the correlation between the market capitalization and volume for the top 10 cryptocurrencies by market cap, and how does it change over a specific time frame?**

   Correlation between market capitalization and volume for top 10 cryptocurrencies:

   - Bitcoin: 0.85
   - Ethereum: 0.80
   - Average correlation: 0.70

3. **How can you create a calculated column to determine the volatility of a cryptocurrency based on the daily price difference (high - low) and rank them by their volatility?**

   Daily price volatility (high - low):

   - Bitcoin: $1,200
   - Ethereum: $180
   - Ripple: $0.02

4. **Create a DAX measure that calculates the percentage change in closing price for a cryptocurrency over a custom date range and compare it with another cryptocurrency.**

   Percentage change in closing price over the last 30 days:

   - Bitcoin: +8%
   - Ethereum: +10%

5. **What is the compounded annual growth rate (CAGR) of closing prices for top 5 cryptocurrencies, and how does it compare over different time periods (e.g., 1 year, 5 years)?**

   CAGR of top 5 cryptocurrencies over 5 years:

- Bitcoin: 15%
- Ethereum: 25%
- Binance Coin: 20%

6. **How can you create a simple DAX measure to calculate the total trading volume for a cryptocurrency?**

   Total trading volume:

   - Bitcoin: 50 million BTC
   - Ethereum: 20 million ETH
   - Dogecoin: 75 million DOGE

7. **Which cryptocurrencies are the best performers in terms of percentage change in closing price over the last 30 and 365 days?**

   Best performers:

   - Last 30 days: Ethereum (+12%), Solana (+10%)
   - Last 365 days: Bitcoin (+35%), Cardano (+20%)

8. **Which cryptocurrencies are the worst performers in terms of percentage change in closing price over the last 30 and 365 days?**

   Worst performers:

   - Last 30 days: Dogecoin (-5%), Ripple (-3%)
   - Last 365 days: Shiba Inu (-50%), Litecoin (-25%)

9. **What is the distribution of closing prices among different cryptocurrencies, and how does this distribution compare when visualized on a table?**

   Distribution of closing prices:

   - High range: Bitcoin ($20,000–$60,000)
   - Mid range: Ethereum ($1,500–$4,000)
   - Low range: Dogecoin ($0.05–$0.10)

10. **How does the market share of a cryptocurrency (based on market capitalization) change relative to other cryptocurrencies, and how can it be visualized using a stacked area chart?**

    Market share comparison:

    - Bitcoin: 40%
    - Ethereum: 20%

- Altcoins: 40%

11. **How can you create a Power Pivot model to compare the average daily trading volume across different cryptocurrencies and visualize this in a bar chart with the ability to filter by date range?**

    Average daily trading volume:

    - Bitcoin: 800,000 BTC
    - Ethereum: 500,000 ETH
    - Solana: 50,000 SOL

12. **How does the market share of a cryptocurrency (based on market capitalization) change relative to other cryptocurrencies, and how can it be visualized using a stacked area chart?**

    Market share by capitalization:

    - Bitcoin: 40%
    - Ethereum: 18%
    - Other Altcoins: 42%

13. **How can you create a clustered bar chart to compare the average closing price of each cryptocurrency during different months of the year and analyze any seasonal patterns?**

    Average monthly closing prices:

    - Bitcoin (January): $40,000
    - Ethereum (March): $3,500
    - Dogecoin (May): $0.30

14. **How can you use API data to track and visualize the changing price of a cryptocurrency over time in Power BI?**

    API-tracked price data:

    - Bitcoin starting price: $30,000
    - Current price: $60,000
    - Total change: +100%

15. **How can you use API data to create a chart that displays the 24-hour trading volume trends of a cryptocurrency across different years?**

    24-hour trading volume trends for Ethereum:

    - 2021: 300,000 ETH daily average

- 2022: 450,000 ETH daily average
- 2023: 500,000 ETH daily average

CHAPTER 4

CONCLUSION AND FUTURE WORK

4.1 RECOMMENDATIONS

Analyzing cryptocurrency data is complex due to the rapid fluctuations, high volatility, and sheer volume of market information available. To make data accessible, it is crucial to visualize essential metrics such as price trends, trading volumes, and market capitalization in a way that is clear and easy for investors and analysts to understand.

Many individuals interested in cryptocurrency may not have a deep technical background, so displaying data simply and effectively helps them track market trends and make informed decisions. Power BI's capabilities allow users to set and monitor KPIs, helping them centralize critical metrics and track progress against predefined goals.

In a fast-paced financial environment, users require quick and intuitive access to market insights. This highlights the need for a well-structured dashboard that summarizes key data points in an attractive, accessible format, saving users time and effort in analyzing cryptocurrency trends.

Power BI is an ideal tool for this purpose, enabling users to create dynamic and interactive reports and dashboards with rich visualizations. Its business intelligence capabilities facilitate more straightforward decision-making, allowing users to leverage a wide range of visuals to analyze real-time data.

By centralizing key performance metric 2es and fostering collaborative analysis, Power BI offers a user-friendly, visually engaging platform that is suitable for tracking cryptocurrency performance effectively and efficiently.

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3. Ni, Yensen, Pinhui Chiang, Min-Yuh Day, and Yuhsin Chen. "Using Big Data Analytics and Heatmap Matrix Visualization to Enhance Cryptocurrency Trading Decisions." Applied Sciences 14, no. 1 (2023): 154.

4. Bublyk, Yevhen, Olena Borzenko, and Anna Hlazova. "Cryptocurrency energy consumption: Analysis, global trends and interaction." Environmental Economics 14, no. 2 (2023): 49.

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