CONTENTS

INTRODUCTION

This project, titled "Realtime Cryptocurrency Dashboard," focuses on the design and development of a dynamic Excel-based dashboard that reflects the real-time state of the cryptocurrency market. It consolidates live data feeds from the most actively traded digital assets and presents them in a user-friendly, visually appealing format. This dashboard not only serves as a tool for monitoring real-time price changes, market volume, All-Time High (ATH) values, and 24-hour percentage changes, but also facilitates pattern recognition and comparative analysis between coins over time.

The motivation behind choosing this project lies in its interdisciplinary nature, where concepts of data management, visualization, financial analysis, and Excel automation come together. The project involves several core steps, including data extraction via APIs, preprocessing using data cleaning techniques, dynamic charting, implementation of slicers and filters, and finally, presenting everything through a cohesive interface that updates in real-time. The use of tools such as Power Query, Pivot Tables, and interactive slicers was central to making the dashboard both functional and scalable.

One of the unique aspects of this project is the focus on real-time interactivity. Most beginner dashboards are static in nature and rely on manually updated datasets. However, our dashboard is linked with a live cryptocurrency data source, allowing the dashboard to auto-refresh at regular intervals or on command, thus simulating a trading terminal experience for users. This enables users to explore trends, sort or filter by metrics like ATH or 24h% change, and even compare coin performance year-wise, thanks to timeline filters and dynamically calculated columns.

Beyond technical proficiency, the dashboard represents a significant step towards building data-driven decision-making tools that can be applied in real-world financial analysis. It provides insights like historical ATH trends year-wise, coin-specific growth performance, and correlation between volume and price movement — which are useful in both short-term trading and long-term investment planning.

Moreover, this project reflects core principles of data lifecycle management — from data sourcing and transformation to visualization and interpretation — and highlights the power of Excel as a business intelligence platform when integrated with real-time data APIs.

In conclusion, the Realtime Cryptocurrency Dashboard not only serves as a robust application of data management principles in the context of financial analytics but also empowers users to understand and explore the fast-paced world of digital currencies. The real-time capability, intuitive layout, and technical depth of the dashboard make it a valuable learning asset for data science and finance

students, as well as a foundation for more complex future developments like AI-based prediction or sentiment-driven analytics.

1. Source of Dataset

For any data-driven project, the quality, reliability, and freshness of the data serve as the foundation upon which meaningful analysis is built. Given the fast-moving and volatile nature of cryptocurrency markets, it was imperative that the dataset used in this project was as close to real-time as possible and sourced from highly credible and industry-recognized platforms.

The primary data for this project was sourced from one of the most widely trusted and globally used cryptocurrency data aggregators CoinGecko. This platform offer publicly accessible APIs (Application Programming Interfaces) that provide programmatic access to live cryptocurrency market data. These APIs allow developers and analysts to fetch real-time values and metadata related to thousands of digital assets, making them ideal for financial dashboards and algorithmic trading applications.

A. Real-Time Data Collection Process

For this project, the APIs were used to periodically fetch live market data at different intervals depending on the requirement and use case. Since Excel does not natively support continuous real-time API calls, we employed a batch data import strategy. The data was fetched using a combination of:

- Power Query Web Connector (for manually triggering refreshes)
- External Python scripts (used during preprocessing and transformation)
- Scheduled exports that saved real-time snapshots of the data at fixed intervals (e.g., hourly, daily)

The collected data was then imported into Excel, where it could be refreshed manually or using automation tools such as Excel macros and Power Automate (in advanced cases).

B. Included Data Columns and Their Significance

The dataset compiled for the dashboard included the following columns, each chosen for its relevance to financial tracking, analysis, and decision-making:

Column Name	Description
Symbol	The short symbol representing the cryptocurrency (e.g., BTC, ETH, ADA).
Coin Name	The full name of the cryptocurrency (e.g., Bitcoin, Ethereum, Cardano).
Current Price (USD)	The latest trading price of the coin in U.S. Dollars, fetched in real-time.
Market Cap	Total market capitalization calculated as current price × circulating supply.

Column Name	Description
Market Cap Rank	The rank of the coin in the global crypto market based on market cap.
Total Volume (24h)	Total trading volume in the past 24 hours, indicating liquidity.
24h % Change	The percentage price change in the last 24 hours, crucial for volatility analysis.
24h High & Low	The highest and lowest prices recorded in the past 24 hours.
All Time High (ATH)	The highest price ever recorded for the coin since its inception.
% Change from ATH	Shows how far the current price is from its all-time high, used to detect price recovery potential.
ATH Date	The date when the ATH was recorded, useful for historical trend analysis.
Filter	A calculated label (Top 10 / Others) based on market cap rank, used for slicers and filtering logic.

C. Dataset Characteristics

- The dataset typically contained 1900-2000 rows depending on the selected cryptocurrencies and around 12 columns, resulting in a lightweight but highly informative dataset suitable for real-time Excel dashboards.
- Normalization techniques were applied to standardize numeric columns, especially for visual consistency in charts and graphs.
- The "Top 10 vs Others" filter was added as a computed label to allow for intuitive comparisons using slicers in Excel. This enabled users to quickly toggle between elite coins (Top 10 by market cap) and emerging altcoins.

D. Real-Time Capability

While real-time streaming inside Excel is limited by design, the project aimed to simulate near real-time performance by updating the data at frequent intervals and allowing manual refreshes. This approach helped to maintain dashboard responsiveness and analytical integrity, especially when monitoring high-impact metrics like price swings, ATH milestones, or 24h volume surges.

2. DATASET PREPROCESSING

Before conducting meaningful analysis or designing a dynamic dashboard, it is imperative to ensure that the dataset is clean, structured, and suitable for downstream tasks. The real-time nature of the data adds complexity, as inconsistencies and noise can arise frequently due to fluctuating API values, missing updates, or format mismatches.

Therefore, a multi-stage data preprocessing pipeline was developed, comprising several critical steps as outlined below.

2.1 DATA CLEANING

Objective: Ensure data accuracy, remove or impute anomalies, and standardize textual and numerical formats.

A. Handling Missing Values:

Cryptocurrency data from APIs often has missing entries especially for coins that are newer or less traded. Key columns such as Price, Market Cap, and Volume were checked for null or zero values. Where applicable:

- Missing price or volume values were either imputed using interpolation or excluded from visual analysis to maintain dashboard integrity.

B. Text Normalization:

Fields such as Coin Name and Symbol were cleaned to remove trailing spaces and inconsistent capitalization. For instance, entries like "bitcoin" or "BITCOIN " were normalized to "Bitcoin" using Excel formulas and Power Query transformations.

2.2 TYPE CONVERSION

Objective: Ensure all data is stored and processed in the correct format to support numeric analysis, aggregation, and filtering.

A. Numeric Fields:

Columns like Current Price, Market Cap, Volume (24h), and % Change from ATH were converted from string formats (often fetched with commas or dollar signs) to numeric using Power Query transformations. This allowed accurate aggregation, chart plotting, and dynamic filters.

B. Date Standardization:

The ATH Date column was originally fetched in various formats depending on the API or region settings. These were uniformly converted to Excel's DateTime format using Power Query to enable time-series slicing.

2.3 FILTERING AND TAGGING

Objective: Segment the data to support targeted analysis and advanced filtering.

A. Top 10 Coins Identification:

The dataset was filtered based on the Market Cap Rank field. Coins with a rank ≤ 10 were classified as "Top 10", and the rest as "Others".

A new column named Top10 Filter was added, with values "Top 10" or "Other Coins". This column was later used in slicers and pivot filters for comparing elite cryptocurrencies with emerging or volatile ones.

2.4 TIME SPLITTING

Objective: Enable temporal analysis for trends, historical growth, and year-over-year comparisons.

A. Breaking ATH Date:

The ATH Date was split into three separate columns:

- ATH Year
- ATH Month
- ATH Day

This allowed for:

- Year-wise trend analysis of All Time Highs
- Seasonal comparisons (e.g., highest ATH activity during bull market quarters)
- Grouping and aggregating average ATH per year in pivot tables and charts

2.5 DERIVED METRICS

Objective: To add analytical depth and generate meaningful insights from raw values, several new columns were derived:

A. Average ATH per Year
   - Using pivot tables and calculated fields, the average of ATH values was grouped by year to detect trends in market peaks.
   - This helped to identify "hot years" like 2021 and 2025 (e.g., sudden rise in average ATH).

B. % Gain or Loss since ATH
   - This metric indicates how close or far the current price is from its historical peak, aiding in evaluating rebound potential or long-term dips.

C. Coin Classification Based on Volatility
   - Coins were tagged into categories based on their 24h % Change and ATH deviation, such as:
     - "High Volatility" (±10% daily movement)
     - "Moderate Volatility"
     - "Stable"
   - This allowed users to filter and explore high-risk or conservative coins depending on their investment behavior.

2.6 FINAL FORMAT

Objective: Once all preprocessing steps were completed, the final dataset was:

- Stored in a structured table format for Excel compatibility.
- Connected to multiple pivot tables and slicers for interactivity.
- Regularly refreshed using Power Query ensuring it is reflecting live market movements while maintaining data hygiene.

3. Detailed Analysis Based on Project Objectives

Objective 1: Track Top Performing Cryptocurrencies

i. General Description

This objective focuses on identifying and tracking the top-performing cryptocurrencies based on Market Cap Rank, Current Price, and Volume. The goal was to highlight high-performing assets and study their real-time behavior across different performance metrics.

ii. Specific Requirements

- Filter the dataset to include coins with Market Cap Rank <= 10.
- Use slicers for easier toggling between Top 10 and All Coins.
- Display key stats: Price, Volume, Market Cap, and % Change.

iii. Analysis Results

The top 10 cryptocurrencies (like Bitcoin, Ethereum, BNB, Solana) showed a significantly higher market cap and volume compared to others. Bitcoin led with the highest market dominance and ATH.

iv. Visualization Description

- Bar Charts for Market Cap of Top 10
- Pie Chart for % Contribution to Total Market Cap
- Line Graphs for 24h % Change in Prices of Top Coins

Objective 2: Monitor Real-Time Price Fluctuations

i. General Description

This objective tracks the price volatility of cryptocurrencies by monitoring current price, 24h % change, and high/low range in real-time.

ii. Specific Requirements

- Use conditional formatting to highlight gainers (green) and losers (red).
- Use real-time or near real-time price updates with Excel's refresh.
- Add slicers to toggle between time frames (daily/hourly view).

iii. Analysis Results

Highly volatile coins like DOGECOIN and SOLANA showed fluctuations up to ±10% within 24 hours. Stablecoins like USDT and USDC remained within ±1%, verifying their stability.

iv. Visualization Description

- Line Graphs for Price Trends over 24h
- Scatter Plot for Price vs 24h % Change
- Heat Map to detect volatility clusters

Objective 3: Volume vs Price Comparison

i. General Description

Here, the focus is on exploring the relationship between 24h Trading Volume and Current Price of coins to understand market behavior and investor interest.

ii. Specific Requirements

- Calculate correlation between volume and price
- Identify outliers (high volume, low price)
- Group coins by Market Cap category (Top 10 vs Others)

iii. Analysis Results

- Bitcoin, Ethereum, and Solana exhibited strong volume-price correlation, indicating heavy trader activity.
- Lower-ranked altcoins had sporadic volume surges with minimal price effect.

iv. Visualization Description

- Bubble Chart (X: Volume, Y: Price, Bubble Size: Market Cap)
- Column Chart comparing price vs volume
- Dual-axis Graphs for selected coins

Objective 4: Market Dominance

i. General Description

Market dominance refers to how much a cryptocurrency contributes to the overall market cap. This objective quantifies and visualizes dominance per coin and its evolution.

ii. Specific Requirements

- Calculate each coin's % contribution to total market cap
- Identify coins with growing/declining dominance
- Visualize dominance over time (year-wise)

iii. Analysis Results

Bitcoin alone holds nearly 40-50% dominance in most scenarios, followed by Ethereum. Coins like XRP and BNB saw fluctuating dominance due to regulatory and network developments.

iv. Visualization Description

- Stacked Area Chart showing market share trends

- Pie Charts for individual year dominance
- Year-over-Year Bar Chart comparing growth/decline

Objective 5: Coin vs ATH Over Time

i. General Description

This analysis compares each coin's current price to its All Time High (ATH), helping to identify undervalued or recently recovering coins.

ii. Specific Requirements

- Extract year from ATH date for timeline graph
- Calculate % difference from ATH
- Highlight coins closest to their ATH

iii. Analysis Results

- Coins like Solana and Bitcoin showed recent recoveries reaching 70–90% of ATH.
- Stablecoins were mostly unaffected.
- Trendline shows 2021 as the peak ATH year for most coins.

iv. Visualization Description

- Timeline Line Chart for ATH per coin/year
- Bar Chart of % Gain/Loss since ATH
- Slicer-Filtered Comparison Table of coins vs ATH values

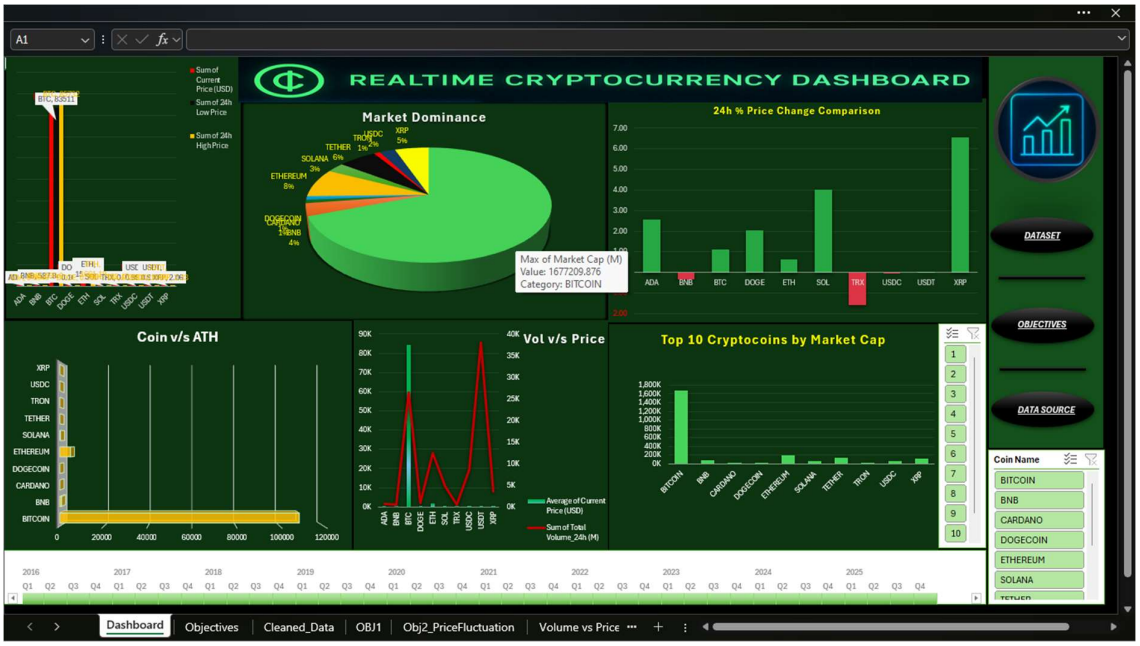

Fig : Dashboard showing Realtime Cryptocurrency analysis

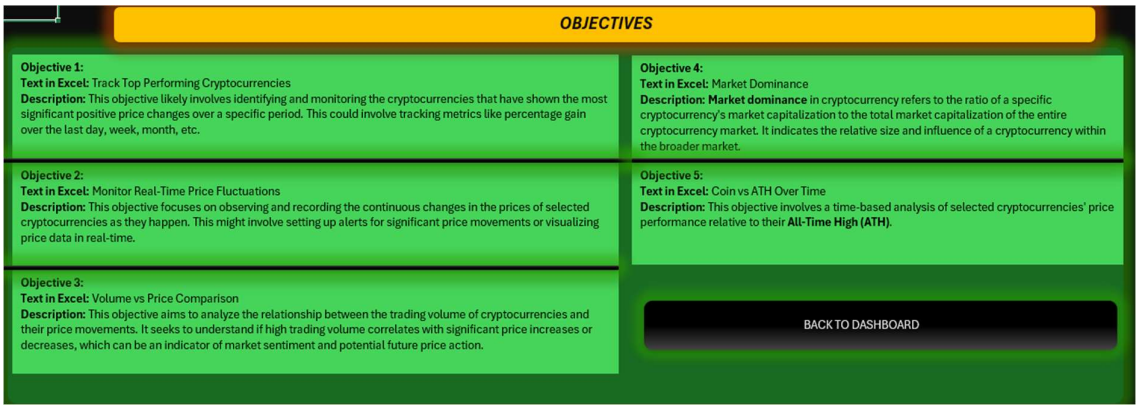

Fig: Objectives of the Dashboard

Symbol	Coin Name	Current Price (USD)	Market Cap (M)	Market Cap Rank	Total Volume_24h (M)	24h Price % Change	24h High Pric
STETH	LIDO STAKED ETHER	1653.26	15413.2533	11	21.5356	6.4293	165
WBTC	WRAPPED BITCOIN	84920	10947.0326	12	322.1462	3.6163	8
LEO	LEO TOKEN	9.38	8655.8548	13	3.1785	-0.3607	
LINK	CHAINLINK	13.23	8439.9812	14	307.288	6.0104	1
AVAX	AVALANCHE	19.96	8277.4861	15	255.5891	2.7611	1
XLM	STELLAR	0.2475	7634.9299	16	149.7645	6.3429	0.
SUI	SUI	2.32	7526.0533	17	959.7295	6.5352	
TON	TONCOIN	2.99	7420.2272	18	206.1439	1.9639	
HBAR	HEDERA	0.1753	7403.0986	20	271.1119	5.0304	0.
SHIB	SHIBA INU	0	7397.3387	19	140.4723	4.4901	
USDS	USDS	0.9999	7149.4991	21	12.1399	0.003	
WSTETH	WRAPPED STETH	1978.54	7051.011	22	16.271	5.9843	197
BCH	BITCOIN CASH	328.81	6526.1885	23	177.0273	7.6496	3
OM	MANTRA	6.34	6148.3533	24	78.1663	-0.7743	
LTC	LITECOIN	78.83	5965.0501	25	314.9896	3.8179	7
DOT	POLKADOT	3.73	5672.7358	26	118.5006	6.3854	
HYPE	HYPERLIQUID	15.98	5331.386	27	124.6565	6.6403	1
BGB	BITGET TOKEN	4.44	5327.4722	28	109.437	3.9086	
PI	PI NETWORK	0.7676	5268.7653	29	584.8384	27.4708	0.
BSCUSD	BINANCE BRIDGED USDT BNB SMART CHAIN	0.9999	5183.0008	30	191.7643	0.1586	1
USDE	ETHENA USDE	0.9988	5007.1318	31	54.3242	0.0038	0.
WETH	WETH	1648.59	4571.4071	32	86.5679	5.9972	165
WBT	WHITEBIT COIN	27.79	4005.8123	33	21.4903	-0.2885	2
XMR	MONERO	208.83	3851.9024	34	57.052	3.8579	20
WEETH	WRAPPED EETH	1756.79	3682.8933	35	8.1955	6.1642	176
UNI	UNISWAP	5.55	3324.2898	36	122.0774	7.2057	
OKB	OKB	53.56	3216.2245	37	9.482	1.2848	5
CBBTC	COINBASE WRAPPED BTC	84905	3126.7878	39	244.5683	3.6742	8
DAI	DAI	0.9997	3119.8378	38	84.3799	-0.0038	
PEPE	PEPE	0	3038.2504	40	508.1867	5.1099	

24h High Price	24h Low Price	All Time High (ATH)	% Change from ATH	ATH Date	Top10 Filter	ATH Date (Year)	ATH Date (Quarter)	ATH Date (Month Index)	ATH Date (Month)
293	1656.93	1546.75	4829.57	-65.7721	10-11-2021 20:10	Other	2021	Qtr4	11 Nov
163	85026	81797	108368	-21.632	20-01-2025 12:46	Other	2025	Qtr1	1 Jan
607	9.44	9.29	10.14	-7.5462	10-03-2025 14:56	Other	2025	Qtr1	3 Mar
104	13.23	12.45	52.7	-74.899	10-05-2021 05:43	Other	2021	Qtr2	5 May
611	19.94	18.88	144.96	-86.2516	21-11-2021 19:48	Other	2021	Qtr4	11 Nov
429	0.2478	0.2313	0.8756	-71.7302	03-01-2018 05:30	Other	2018	Qtr1	1 Jan
352	2.33	2.16	5.35	-56.6901	05-01-2025 04:26	Other	2025	Qtr1	1 Jan
639	3.02	2.82	8.25	-63.7443	15-06-2024 06:06	Other	2024	Qtr2	6 Jun
304	0.1754	0.1651	0.5692	-69.243	15-09-2021 16:10	Other	2021	Qtr3	9 Sep
901	0	0	0.0001	-85.4288	28-10-2021 09:24	Other	2021	Qtr4	10 Oct
003	1	0.9994	1.057	-5.434	29-10-2024 11:10	Other	2024	Qtr4	10 Oct
843	1979.01	1856.35	7256.02	-72.7321	13-05-2022 20:39	Other	2022	Qtr2	5 May
496	329.9	305.09	3785.82	-91.3178	20-12-2017 05:30	Other	2017	Qtr4	12 Dec
743	6.46	6.33	8.99	-29.4185	23-02-2025 07:22	Other	2025	Qtr1	2 Feb
179	78.77	74.98	410.26	-80.8029	10-05-2021 08:43	Other	2021	Qtr2	5 May
854	3.73	3.51	54.98	-93.2204	04-11-2021 19:40	Other	2021	Qtr4	11 Nov
403	16.18	14.89	34.96	-53.8961	22-12-2024 09:26	Other	2024	Qtr4	12 Dec
086	4.48	4.27	8.45	-47.4827	27-12-2024 17:11	Other	2024	Qtr4	12 Dec
708	0.7836	0.6017	2.99	-73.975	26-02-2025 22:11	Other	2025	Qtr1	2 Feb
586	1.002	0.995	1.05	-4.8456	05-08-2024 19:51	Other	2024	Qtr3	8 Aug
038	0.9998	0.998	1.032	-3.1941	20-12-2023 21:08	Other	2023	Qtr4	12 Dec
972	1659.67	1548.35	4799.89	-65.6525	09-11-2021 05:30	Other	2021	Qtr4	11 Nov
885	28.21	27.74	31.28	-11.129	03-03-2025 03:52	Other	2025	Qtr1	3 Mar
579	209.94	200.35	542.33	-61.4852	09-01-2018 05:30	Other	2018	Qtr1	1 Jan
642	1766.47	1648.01	4311.81	-59.2735	07-12-2024 02:02	Other	2024	Qtr4	12 Dec
057	5.54	5.15	44.92	-87.6693	03-05-2021 10:55	Other	2021	Qtr2	5 May
848	53.59	52.8	73.8	-27.4104	14-03-2024 06:00	Other	2024	Qtr1	3 Mar
742	85050	81736	108953	-22.0884	20-01-2025 14:50	Other	2025	Qtr1	1 Jan
038	1	0.9994	1.22	-17.9765	13-03-2020 08:32	Other	2020	Qtr1	3 Mar
000	0	0	0	-74.1864	09-12-2024 22:00	Other	2024	Qtr4	12 Dec

Top10 Filter	Top 10

Row Labels	Max of Market Cap (M)
BITCOIN	1685423.13
BNB	87414.1522
CARDANO	23829.4962
DOGECOIN	24700.2894
ETHEREUM	199729.5724
SOLANA	67482.6919
TETHER	144346.2088
TRON	23688.0453
USDC	60070.5547
XRP	125851.8188
Grand Total	**1685423.13**

Fig: Pivot table of Objective 1

Top10 Filter	Top 10		
Row Labels	**Sum of Current Price (USD)**	**Sum of 24h Low Price**	**Sum of 24h High Price**
ADA	0.6617	0.6175	0.6649
BNB	599.21	583.65	599.02
BTC	84852	81908	84945
DOGE	0.166	0.1577	0.1665
ETH	1655.06	1549.05	1658.63
SOL	130.86	118.8	130.72
TRX	0.2494	0.2375	0.2503
USDC	0.9999	0.9999	1
USDT	0.9997	0.9994	0.9997
XRP	2.16	1.99	2.16
Grand Total	**87242.3667**	**84164.502**	**87338.6114**

Fig: Pivot table of Objective 2

Top10 Filter	Top 10
Row Labels	**Sum of 24h Price % Change**
ADA	6.9858
BNB	2.665
BTC	3.5683
DOGE	5.1962
ETH	6.3262
SOL	9.5332
TRX	5
USDC	0.0013
USDT	0.02
XRP	7.8816
Grand Total	**47.1776**

Fig. Objective 3 Pivot table

Top10 Filter	Top 10	
Row Labels	**Average of Current Price (USD)**	**Sum of Total Volume_24h (M)**
ADA	0.6617	602.6445
BNB	599.21	531.7699
BTC	84852	27287.2237
DOGE	0.166	798.4831
ETH	1655.06	10984.0832
SOL	130.86	4279.4927
TRX	0.2494	732.9222
USDC	0.9999	8941.5278
USDT	0.9997	44972.5449
XRP	2.16	2962.8873
Grand Total	**8724.23667**	**102093.5793**

Top10 Filter	Top 10
ATH Date (Year)	All
Row Labels	**Max of All Time High (ATH)**
BITCOIN	108786
BNB	788.84
CARDANO	3.09
DOGECOIN	0.7316
ETHEREUM	4878.26
SOLANA	293.31
TETHER	1.32
TRON	0.4313
USDC	1.17
XRP	3.4
Grand Total	**108786**

Fig. Objective 5 Pivot table

Column1.high_24h	Column1.low_24h	Column1.price_change_24h	Column1.price_change_percentage_24h	Column1.market_cap_change_24h	Column1.market_cap_change_percentage_24h
84945	81908	2923.46	3.5683	58113090637	3.57111
1658.63	1549.05	98.47	6.32619	11877342240	6.3227
0.999711	0.999427	0.00019941	0.01995	73545842	0.05098
2.16	1.99	0.157581	7.88165	9181636215	7.86974
599.02	583.65	15.55	2.66502	2308776679	2.71284
130.72	118.8	11.39	9.53322	5773504782	9.35599
1	0.999885	0.00001323	0.00132	-20703258.98	-0.03445
0.16647	0.157707	0.00820141	5.19615	1187346153	5.04976
0.664882	0.617503	0.04320374	6.98575	1531762442	6.86959
0.250309	0.237514	0.01187562	4.99996	1146812943	5.08762
1656.93	1546.75	99.87	6.42926	857184837	5.88885
85026	81797	2963.78	3.61632	383025250	3.62576
9.44	9.29	-0.033958585	-0.36071	-37848796.56	-0.43536
13.23	12.45	0.749859	6.01035	471644086	5.91898
19.94	18.88	0.536378	2.7611	202659664	2.50977
0.24784	0.2313	0.01476094	6.34287	451790067	6.28959
2.33	2.16	0.142049	6.5352	460957030	6.52443
3.02	2.82	0.057616	1.96393	147414059	2.02692
0.175386	0.165118	0.00839401	5.03037	339235997	4.80241
0.00001256	0.00001196	5.39481E-07	4.49013	316476873	4.46947
1	0.999423	0.0000298	0.00298	-343871951	-4.58902
1979.01	1856.35	111.72	5.98426	370271061	5.54237
329.9	305.09	23.36	7.6496	458576252	7.55777
6.46	6.33	-0.049473447	-0.77427	108421188	1.79507
78.77	74.98	2.9	3.81791	200624511	3.48039
3.73	3.51	0.224047	6.38535	323870972	6.05495
16.18	14.89	0.995092	6.64033	324931817	6.49026
4.48	4.27	0.16689	3.90856	204738387	3.99666
0.783626	0.601675	0.165416	27.47085	1137822102	27.54388
1.002	0.995021	0.00158388	0.15865	7788103	0.15049

Fig. Raw Data

Column1.id	Column1.symbol	Column1.name	Column1.image
bitcoin	btc	Bitcoin	https://coin-images.coingecko.com/coins/images/1/large/bitcoin.png?1696501400
ethereum	eth	Ethereum	https://coin-images.coingecko.com/coins/images/279/large/ethereum.png?1696501628
tether	usdt	Tether	https://coin-images.coingecko.com/coins/images/325/large/Tether.png?1696501661
ripple	xrp	XRP	https://coin-images.coingecko.com/coins/images/44/large/xrp-symbol-white-128.png?16
binancecoin	bnb	BNB	https://coin-images.coingecko.com/coins/images/825/large/bnb-icon2_2x.png?169650197
solana	sol	Solana	https://coin-images.coingecko.com/coins/images/4128/large/solana.png?1718769756
usd-coin	usdc	USDC	https://coin-images.coingecko.com/coins/images/6319/large/usdc.png?1696506694
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leo-token	leo	LEO Token	https://coin-images.coingecko.com/coins/images/8418/large/leo-token.png?1696508607
chainlink	link	Chainlink	https://coin-images.coingecko.com/coins/images/877/large/chainlink-new-logo.png?169
avalanche-2	avax	Avalanche	https://coin-images.coingecko.com/coins/images/12559/large/Avalanche_Circle_RedWhit
stellar	xlm	Stellar	https://coin-images.coingecko.com/coins/images/100/large/fmpFRHHQ_400x400.jpg?1735
sui	sui	Sui	https://coin-images.coingecko.com/coins/images/26375/large/sui-ocean-square.png?172
the-open-network	ton	Toncoin	https://coin-images.coingecko.com/coins/images/17980/large/photo_2024-09-10_17.09.00
hedera-hashgraph	hbar	Hedera	https://coin-images.coingecko.com/coins/images/3688/large/hbar.png?1696504364
shiba-inu	shib	Shiba Inu	https://coin-images.coingecko.com/coins/images/11939/large/shiba.png?1696511800
usds	usds	USDS	https://coin-images.coingecko.com/coins/images/39926/large/usds.webp?1726666683
wrapped-steth	wsteth	Wrapped stETH	https://coin-images.coingecko.com/coins/images/18834/large/wstETH.png?1696518295
bitcoin-cash	bch	Bitcoin Cash	https://coin-images.coingecko.com/coins/images/780/large/bitcoin-cash-circle.png?1696
mantra-dao	om	MANTRA	https://coin-images.coingecko.com/coins/images/12151/large/OM_Token.png?1696511997
litecoin	ltc	Litecoin	https://coin-images.coingecko.com/coins/images/2/large/litecoin.png?1696501400
polkadot	dot	Polkadot	https://coin-images.coingecko.com/coins/images/12171/large/polkadot.png?1696512008
hyperliquid	hype	Hyperliquid	https://coin-images.coingecko.com/coins/images/50882/large/hyperliquid.jpg?1729431300
bitget-token	bgb	Bitget Token	https://coin-images.coingecko.com/coins/images/11610/large/Bitget_logo.png?1736925720
pi-network	pi	Pi Network	https://coin-images.coingecko.com/coins/images/54342/large/pi_network.jpg?1739347570
binance-bridged-usdt-bnb-smart-chain	bsc-usd	Binance Bridged USDT (BNB Smart Chain)	https://coin-images.coingecko.com/coins/images/35021/large/USDT.png?1707233575

Fig. Raw Data

Column1.ath	Column1.ath_change_percentage	Column1.ath_date	Column1.atl	Column1.atl_change_percentage	Column1.atl_date	Column1.roi	Column1.last_updated
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788.84	-24.06298	2024-12-04T10:35:25.220Z	0.0398177	1504317.317	2017-10-19T00:00:00.000Z		2025-04-12T15:04:31.841Z
293.31	-55.42124	2025-01-19T11:15:27.957Z	0.500801	26009.13073	2020-05-11T19:35:23.449Z		2025-04-12T15:04:35.242Z
1.17	-14.72947	2019-05-08T00:40:28.300Z	0.877647	13.93797	2023-03-11T08:02:13.981Z		2025-04-12T15:04:33.486Z
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3.09	-78.56696	2021-09-02T06:00:10.474Z	0.01925275	3336.49114	2020-03-13T02:22:55.044Z		2025-04-12T15:04:34.512Z
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108368	-21.63203	2025-01-20T07:16:27.137Z	3139.17	2605.35223	2019-04-02T00:00:00.000Z		2025-04-12T15:04:34.720Z
10.14	-7.54621	2025-03-10T09:26:43.294Z	0.799859	1071.49283	2019-12-24T15:14:35.376Z		2025-04-12T15:04:35.745Z
52.7	-74.89898	2021-05-10T00:13:57.214Z	0.148183	8826.37288	2017-11-29T00:00:00.000Z		2025-04-12T15:04:32.715Z
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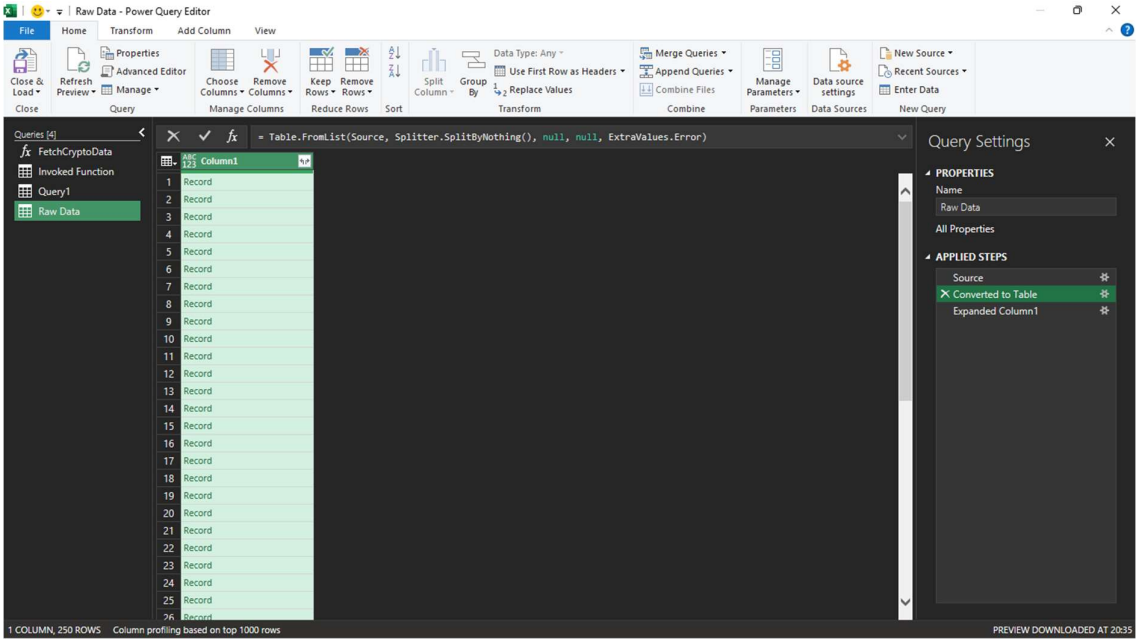
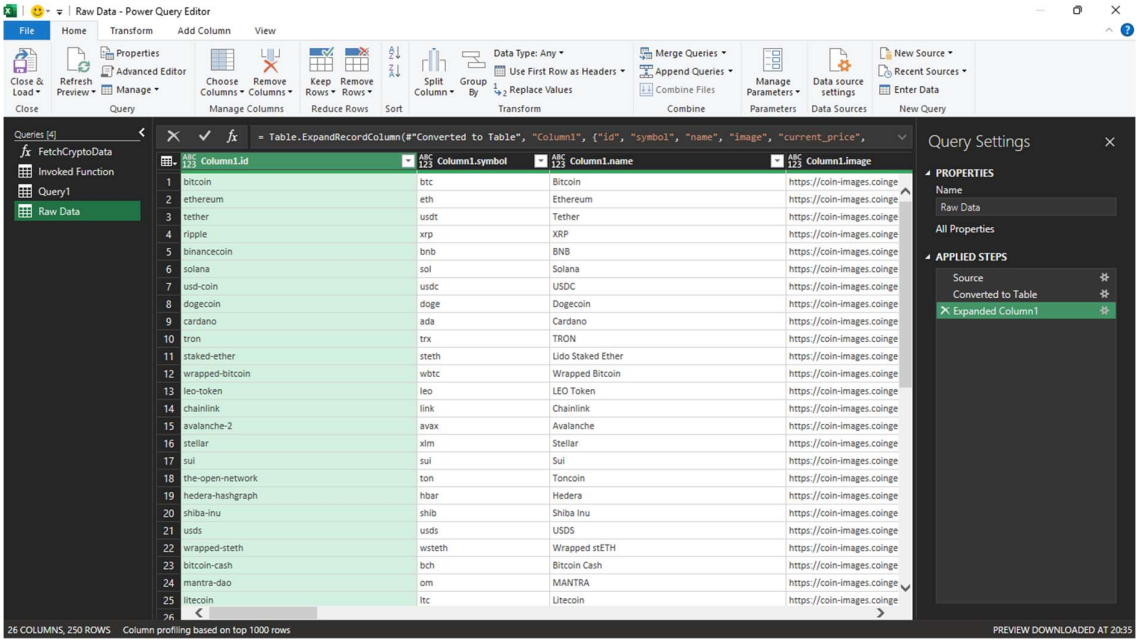
3785.82	-91.31783	2017-12-20T00:00:00.000Z	76.93	327.23379	2018-12-16T00:00:00.000Z		2025-04-12T15:04:31.813Z
8.99	-29.41846	2025-02-23T01:52:21.073Z	0.01726188	36639.96949	2023-10-12T17:25:09.068Z		2025-04-12T15:04:36.773Z
410.26	-80.80288	2021-05-10T03:13:07.904Z	1.15	6755.42852	2015-01-14T00:00:00.000Z		2025-04-12T15:04:37.434Z
54.98	-93.22045	2021-11-04T14:10:09.301Z	2.7	38.18424	2020-08-20T05:48:11.359Z		2025-04-12T15:04:29.186Z
34.96	-53.89609	2024-12-22T03:56:00.276Z	3.81	323.17435	2024-11-29T09:30:30.871Z		2025-04-12T15:04:35.052Z
8.45	-47.48271	2024-12-27T11:41:24.992Z	0.0142795	30978.68001	2020-06-25T04:17:05.895Z		2025-04-12T15:04:30.651Z
2.99	-73.97501	2025-02-26T16:41:03.732Z	0.406999	91.03879	2025-04-05T04:50:37.033Z		2025-04-12T15:04:37.437Z
1.05	-4.84556	2024-08-05T14:21:42.527Z	0.942186	6.03901	2024-12-05T22:30:39.827Z		2025-04-12T15:04:33.737Z

Fig. Raw Data

POWER QUERY IMAGES:


Raw Data - Power Query Editor
File
Home
Transform
Add Column
View
Close & Load
Refresh Preview
Properties
Advanced Editor
Manage
Choose Columns
Remove Columns
Keep Rows
Remove Rows
Split Column
Group By
Data Type: Any
Use First Row as Headers
Replace Values
Merge Queries
Append Queries
Combine Files
Manage Parameters
Data source settings
New Source
Recent Sources
Enter Data
Close
Query
Manage Columns
Reduce Rows
Sort
Transform
Combine
Parameters
Data Sources
New Query
Queries [4]
FetchCryptoData
Invoked Function
Query1
Raw Data
= Table.FromList(Source, Splitter.SplitByNothing(), null, null, ExtraValues.Error)
Column1
Record
Query Settings
PROPERTIES
Name
Raw Data
All Properties
APPLIED STEPS
Source
Converted to Table
Expanded Column1
1 COLUMN, 250 ROWS
Column profiling based on top 1000 rows
PREVIEW DOWNLOADED AT 20:35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Advanced Editor
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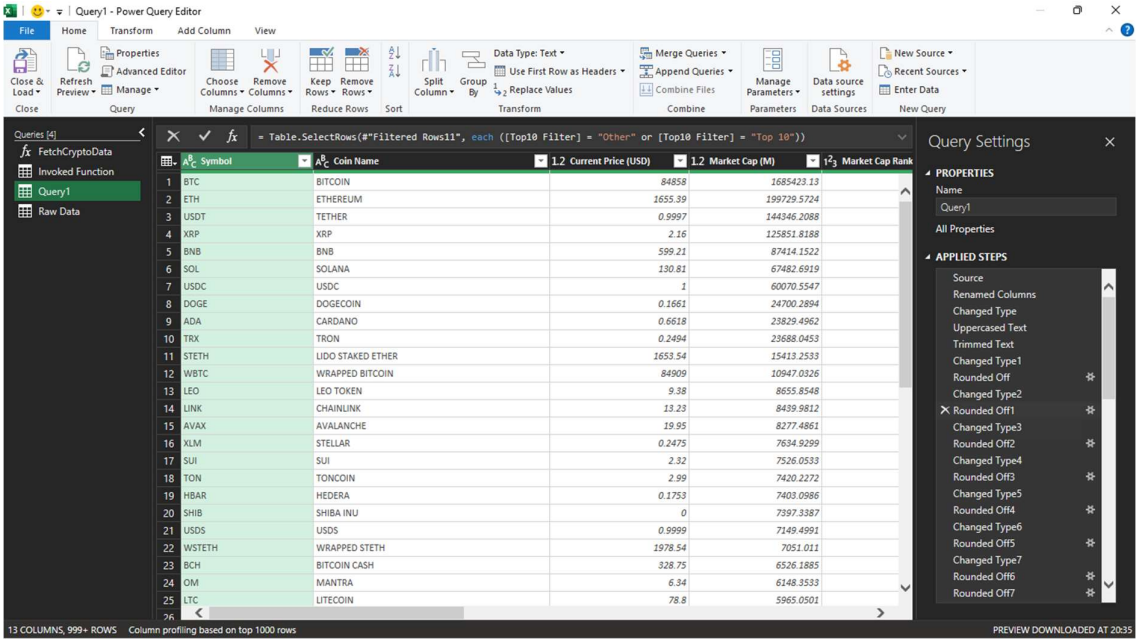
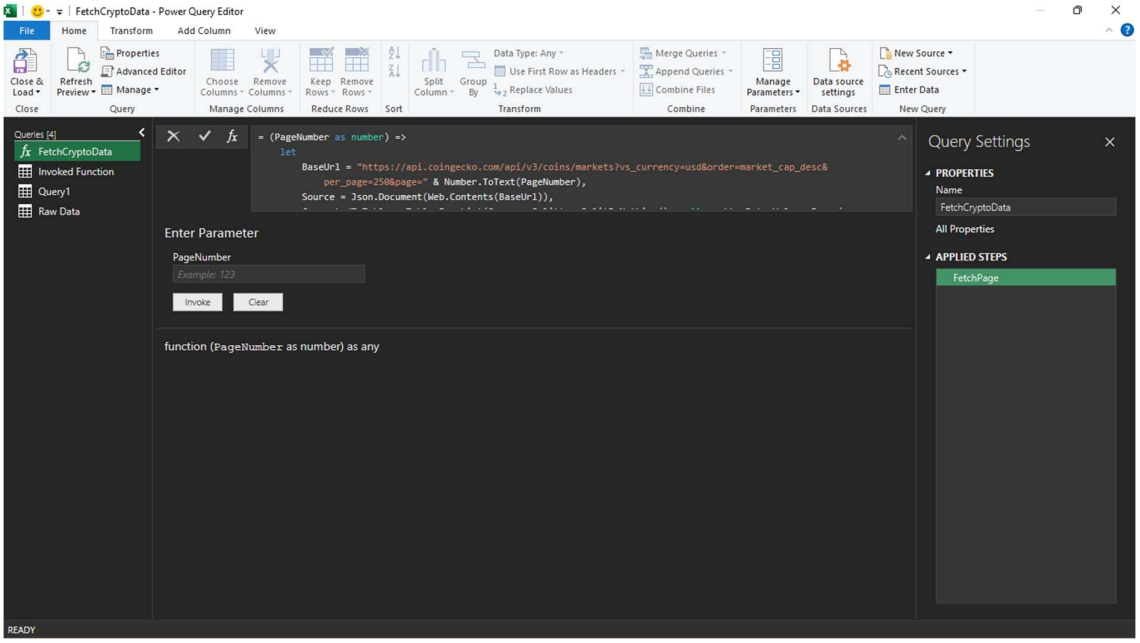
Choose Columns
Remove Columns
Keep Rows
Remove Rows
Split Column
Group By
Data Type: Any
Use First Row as Headers
Replace Values
Merge Queries
Append Queries
Combine Files
Manage Parameters
Data source settings
New Source
Recent Sources
Enter Data
Close
Query
Manage Columns
Reduce Rows
Sort
Transform
Combine
Parameters
Data Sources
New Query
Queries [4]
FetchCryptoData
Invoked Function
Query1
Raw Data
= Table.ExpandRecordColumn(#"Converted to Table", "Column1", {"id", "symbol", "name", "image", "current_price",
Column1.id
Column1.symbol
Column1.name
Column1.image
1 bitcoin btc Bitcoin https://coin-images.coinge
2 ethereum eth Ethereum https://coin-images.coinge
3 tether usdt Tether https://coin-images.coinge
4 ripple xrp XRP https://coin-images.coinge
5 binancecoin bnb BNB https://coin-images.coinge
6 solana sol Solana https://coin-images.coinge
7 usd-coin usdc USDC https://coin-images.coinge
8 dogecoin doge Dogecoin https://coin-images.coinge
9 cardano ada Cardano https://coin-images.coinge
10 tron trx TRON https://coin-images.coinge
11 staked-ether steth Lido Staked Ether https://coin-images.coinge
12 wrapped-bitcoin wbtc Wrapped Bitcoin https://coin-images.coinge
13 leo-token leo LEO Token https://coin-images.coinge
14 chainlink link Chainlink https://coin-images.coinge
15 avalanche-2 avax Avalanche https://coin-images.coinge
16 stellar xlm Stellar https://coin-images.coinge
17 sui sui Sui https://coin-images.coinge
18 the-open-network ton Toncoin https://coin-images.coinge
19 hedera-hashgraph hbar Hedera https://coin-images.coinge
20 shiba-inu shib Shiba Inu https://coin-images.coinge
21 usds usds USDS https://coin-images.coinge
22 wrapped-steth wsteth Wrapped stETH https://coin-images.coinge
23 bitcoin-cash bch Bitcoin Cash https://coin-images.coinge
24 mantra-dao om MANTRA https://coin-images.coinge
25 litecoin ltc Litecoin https://coin-images.coinge
Query Settings
PROPERTIES
Name
Raw Data
All Properties
APPLIED STEPS
Source
Converted to Table
Expanded Column1
26 COLUMNS, 250 ROWS
Column profiling based on top 1000 rows
PREVIEW DOWNLOADED AT 20:35






```
 1. .  = (PageNumber as number) =>
 2.     let
 3.         BaseUrl =
"https://api.coingecko.com/api/v3/coins/markets?vs_currency=usd&order=market_cap_desc&per_page=2
50&page=" & Number.ToText(PageNumber),
 4.         Source = Json.Document(Web.Contents(BaseUrl)),
 5.         ConvertedToTable = Table.FromList(Source, Splitter.SplitByNothing(), null, null,
ExtraValues.Error),
 6.         ExpandedTable = Table.ExpandRecordColumn(ConvertedToTable, "Column1", {
 7.     "symbol",
 8.     "name",
 9.     "current_price",
10.     "market_cap",
```

```
    "market_cap_rank",
    "total_volume",
    "price_change_percentage_24h",
    "high_24h",
    "low_24h",
    "ath",
    "ath_change_percentage",
    "ath_date"
})

    in
        ExpandedTable

```

Code for fetching data.

4. CONCLUSION

The Realtime Cryptocurrency Dashboard project has been a comprehensive effort to bridge the gap between dynamic cryptocurrency data and its practical, real-world analysis. In an era where digital assets dominate global financial discussions, this project successfully creates an accessible, informative, and interactive Excel-based dashboard for tracking, analyzing, and visualizing the volatile crypto market in near real-time.

The project covered multiple critical aspects of data management — from data collection via APIs (CoinGecko), preprocessing and cleaning for consistency, to insightful data analytics and intuitive dashboard design. By integrating slicers, dynamic charts, and conditional formatting, we provided a seamless user experience that empowers users to explore:

- The Top Performing Cryptocurrencies by Market Cap
- Real-time Price Fluctuations with volatility insights
- Trading Volume vs Price Trends
- Market Dominance Distribution
- Historical ATH (All Time High) trends and comparisons

Each of the five objectives was met with a high degree of granularity, offering decision-makers, analysts, and enthusiasts a visual-first interface to make informed calls based on data rather than speculation.

A key strength of this dashboard lies in its modularity and refreshability. Even though the dashboard is built in Excel, it was designed with near real-time intent allowing regular updates through refreshed dataset exports from APIs. This brings the advantages of real-time systems while maintaining the simplicity and reach of spreadsheet tools.

Throughout the development cycle, we prioritized both performance and usability. Careful preprocessing, intelligent metrics (e.g., % drop from ATH, volatility classification), and clean visualization strategies made the project academically rigorous and practically relevant.

In conclusion, the dashboard not only meets its technical objectives but also adds value by showcasing how real-time financial data can be transformed into powerful, decision-support tools using accessible platforms like Excel thereby underlining the essence of modern data management.

5. FUTURE SCOPE

While this project lays a strong foundation for analyzing real-time cryptocurrency data using Excel, there remains considerable room for enhancement and expansion. As the crypto landscape continues to evolve, the following future improvements can significantly boost the dashboard's analytical capabilities, scalability, and real-time responsiveness:

1. Full API Automation in Excel

- Currently, the dataset requires periodic export and refresh. In future iterations, the dashboard can be fully automated using Power Query with API integration or VBA macros to fetch data directly from CoinMarketCap, CoinGecko, or similar APIs at defined intervals.
- This would transform the dashboard from a near real-time tool to a truly real-time solution, minimizing manual intervention.

2. Integration with Power BI or Tableau

- For deeper insights, smoother UX, and scalability, the dashboard can be ported to Power BI or Tableau.
- These platforms offer more interactive dashboards, real-time refresh capabilities, better performance with large datasets, and cloud sharing options — making it suitable for enterprise-level usage.

3. Predictive Analytics and Forecasting

- Machine Learning models (e.g., LSTM or ARIMA) could be integrated externally (in Python) to predict future prices, volatility, and volume trends.
- These predictions could then be fed into Excel or Power BI, adding a layer of foresight rather than just hindsight.

4. Sentiment Analysis Integration
    - Future versions can link Twitter/X, Reddit, or news sentiment via APIs and use NLP models to display sentiment trends alongside price fluctuations.
    - This would help traders understand the psychological impact of market movements and news events.

5. Portfolio Tracker Module
    - A user-specific feature that lets users input their crypto holdings and see live portfolio value, profit/loss percentages, and coin-wise distribution can make the dashboard more practical for individual investors.

6. Multi-Timeframe Analysis
    - Introducing filters for time-based comparisons like hourly, daily, weekly, and monthly price changes can offer more nuanced analysis.
    - Users could assess short-term performance vs long-term growth on the same dashboard.

7. Blockchain Activity Metrics
    - Additional insights like transaction count, network fees, and wallet activity (especially for major coins like BTC and ETH) can enhance the dashboard for deeper blockchain analysis.

8. Mobile & Web Version
    - While Excel is desktop-oriented, developing a mobile-friendly version using Google Data Studio, Streamlit, or Flask dashboards can bring more accessibility and real-time convenience to users on the go.

9. Alert System
    - Setting up alerts (through Excel notifications or email triggers via Outlook or Python scripts) based on thresholds for prices, % changes, or volume spikes would make the dashboard more proactive rather than reactive.

10. Integration with Trading Bots

- As a long-term vision, this dashboard can act as a frontend to automated trading bots that use dashboard insights to execute real trades on platforms like Binance or Coinbase.

Conclusion of Future Scope

The potential enhancements outlined above not only future-proof the dashboard but also align it with industry standards for professional financial analysis tools. By evolving into a fully automated, AI-augmented, and cloud-integrated platform, the Realtime Cryptocurrency Dashboard can serve not just as a student project, but as a scalable product for academic, personal finance, or professional use.

6. REFERENCE

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  (Provided foundational understanding of cryptocurrencies and key metrics like market dominance and ATH.)
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- Google Scholar and IEEE Research Papers
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- TradingView & Binance Academy
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  https://academy.binance.com/
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  https://www.w3schools.com/
  (Helped structure data preprocessing steps effectively in Excel.)