**Analysis Report**

**Introduction**

Cryptocurrencies have become a key component of the financial ecosystem, gaining broad attention from investors, researchers, and politicians. This report summarizes a real-time data analysis project focused on the top 50 cryptocurrencies by market capitalization. The goal is to fetch, analyse, and present the data in a live-updating Excel sheet to provide actionable insights into market trends.

The CoinGecko API is used in this project to collect data, and Python-based automation is used to guarantee continuous evaluation and updates. A changing Excel sheet and this summary report presenting the main conclusions are among the final outputs.

**Objective**

The primary objective of this project is to:

1. Fetch live data for the top 50 cryptocurrencies, including essential metrics like price, market cap, and 24-hour changes.
2. Analyse the data to extract meaningful insights such as identifying the top performers and trends.
3. Present the data in an Excel sheet that updates automatically every 5 minutes.

**Methodology**

The project followed these key steps:

1. Data Fetching:
   * Leveraged the CoinGecko API to retrieve live data for the top 50 cryptocurrencies based on market capitalization.
   * Key fields fetched:
     + Cryptocurrency Name
     + Symbol
     + Current Price (in USD)
     + Market Capitalization
     + 24-hour Trading Volume
     + Price Change (24-hour, percentage)
2. Data Analysis:
   * Identified the top 5 cryptocurrencies by market capitalization.
   * Calculated the average price of the top 50 cryptocurrencies.
   * Determined the cryptocurrencies with the highest and lowest 24-hour percentage price changes.
3. Live-Updating Excel Sheet:
   * Designed an Excel sheet to display the data and refresh it every 5 minutes.
   * Implemented real-time data updates using Python’s openpyxl library.

**Key Insights**

1. Top 5 Cryptocurrencies by Market Cap:

The analysis identified the following as the top 5 cryptocurrencies based on market capitalization:

|  |  |  |  |
| --- | --- | --- | --- |
| **Rank** | **Name** | **Symbol** | **Market Cap (USD)** |
| 1 | Bitcoin | BTC | $1,922,898,170,879 |
| 2 | Ethereum | ETH | $401,103,578,935 |
| 3 | Tether | USDT | $130,174,544,132 |
| 4 | Solana | SOL | $120,644,573,388 |
| 5 | BNB | BNB | $90,515,139,631 |

1. Average Price:

The average price of the top 50 cryptocurrencies is **$4,268.05**.

1. Highest 24-hour Percentage Change:

* **Cryptocurrency**: Arbitrum
* **Price Change**: +15.87%

1. Lowest 24-hour Percentage Change:

* **Cryptocurrency**: Stellar
* **Price Change**: -6.91%

**Implementation**

1. **Fetching Data:**
   * **Source:** CoinGecko API
   * **Method:** A fetch\_cryptocurrency\_data () function was developed to send HTTP GET requests to the CoinGecko API endpoint for cryptocurrency data.
   * **Parameters Passed:**

* vs\_currency: USD (to get prices in US dollars).
* order: Ranked by market capitalization in descending order.
* per\_page: 50 (to retrieve the top 50 cryptocurrencies).
* sparkline: False (to exclude additional trend data).
* **Output:** The API response is parsed into a JSON format and converted into a Pandas DataFrame for further analysis.

1. **Data Analysis**

**Function**: analyse\_data()

**Steps:**

* **Extracts relevant fields:**
  + - Cryptocurrency Name
    - Symbol
    - Current Price
    - Market Capitalization
    - 24-hour Trading Volume
    - 24-hour Percentage Change in Price
  + **Performs the following analyses:**
    - **Top 5 Cryptocurrencies by Market Cap**: Selects the top 5 using the Pandas nlargest() function.
    - **Average Price**: Computes the mean price of the top 50 cryptocurrencies using mean().
    - **Highest and Lowest Percentage Changes**: Identifies cryptocurrencies with the highest and lowest 24-hour percentage changes using the Pandas idxmax() and idxmin() functions.

**3. Live-Updating Excel Sheet**

* **File Handling:**
  + A function named update\_excel() was developed to save data into an Excel file.
  + The script writes or updates the file crypto\_data.xlsx using the openpyxl library.
  + Each row of data is appended to an Excel sheet titled Crypto Data.
* **File Path:** The file is saved in a specified directory (e.g., /content/drive/MyDrive/crypto\_data.xlsx in Google Colab).

**4**. **Automation**

* **Continuous Updates**:
  + The main() function runs an infinite loop (while True) to fetch and analyze new data every 5 minutes.
  + **Time Delay**: The script uses time.sleep(300) to pause for 5 minutes between updates.
* **Error Handling**:
  + Errors during API calls or file operations are caught and logged, ensuring the script remains resilient.

1. **Integration with Google Colab**

* Google Drive Integration: Mounted using drive.mount() to store the output Excel file persistently in Google Drive.

1. **Python Libraries**

* **requests**: For API requests to fetch live cryptocurrency data.
* **pandas**: For data manipulation and analysis.
* **openpyxl**: For writing and updating Excel files.
* **time**: For introducing delays to ensure periodic updates.

**Challenges**

* + 1. **API Response Issues**:
  + Intermittent delays in API responses were addressed by implementing retry logic.
    1. **Data Overwriting**:
  + Ensured that new data is appended without overwriting previous data.

**Conclusion**

This project provides a comprehensive and dynamic view of the cryptocurrency market, enabling users to track top-performing cryptocurrencies and gain real-time insights into market trends. The live-updating Excel sheet and automated script are valuable tools for financial analysis and decision-making.