

# Cryptocurrency Data Analysis Project

*Using Python, MySQL, and Power BI*

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## 1. Project Title

**Crypto Price Trend & Market Analysis Using Python, MySQL, and Power BI**

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## 2. Project Overview

This project focuses on analyzing historical cryptocurrency market data to understand **price trends, volatility, trading volume, and performance comparison** among different cryptocurrencies.

The project follows a **complete data analytics lifecycle**:

- Data collection
- Data cleaning and analysis using **Python**
- Data storage and querying using **MySQL**
- Interactive visualization and insights using **Power BI**

The goal is to transform raw crypto price data into **meaningful business insights** that help understand market behavior.

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## 3. Objectives of the Project

- Analyze historical price trends of cryptocurrencies
  - Identify **top-performing and underperforming coins**
  - Study **market volatility and daily price changes**
  - Compare cryptocurrencies based on **price, volume, and returns**
  - Build an **interactive dashboard** for decision-making
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## 4. Dataset Description

- Dataset contains **365 days of historical crypto data**
- Includes multiple cryptocurrencies (e.g., Bitcoin, Ethereum, etc.)
- Data fields:
  - Date
  - Cryptocurrency Name / Symbol
  - Open Price

- Close Price
- High Price
- Low Price
- Trading Volume
- Market Capitalization (if available)

**Data Source:** Public cryptocurrency market data (CSV/Excel format)

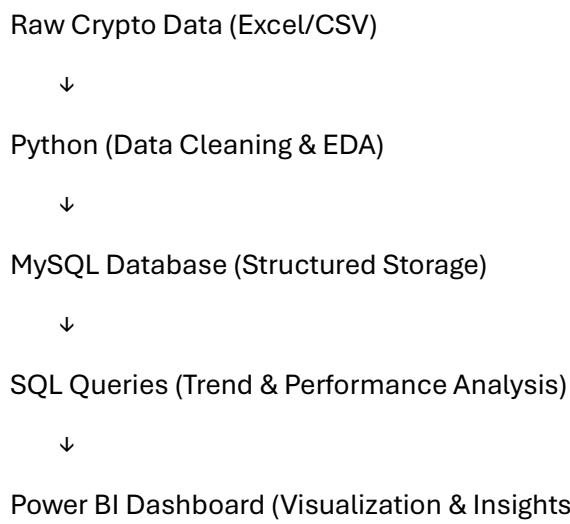
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## 5. Tools & Technologies Used

| Tool                        | Purpose                           |
|-----------------------------|-----------------------------------|
| <b>Python</b>               | Data cleaning, preprocessing, EDA |
| <b>Pandas &amp; NumPy</b>   | Data manipulation                 |
| <b>Matplotlib / Seaborn</b> | Data visualization                |
| <b>MySQL</b>                | Data storage & SQL analysis       |
| <b>Power BI</b>             | Dashboard & reporting             |
| <b>Excel</b>                | Raw data format                   |

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## 6. Project Architecture (Workflow)



## 7. Data Cleaning & Preprocessing (Python)

Performed using Python libraries:

- Removed missing and duplicate values

- Converted date columns into proper datetime format
  - Handled inconsistent price values
  - Created new calculated columns:
    - Daily Price Change
    - Percentage Change
    - Moving Averages
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## **8. Exploratory Data Analysis (EDA)**

Key analysis performed:

- Price movement over time
- Volume trends analysis
- Volatility comparison between cryptocurrencies
- Correlation between price and trading volume
- Identification of high-growth periods

Visualizations used:

- Line charts
  - Bar charts
  - Distribution plots
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## **9. Database Design (MySQL)**

- Created structured tables for crypto data
- Imported cleaned data from Python into MySQL
- Ensured proper data types for numerical and date fields

### **Example Analysis Using SQL:**

- Average closing price per cryptocurrency
  - Highest and lowest price analysis
  - Monthly and yearly trend analysis
  - Volume-based ranking of cryptocurrencies
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## **10. SQL Analysis**

Some key SQL insights:

- Top cryptocurrencies by average price
  - Most volatile coins based on price fluctuations
  - Daily and monthly price trend calculations
  - Ranking cryptocurrencies using window functions
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## 11. Power BI Dashboard

An **interactive dashboard** was built to present insights visually.

### Dashboard Features:

- Price trend over time (Line chart)
  - Volume comparison across cryptocurrencies
  - Top gainers and losers
  - Filters:
    - Cryptocurrency name
    - Date range
  - KPI cards:
    - Average price
    - Total volume
    - Highest price
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## 12. Key Insights & Findings

- Bitcoin and Ethereum show relatively **stable long-term growth**
  - Some altcoins show **high volatility with sharp spikes**
  - Trading volume strongly influences price movements
  - Market behavior changes significantly during high-volume periods
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## 13. Business Use Case

This analysis can help:

- Investors make informed trading decisions
- Analysts understand crypto market trends
- Businesses evaluate risk and volatility
- Portfolio managers compare asset performance

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## **14. Challenges Faced**

- Handling missing and inconsistent crypto data
  - High volatility causing extreme values
  - Optimizing SQL queries for large datasets
  - Designing meaningful dashboard visuals
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## **15. Conclusion**

This project demonstrates a **complete data analytics pipeline**, integrating Python, SQL, and Power BI to analyze real-world cryptocurrency data. It showcases skills in **data cleaning, analysis, database management, and visualization**, making it a strong portfolio project for data analyst roles.

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## **16. Future Enhancements**

- Add real-time API-based crypto data
- Include technical indicators (RSI, MACD)
- Perform price prediction using machine learning
- Automate ETL pipeline