Cryptocurrency Market Analysis Report

Bitcoin (BTC) vs Ethereum (ETH)
Prepared by: Aarya Gawade

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1. Overview

This report presents a concise Exploratory Data Analysis (EDA) comparing two major cryptocurrencies: **Bitcoin (BTC)** and **Ethereum (ETH)**.
The objective is to understand their **price trends, volatility behavior, trading activity, correlations**, and **market differences** using historical data.

The analysis was performed using Python (Pandas, NumPy, Matplotlib, Seaborn).

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2. Data Preprocessing

The dataset contained daily price and volume data. Steps performed:

- Converted Date column to datetime format
- Sorted data chronologically
- Checked and removed duplicate rows
- Validated numerical columns
- Ensured no missing values
- Created additional analytical features (below)

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3. Feature Engineering

To identify deeper market patterns, the following features were computed:

- **Daily Returns** (percentage change in closing price)

- **Price Range** (High – Low)
- **7-day Moving Average (MA7)**
- **30-day Moving Average (MA30)**
- **Rolling Volatility (7-day & 30-day)**

These indicators help evaluate trend direction, market momentum, and overall risk.

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4. Analysis & Key Insights

4.1 Price Trends

- BTC shows **more stable long-term movement**, with smoother cycles.
- ETH exhibits **sharper price swings** and reacts more aggressively to market changes.

4.2 Volatility

- ETH has **higher volatility**, both daily and rolling.
- BTC is relatively stable, making it slightly lower-risk compared to ETH.

4.3 Daily Returns

- Both assets show **high return fluctuations**, confirming crypto as a high-risk market.
- ETH displays **larger spikes**, indicating higher reward potential but greater instability.

4.4 Volume Trends

- Trading volume fluctuates independently of price.
- Volume does **not strongly correlate** with price changes → sentiment and news have higher influence.

4.5 Correlation Patterns

- Price metrics (Open, High, Low, Close) are **strongly correlated** within each cryptocurrency.
- Volume has a **weak correlation** with price.
- BTC and ETH show **similar directional trends**, indicating shared market influence.

4.6 Moving Averages

- MA7 crossing above MA30 indicates **bullish momentum**.
- MA7 crossing below MA30 signals **bearish trends**.
  ETH shows more frequent crossovers → more trend reversals.

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5. Conclusion

The analysis highlights clear differences between Bitcoin and Ethereum:

- **Bitcoin** behaves as a relatively stable asset with smoother trends.

- **Ethereum** is more volatile, delivering sharper price and return movements.

Both assets remain **high-risk** and influenced heavily by market sentiment rather than trading volume.
The engineered features (volatility, MAs, daily returns) provide strong indicators of trend direction and risk level.

This report offers a compact but comprehensive understanding of cryptocurrency market characteristics and provides a foundation for further forecasting, risk analysis, or dashboard visualization.