Business Understanding - Cryptocurrency Historical Prices

Problem Background

The cryptocurrency market has extremely high price volatility, posing a risk to uninformed investors. Therefore, historical data analysis is crucial. This project analyzes price trends (Close) and compares them with key supporting metrics such as transaction volume (Volume) and market capitalization (Marketcap). Additionally, this analysis identifies seasonal patterns (seasonality) to better understand market cycles and support data-driven decision-making.

Purpose of Analysis

To understand the cryptocurrency market through comparative trend analysis of price (Close), volume, and market capitalization (Marketcap), as well as to identify seasonal patterns (seasonality) from 5 main focuses: Bitcoin (BTC), Ethereum (ETH), Binance Coin (BNB), Cardano (ADA), and Polkadot (DOT). This dataset is sourced from Kaggle (Cryptocurrency Price History) for the period 2013-2021.

Reasons for Selecting the 5 Main Cryptocurrencies

These five coins rank among the top based on global market capitalization. They represent the majority of value movements in the cryptocurrency market, so changes in these coins typically affect the entire crypto ecosystem.

- Bitcoin (BTC) → represents a digital store of value asset (as "digital gold").
- Ethereum (ETH) → represents the largest smart contract platform.
- Binance Coin (BNB) → the largest exchange token (exchange token).
- Cardano (ADA) → a proof-of-stake blockchain with a focus on scientific approaches.
- Polkadot (DOT) → focuses on interoperability between blockchains.

This selection also maintains a balance between market representativeness and analysis complexity, ensuring that the results obtained are relevant, reliable, and generalizable for understanding the dynamics of the global crypto market.

Analysis Questions: 1, 2, 4 (descriptive analysis), 4 (diagnostic analysis)

NO	Questions	Objective/Purpose	Analysis Focus	Expected insights	Analysis Method/Metrics
1	How do the closing prices of the five major cryptocurrencies (Bitcoin, Ethereum, Binance Coin, Cardano, and Polkadot) compare over time?	To compare historical price movements and relative growth between coins.	Trend & Comparative Analysis	Identify which coins are leading market movements, when bull/bear phases occur simultaneously, and examine relative price performance	- Metrics: Close vs Date Visualization: Multi-Line Plot (with hue='CoinName').
2.	How does the transaction volume trend of all major coins compare over time?	To compare historical trading activity levels, market interest, and liquidity between coins.	Trend Analysis & Liquidity Analysis	-Identify periods of high trading interest (volume spikes), which often correlate with price volatility, and see which coins are most actively traded	Metric: Volume vs Date Visualization: Multi-Line Plot (with hue='CoinName')
3.	How does the market capitalization (Market Cap) trend compare for all major coins within a specific timeframe (2013-2021)?	To understand and compare the total market valuation growth of each coin, which is an indicator of market dominance and adoption.	Trend Analysis & Market Dominance Analysis	Identifying which coins have the largest market capitalization and how their dominance changes over time (e.g., ETH vs. BTC growth).	Metric: Market Cap vs Date Visualization: Multi-Line Plot (using df.plot() on the same axis).
4.	Is there any seasonality in the average closing price of coins when viewed from annual, monthly, and weekly cycles?	To identify whether there are recurring trends or periodic patterns that can help in determining market timing strategies.	Seasonal Analysis & Average Analysis	Identifying recurring cycles. (Example: "Average prices tend to peak in the fourth quarter (Q4) of each year," or "There is a weakening of average prices in the middle of the week.")	Metric: Average Close (Mean) Grouped by Year, Month, and Week. Visualization: Three separate line plots (via plt.subplot) per coin for annual, monthly, and weekly trends.