Final Report: Cryptocurrency Liquidity Forecasting for Market Stability

This project focuses on forecasting cryptocurrency liquidity to enhance market stability through data-driven methodologies. To achieve this, we leveraged historical cryptocurrency data from CoinGecko, specifically spanning March 16 and 17, 2022. The dataset incorporated key financial metrics such as price, 24-hour trading volume, market capitalization, and asset returns.

Data Processing and Feature Engineering

To ensure data quality and reliability, we conducted thorough preprocessing by eliminating missing values and duplicate entries. Additionally, we engineered new features to enhance predictive accuracy:

- **Volatility**, computed as the standard deviation of price movements over two days.
- **Liquidity ratio**, derived as the ratio of trading volume to market capitalization.

Exploratory Data Analysis (EDA)

A comprehensive EDA was performed to uncover meaningful patterns within the dataset:

- **Generating a correlation heatmap** to examine interdependencies among numerical features.
- **Summarizing key statistical distributions** to gain insights into data variability.

Model Development and Evaluation

We initiated model training with different regressor models, carefully fine-tuning its hyperparameters to optimize results. The final model demonstrated strong predictive capabilities, achieving an **R^2 score of 0.859**, indicating high precision in forecasting cryptocurrency liquidity.

Model Preservation and Future Utilization

To facilitate seamless future predictions, we preserved the trained model using **Joblib**, ensuring efficient deployment and accessibility.

Conclusion

This study highlights the potential of machine learning in **forecasting cryptocurrency liquidity**, offering valuable insights for financial stability. By leveraging advanced data science techniques, we can enable informed decision-making and bolster resilience within digital asset markets.