

Final Report

Cryptocurrency Volatility Prediction Using Machine Learning

1. Introduction

Cryptocurrency markets are highly volatile due to rapid price fluctuations and speculative trading. This project aims to analyze and predict cryptocurrency volatility using historical market data and machine learning techniques.

2. Objective

The objective of this project is to build a machine learning model capable of predicting cryptocurrency volatility using historical price, volume, and market capitalization data.

3. Dataset Description

The dataset contains daily historical records for multiple cryptocurrencies, including Open, High, Low, Close prices, trading volume, and market capitalization.

4. Methodology

The methodology includes data preprocessing, feature engineering, exploratory data analysis, model training, and evaluation.

5. Feature Engineering

Key engineered features include daily returns, rolling volatility, moving averages, and liquidity indicators.

6. Machine Learning Model

A Random Forest Regressor was used to model the relationship between market features and volatility levels.

7. Model Evaluation

The model was evaluated using Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and R² Score. The results highlight the challenging nature of volatility prediction.

8. Results and Insights

The model demonstrates reasonable prediction error while emphasizing the inherent unpredictability of cryptocurrency markets.

9. Conclusion

This project successfully demonstrates an end-to-end machine learning pipeline for cryptocurrency volatility prediction and provides valuable insights into market behavior.

10. Future Scope

Future enhancements may include deep learning models, sentiment analysis, and real-time deployment.