

Feature Engineering Report – Crypto Liquidity Prediction

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1. Introduction

Feature engineering is one of the most important steps in any machine learning pipeline. It transforms raw data into meaningful indicators that help the model learn patterns more effectively. In this project, we created several new features based on historical price and volume data to better capture market behavior, liquidity conditions, and volatility.

2. New Features Created

◆ 7-Day Moving Average (Price)

- **Purpose:** Smooths out short-term noise and highlights trends.
- **Formula:** Rolling average of the 'Close' price over the last 7 days.

◆ 7-Day Volume Moving Average

- **Purpose:** Detects stable or increasing trading activity.
- **Formula:** Rolling average of the 'Volume' over the last 7 days.

◆ Volatility

- **Purpose:** Reflects the price range in a single day — high volatility indicates uncertainty.
- **Formula:** High - Low

◆ Liquidity Ratio

- **Purpose:** Shows how easily assets can be traded without impacting price.
- **Formula:** Volume / Market Cap

3. Importance of These Features

These features help the model detect deeper patterns:

- Moving averages reduce daily noise and highlight important market shifts
- Volatility acts as a strong signal for unstable or risky conditions
- Liquidity ratio indicates market strength and trade capacity — a critical signal in cryptocurrency environments

4. Summary

By crafting these features, we equipped the model with deeper context and better signal-to-noise ratios. This helped improve prediction accuracy and model reliability — particularly in identifying sudden drops in liquidity and price.