High-Level Design (HLD) Document

Project Title: Cryptocurrency Liquidity Prediction for Market Stability

1. Objective:

To build a machine learning system that predicts cryptocurrency liquidity using historical and market-based data, providing early warning signals for liquidity crises.

2. System Overview:

The system includes data collection, preprocessing, feature engineering, model training, evaluation, and deployment modules. It is designed to work on historical crypto market data from 2016 and 2017.

3. Architecture Diagram:

[Architecture not visualized here, should be added in diagram form]

4. Components:

- Data Layer: Contains raw, cleaned, and engineered datasets.
- Processing Layer: Scripts for cleaning, feature creation, and merging datasets.
- Model Layer: Model training, selection, evaluation, and serialization.
- Deployment Layer: A Flask or Streamlit interface for model inference.
- Reporting Layer: EDA reports, performance summaries, and documentation.

5. Technology Stack:

- Python
- Libraries: Pandas, NumPy, Scikit-learn, Matplotlib, Seaborn

- Streamlit or Flask for local deployment

- Jupyter Notebooks for analysis

- GitHub for version control

6. Inputs and Outputs:

- Input: Historical price and volume data

- Output: Liquidity prediction (numerical value or classification)

7. Users:

- Crypto Traders

- Financial Analysts

- Exchange Platforms

8. Assumptions:

- The dataset represents true market conditions.

- External market anomalies are not accounted for.