

High-Level Design (HLD) - Cryptocurrency Volatility Prediction

1. Objective & Problem Statement

The objective of this project is to predict the daily volatility of Bitcoin based on historical OHLCV (Open, High, Low, Close, Volume, Market Cap) data. The system uses feature engineering techniques and a Random Forest Regressor model to identify volatility patterns and make predictions.

2. Scope of the Project

The scope includes data preprocessing, exploratory data analysis (EDA), model training, evaluation, and deployment via a Streamlit-based user interface.

3. Dataset Overview

Dataset contains columns: open, high, low, close, volume, marketCap, timestamp, crypto_name, date. This project focuses on Bitcoin data for demonstration.

4. High-Level Architecture

Data Source → Preprocessing & Feature Engineering → EDA → Model Training → Model Storage → Web UI for Predictions.

5. Major Components

- Data Preprocessing Module - Feature Engineering Module - Model Training Module - Model Evaluation - Streamlit Web Interface

6. Technology Stack

Python, pandas, numpy, scikit-learn, matplotlib, seaborn, Streamlit, joblib.

7. Expected Outcomes

A functional volatility prediction system with an intuitive web interface and supporting documentation.