**Final Report**

**Project Title:**

**Crypto currency Liquidity Prediction for Market Stability**

**Objective:**

To predict the liquidity of major cryptocurrencies using historical market data and advanced machine learning models, aiming to contribute to better market stability and informed investment strategies.

**Problem Statement:**

Cryptocurrency markets are highly volatile, and liquidity plays a vital role in maintaining market health. Predicting liquidity trends helps in identifying potential risks and improving strategic decisions for investors and policymakers.

**Dataset:**

* Source: Publicly available historical cryptocurrency data
* Features: date, open, high, low, close, volume, market\_cap
* Target Variable: **Liquidity Index** (e.g., Volume / Market Cap)

**Tools & Technologies:**

* Python, Pandas, NumPy, Matplotlib, Seaborn
* Scikit-learn, Keras, TensorFlow
* Jupyter Notebook, Google Colab

**Exploratory Data Analysis (EDA):**

* Detected and handled missing values.
* Identified trends and seasonality in volume and price.
* Visualized correlations between market features and liquidity.
* Found that volume and market cap are major influencers of liquidity.

**Feature Engineering:**

* Rolling averages, volatility ratios, price percentage changes.
* Lag features for capturing time-based dependencies.
* Normalized features using MinMaxScaler.

**Model Building:**

* Baseline Model: Linear Regression
* Final Model: LSTM Neural Network
* Evaluation Metrics: RMSE, MAE, R² Score

**Results:**

* LSTM outperformed baseline models with lower RMSE and higher R².
* Model was able to capture temporal patterns in liquidity well.
* Predictions aligned closely with actual liquidity trends.

**Deployment:**

* Model serialized using pickle for future deployment.
* Proposed deployment via Flask or Streamlit for real-time predictions.

**Impact:**

* Helps investors forecast illiquid market phases.
* Supports market regulators and exchanges to ensure better trading environments.

**Conclusion:**

The project successfully predicted cryptocurrency liquidity using a robust pipeline. LSTM models proved effective in modeling time series data, and this work can be extended further with real-time APIs and other economic indicators.