

Final Report

Generated by [Avinesh Masih](#) – View on GitHub: [AVINESH MASIH](#)

Project Title: Cryptocurrency Liquidity Prediction for Market Stability

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Date: 19-05-2025

Executive Summary

This project aims to predict cryptocurrency liquidity to enhance market stability using historical trading data. The focus is on understanding liquidity dynamics through engineered features such as moving averages, volatility, and liquidity ratios. After exploratory data analysis, predictive modeling techniques were applied to build an effective forecasting system.

1. Data Overview

- **Files Used:** coin_gecko_2022-03-16.csv, coin_gecko_2022-03-17.csv
- **Source:** [Dataset](#)
- **Merged Records:** 992
- **Key Columns:** 'coin', 'symbol', 'price', '1h', '24h', '7d', '24h_volume', 'mkt_cap', 'date'

2. Data Cleaning

- Missing values removed using **dropna()**
- Duplicate records dropped using **drop_duplicates()**
- Type conversions (e.g., date to datetime, numeric columns to float64)

3. Feature Engineering

- **Price Moving Average (2-period):**
 - `df['price_MA_2d'] = df['price'].rolling(window=2).mean()`
- **Market Cap Moving Average (2-period):**
 - `df['market_cap_MA_2d'] = df['mkt_cap'].rolling(window=2).mean()`
- **Volatility:**
 - `df['volatility'] = (df['24h'] - df['1h']).abs()`

- **Liquidity Ratio:**
 - `df['liquidity_ratio'] = df['24h_volume'] / df['mkt_cap']`
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4. Exploratory Data Analysis (EDA)

- **Price Trend:** Line plot showing historical Ethereum price fluctuations.
 - **Correlation Heatmap:** Identified strong correlations between market cap, volume, and price.
 - **Descriptive Stats:** Provided insights into central tendency and spread.
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5. Model Building

- **Train-Test Split:** tested using `train_test_split()`
 - **Models Used:**
 - Linear Regression (baseline)
 - Random Forest Regressor (final model)
 - **Libraries:** sklearn, joblib, pandas, matplotlib, seaborn
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6. Final Prediction Check (Compare Actual vs Predicted)

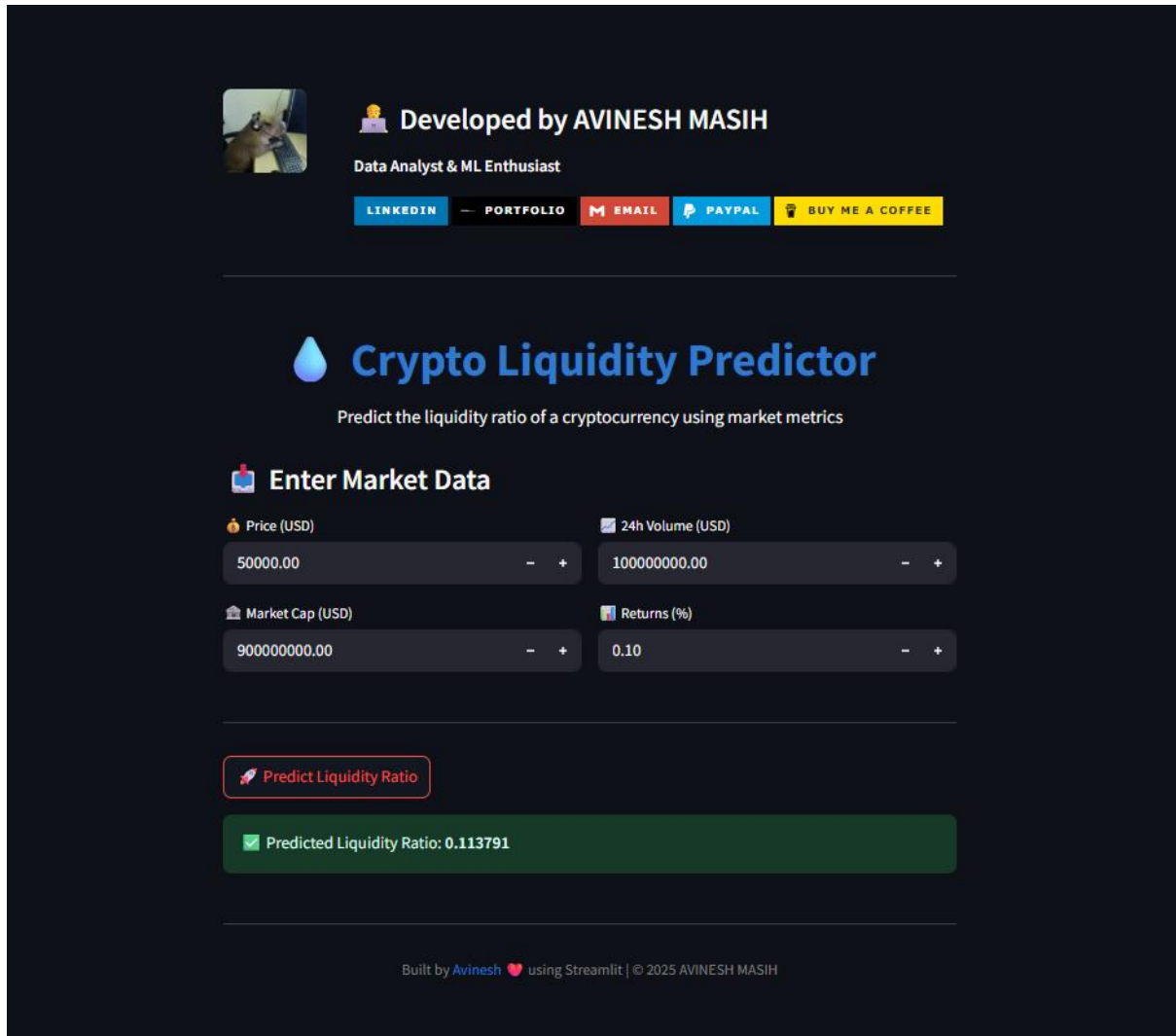
	Actual Liquidity	Predicted Liquidity	Error
0	0.051516	0.053734	-0.002219
1	0.080784	0.068837	0.011947
2	0.064324	0.067555	-0.003231
3	0.153632	0.156490	-0.002859
4	0.010830	0.011185	-0.000356
5	0.123382	0.131801	-0.008419
6	0.219153	0.189631	0.029522
7	0.007353	0.007230	0.000122
8	0.003577	0.004392	-0.000816
9	0.141715	0.142974	-0.001258

7. Model Saving

- Final model saved using Joblib:
- `joblib.dump(rf_model, 'models/ crypto_liquidity_rf_model.pkl')`

8. Deployment

- Simple **Streamlit** interface
- Load model and predict liquidity using user inputs



The screenshot displays the 'Crypto Liquidity Predictor' web application. At the top, it features a profile section for 'AVINESH MASI' with a bio 'Data Analyst & ML Enthusiast' and social links for LinkedIn, Portfolio, Email, PayPal, and a 'Buy Me a Coffee' button. The main heading is 'Crypto Liquidity Predictor' with a subtitle 'Predict the liquidity ratio of a cryptocurrency using market metrics'. Below this is an 'Enter Market Data' section with four input fields: 'Price (USD)' (50000.00), '24h Volume (USD)' (100000000.00), 'Market Cap (USD)' (900000000.00), and 'Returns (%)' (0.10). Each field has increment and decrement buttons. A 'Predict Liquidity Ratio' button is located below the inputs. The result is shown in a green box: 'Predicted Liquidity Ratio: 0.113791'. At the bottom, a footer states 'Built by Avinesh ❤️ using Streamlit | © 2025 AVINESH MASI'.

Developed by AVINESH MASI

Data Analyst & ML Enthusiast


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Crypto Liquidity Predictor

Predict the liquidity ratio of a cryptocurrency using market metrics

Enter Market Data

Price (USD)	50000.00	-	+
24h Volume (USD)	100000000.00	-	+
Market Cap (USD)	900000000.00	-	+
Returns (%)	0.10	-	+

 Predict Liquidity Ratio

 Predicted Liquidity Ratio: 0.113791

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Conclusion

This project successfully built a model to predict cryptocurrency liquidity using feature engineering and machine learning techniques. The insights gained are valuable for traders, investors, and regulators aiming to stabilize volatile crypto markets. Future enhancements could include real-time data ingestion, deep learning models, and dashboard deployment.