Pipeline Architecture for Crypto Liquidity Prediction

1. Data Ingestion

- **Source**: CSV (Dataset)
- **Tools**: pandas, requests, SQLAlchemy
- **Output**: Raw data frame

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2. Data Preprocessing • **Handling missing values** • **Outlier detection and removal**

- **Feature engineering**: ○ volatility = abs(returns)
- **Scaling** (if required)
- **Tools**: pandas, numpy, scikit-learn

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3. Feature Selection

- Select key numerical features:
  - ○ price, market_cap, volume_24h, returns, volatility
- Optional: correlation analysis or feature importance

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4. Model Training

- **Model used**: Random Forest Regressor (or XGBoost, Linear Regression)
- **Training pipeline**:
  - ○ train_test_split ○ model.fit(X_train, y_train)
- **Tools**: scikit-learn, joblib (for model saving)

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5. Model Evaluation

- **Metrics**: RMSE, MAE, R² score
- **Validation**: Cross-validation (e.g., KFold)
- Save best model using joblib.dump()

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6. Model Deployment • **Deployment Framework**: Streamlit

- **Frontend UI**: User inputs price, volume, market cap, returns

- **Backend**: Loads model, makes predictions
- **Bonus**: Add author info, social links, hover effects, and branding

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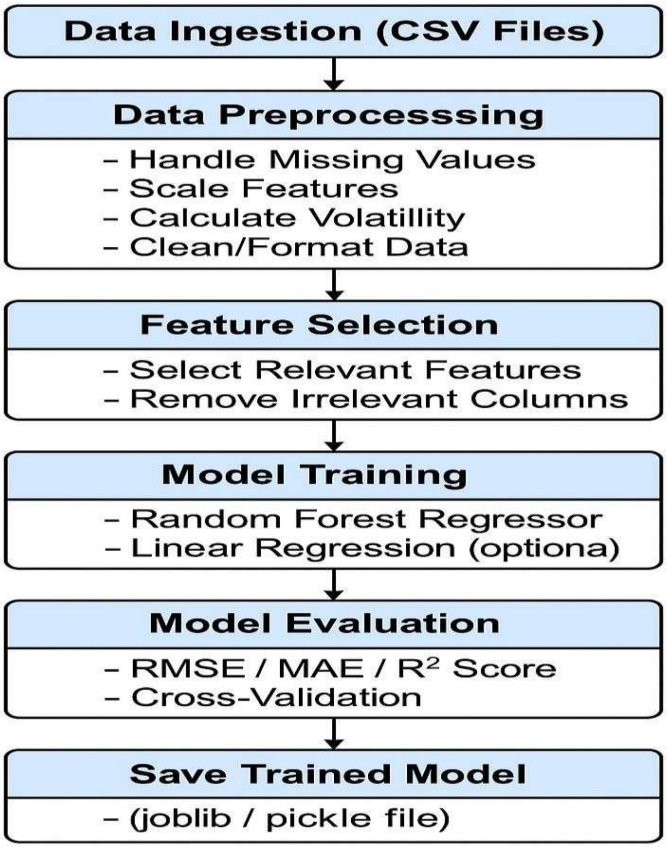
Technologies Used

Component	**Tool**
Data Processing	pandas, numpy
Modeling	scikit-learn, joblib
Deployment	Streamlit
Visualization	Matplotlib / Seaborn (for EDA)

Diagram Overview


Data Ingestion (CSV Files)
Data Preprocesssing
– Handle Missing Values
– Scale Features
– Calculate Volatillity
– Clean/Format Data
Feature Selection
– Select Relevant Features
– Remove Irrelevant Columns
Model Training
– Random Forest Regressor
– Linear Regression (optiona)
Model Evaluation
– RMSE / MAE / R^2 Score
– Cross-Validation
Save Trained Model
– (joblib / pickle file)