

AI for Market Trend Analysis

Machine learning based trend regime classification

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Track: AI for Market Trend Analysis

Made with Python

Introduction

- Build an end-to-end ML system to classify stock market trend
- Goal: Predict bullish/bearish regime 5 trading days ahead
- Feature-based modelling using technical indicators
- Deployed with Streamlit UI for non-technical users

Illustration

Problem Statement

- Market is noisy → trend identification is difficult manually
- Traditional analysis is time-consuming and subjective
- Need an AI based automated trend prediction system
- Output should be interpretable and easy to use

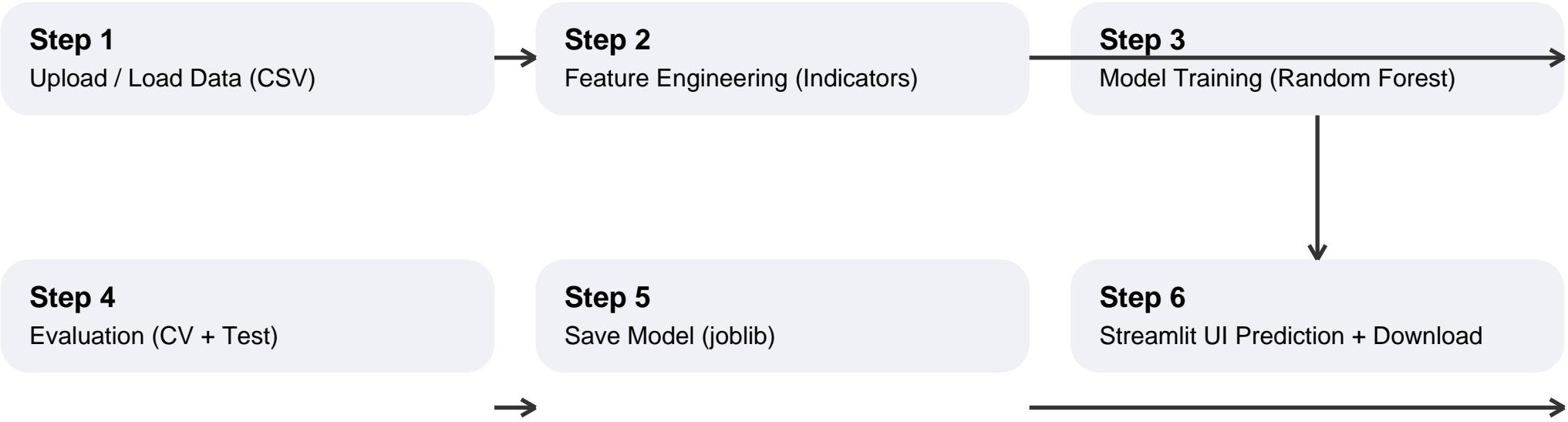
Illustration

Objectives

- Prepare time-series dataset from OHLCV market data
- Engineer technical indicator features (SMA, RSI, MACD, volatility)
- Train supervised model (Random Forest) with time-series validation
- Deploy model through interactive UI and export predictions

Illustration

Methodology / Workflow



Workflow

Tools & Technologies

- Frontend/UI: Streamlit
- Backend: Python
- Libraries: pandas, numpy, scikit-learn, joblib, matplotlib
- Validation: TimeSeriesSplit (prevents data leakage)
- Artifacts: trained model (.joblib) + processed dataset (.csv)

Illustration

Implementation

- Pipeline: Load CSV → feature engineering → train model
- Target: Bullish if SMA20 > SMA50 (shifted by 5 days)
- Model saved using joblib for reuse in UI
- UI supports CSV upload + probability output + download predictions

Illustration

Results & Observations

- TimeSeriesSplit CV: ROC-AUC ≈ 0.99 , Accuracy ≈ 0.95
- Test set: ROC-AUC ≈ 0.996 , Accuracy ≈ 0.967 , F1 ≈ 0.978
- Strong performance due to persistence in trend regimes
- System provides fast prediction and downloadable output

Illustration

Conclusion & Future Work

- Successfully built end-to-end AI pipeline for trend classification
- Deployed as a simple web app (Streamlit)
- Future: return-based target, advanced models (XGBoost/LSTM), backtesting
- Add transaction cost modelling and cloud deployment

Illustration

Thank You

Questions?