Market Data Regime Detection

Project for **detecting market regimes using machine learning models** (mainly HMM but will be expanded). This repository includes scripts for preparing features, training, running experiment grids, evaluating models, and visualizing states on market data (EURUSD 15M or else).

Analyzes market data to classify the current state into different regimes (e.g., bullish, bearish, ranging). The main workflow in this repository allows you to:

- Build feature sets from a CSV of prices.
- Train HMMs with splits by size (sliding train/val/test).
- Run parallelizable grids on combinations of features / number of states / covariance type.
- Evaluate models and export states and probabilities in CSV/JSON.
- Visualize states over the price series with a Streamlit app (`app.py`).


Observaciones en el período
10,883
Cambio de precio
-0.0444
↓ -4.09%
Volatilidad (período)
0.0246

Resumen por Estado (período seleccionado)

	Estado	Observaciones	Porcentaje	Precio Promedio	Volatilidad	Precio Min	Precio Max
0	0	2448	22.5%	1.0831	0.0250	1.0379	1.1206
1	1	4263	39.2%	1.0840	0.0239	1.0348	1.1206
2	2	4172	38.3%	1.0822	0.0250	1.0340	1.1200

Main structure

- `app.py` — Viewer for HMM evaluation results.
- `src/`:
    - `train_hmm.py` — Trains HMMs using splits by size. Saves models in `src/data/models/` and results in `src/data/results/`.
    - `experiment_hmm.py` — Runs experimental grids (parallelizable with processes or threads) on sets of features, states, and covariances.

    - `evaluate_hmm.py` — Recalculates states/probabilities for saved models and generates summaries (transitions, durations, conditional statistics).
    - `preprocessing.py`, `build_feature_sets.py` — (support scripts) to generate and validate CSVs of features used by experiments.
- `data/` — Data:
    - default dataset: `dataset_raw/DUKASCOPY_EURUSD_15_2000-01-01_2025-01-01.csv`
    - feature CSVs and JSONs with subsets: `features/`
    - training and evaluation outputs: `models/`, `results/`

Authors

- **SilverDelgado** — GitHub
- **Sauvageduck24** — GitHub

★ If you like this project, star would be appreciated hehe! ★

MARKET MASTER

*See you in the markets 💖 *