READ ME

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- pip_version_checker.py
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- Sector_Data.py
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Data

- ml_historical_data.json
- ml_historical_data.BAK
- Nico_Requirements.txt

Command Files

- Nicola.bat
- Nicola.sh

Overview

- This README file

Visual Code

- nicola.sh
- Visualization.py
- main_ML.pyproj
- main_ML.sln

General Remarks:

The layout was tested on a 1920x1080 screen. With lower resolutions, layout issues may occur.

Python 3.13 minimum required. Due to bugs in early Python thread implementations, version 3.13.9 or later is preferred.

All graphs include zoom, fullscreen, print, PDF save, layout adjustment, etc.

The development of this program required extensive web research, consultation of many online Python courses.

Program Startup:

The program can be started:

- Under Visual Code control, running in the default Python environment
- Or in a virtual environment using a command file On Windows, run Nicola.bat; on macOS, run Nicola.sh from the program directory.
  Note: On some systems Python is launched with “python”, on others with “python3”.

Starting the Program:

At startup the program:

1. Checks network connection
2. Detects Windows or Mac
3. Verifies Python version (tested with Python 3.13.9)
4. If there is no internet connection or Python is too old, the program stops with an error message
5. The program checks whether it was launched from .bat or .sh using a first parameter set to “NICO_BAT_Mode” (check .bat and/or .sh files in which it may be necessary to replace python with python3 as indicated above)

If not launched from .bat/.sh:

1. Updates pip (default environment)
2. Installs missing libraries (default environment)

If launched from a command file:

1. Creates and activates a virtual environment named “Nicola__env”
2. Installs required libraries
3. Launches Python with ml_main.py and argument NICO_BAT_Mode
4. No pip update or library installation occurs in the base Python
5. The program loads “ml_historical_data.json”. If missing or too short, data can be reloaded from the web (minimum 50 entries) or restored from “ml_historical_data.BAK” if available.
6. The program replaces immediate exit via the “X” button with a confirmation prompt, followed by saving, cleanup of temporary files, and updating “ml_historical_data.json”.

Running the program

Action 1

Press **"Run Sector Analysis"** to complete or update ml_historical_data.json. This may take time depending on internet speed and server responsiveness.

Once enough data is loaded, proceed to the next step.

Action 2

Train ML models by pressing **"Train ML Models".** The program evaluates four predefined models and multiple parameter sets. This process may take time.

After completion, a window displays six graphs:

- Training dataset
- Test dataset
- Prediction results for the four models
- Ideal prediction curve ($\hat{Y} = Y$)

Numerical results are shown in the central dropdown list.

Action 3

After training, additional fields are enabled.

Prediction:

Use **"ML Prediction"** then **"Show ML Prediction"** to display results.

Distribution:

Press **"Distribution Analysis"** to

Analyze closing values and/or volumes.

A first window allows data selection and grouping

Then press:

> **"Return"**: back to main window
>
> **"Plot data selection"**: visualize selected data
>
> **"Start estimation"**: begin estimation

The estimation window allows:

- Polynomial degree selection
- Data age weighting (use **"Ponderation Help"** for visualization)
- Time domain selection
- Press **"Fit data"** to perform the fit and display standard deviation results. The results are displayed in the dropdown list.
- **"Distribution Function"** displays the distribution function and probability density.

Export to CSV:

Creates an Excel file containing all distribution analysis data.

Save Results:

Saves dropdown content to JSON and PDF formats.

ML Dashboard:

Similar to Show ML Prediction but displayed in a browser (tested with Firefox).

Show all plots:

Displays all available graphs.

Select graphs:

Choose which graphs to display and visualize the selection.

Note

Some buttons are initially disabled and will become available as you complete certain prerequisite steps or milestones within the program.