

Microgrids

Forecasting assignment

Forecasting assignment

Learning objectives

Through this assignment, it is aimed for the students to be able to:

- Produce **point** forecasts;
- Produce **probabilistic** (quantile) forecasts;
- Perform **verification** of point & probabilistic forecasts

Forecasting assignment

Case study: PV parking rooftops from Liège university

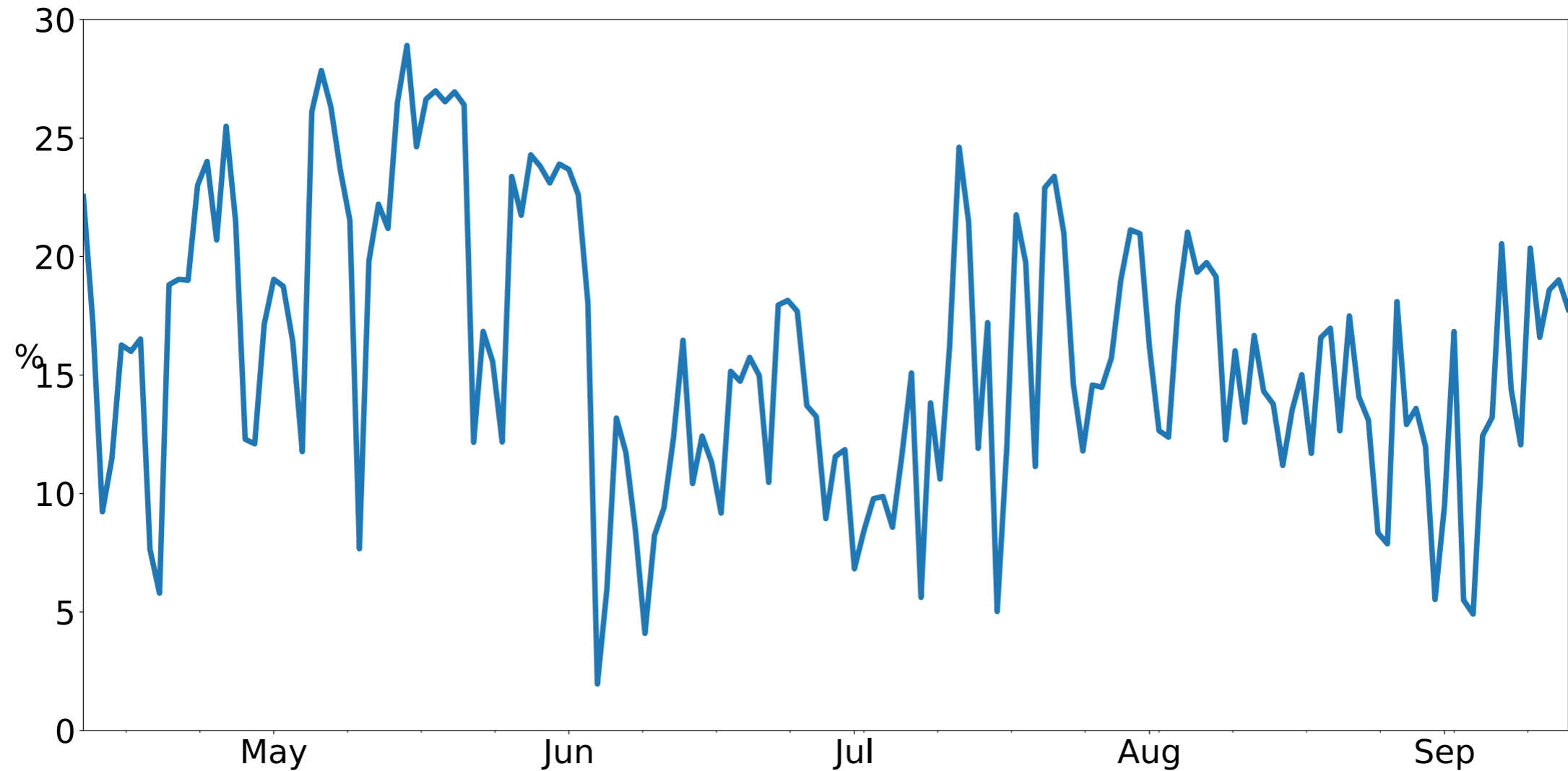
PV installation of 466.4 kWp



https://www.uliege.be/cms/c_7726266/fr/2500-m-de-panneaux-photovoltaiques-bientot-en-fonction-sur-le-campus-du-sart-tilman

Forecasting assignment

Daily energy per day of the dataset



Daily energy PV generation normalized by the daily energy produced by the total installed capacity ($466.4 * 24$ kWh).

Forecasting assignment

Dataset inspection

Plot the PV generation observations.

Plot the weather forecasts: irradiance and air temperature.

Use the file « data_inspection.py ».

Forecasting assignment

Point forecasts

1. Implement a persistent model to be used as benchmark: $D-1 = D$ in the file « persistence_model_TODO.py ».
2. Implement a linear regression model from scikit-learn in the file « MLR_point_TODO.py ».
3. Implement a Gradient Boosting Regressor (GBR) from scikit-learn in the file « GBR_point_TODO.py ».
4. Try to optimize the GBR hyper-parameters.
5. Perform the visual inspection of point forecasts, and compute scores. Comment the results. You can use « score_comparison.py ».
6. Change the random parameter to build the pair learning, validation set. How does behave the scores ? Comment the results.
7. Discuss the validation strategy. Would it be possible to adopte another strategy ? What would be the pros and cons ?

Forecasting assignment

Quantile forecasts

1. Implement a Gradient Boosting Regressor (GBR) from scikit-learn and change the loss function to produce quantiles in the file « GBR_quantile_TODO.py ».
2. Try to optimize the GBR hyper-parameters.
3. Perform the visual inspection of probabilistic forecasts, and compute scores. Comment the results. You can use « score_comparison.py ».
4. Change the random parameter to build the pair learning, validation set. How does behave the scores ? Comment the results.
5. Discuss the validation strategy. Would it be possible to adopte another strategy ? What would be the pros and cons ?

Forecasting assignment

Rules for assignment completion and submission

1. Use the groups created for the precedent assignments.
2. When submitting your report, please indicate as a comment **who are the students of your group** and also in **the report title page**.
3. Write a **short report** (max 4 pages, 11pt font).
4. Submit your code and your report on Ecampus.