Microgrids

Forecasting assignment

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Introduction to forecasting

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

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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

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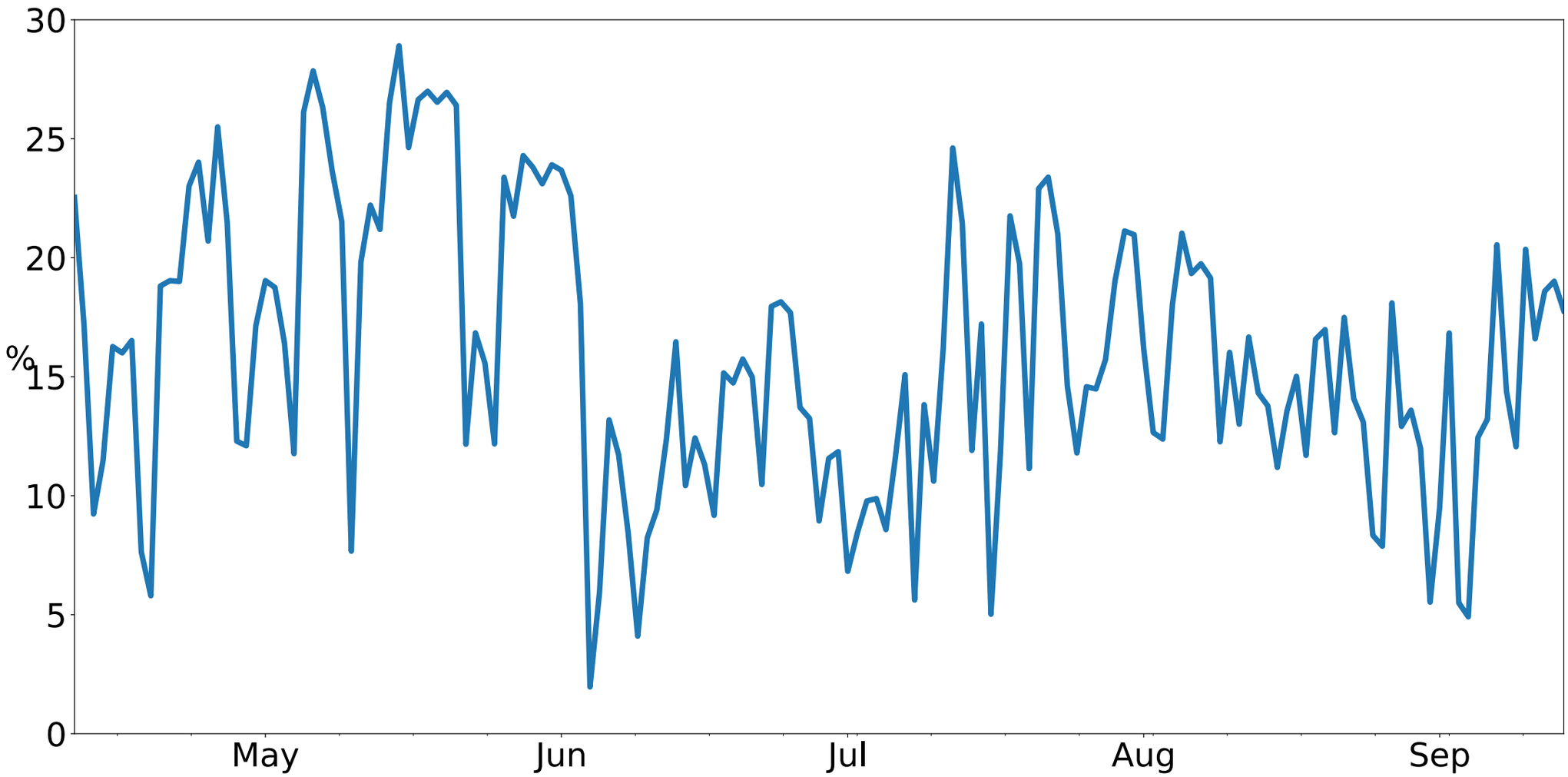
Daily energy per day of the dataset



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

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Dataset inspection

Plot the PV generation observations.

Plot the weather forecasts: irradiance and air temperature.

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Point forecasts

1. Implement a persistent model to be used as benchmark: D-1 = D

2. Implement a linear regression model from sklearn

3. Implement a Gradient Boosting Regressor (GBR) from sklearn

4. Try to optimize the GBR hyper-parameters

5. Perform the visual inspection of point forecasts, and compute scores. Comment the results

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 ?

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Quantile forecasts

1. Implement a Gradient Boosting Regressor (GBR) from sklearn and change the loss function to produce quantiles

2. Try to optimize the GBR hyper-parameters

3. Perform the visual inspection of probabilistic forecasts, and compute scores. Comment the results

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 ?