



1SC4692 – Power consumption analysis using data science techniques

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Department: DOMINANTE - ENERGIE

Language of instruction: FRANCAIS

Campus: CAMPUS DE PARIS - SACLAY

Workload (HEE): 40

On-site hours (HPE): 27,00

Description

To successfully realize the energy transition, it is essential not only to develop renewable energy sources but also to know how to adjust the consumption and thus make energy savings. With the development of data science and the availability of massive consumption data (big data), new solutions are possible to achieve the objective of consumption reduction.

The purpose of this EI is:

- To become familiar with data science methods applied to the field of electricity consumption
- To use data science methods for the recognition of electric loads and the forecast of power consumption

Quarter number

ST4

Prerequisites (in terms of CS courses)

Basic knowledge of programming in Python.

Syllabus

The week is divided into two parts:

- During the first 3 half days, the students do case studies to apply machine learning methods to the processing of data on electricity consumption. In this way, the students learn how to use Python libraries specially designed for data science.



- The following days are devoted to a project where students work in groups on the problem of forecast of electrical consumption based on consumption histories.

Class components (lecture, labs, etc.)

During the case studies of the first 3 half days, the students are supervised by the teachers to master Python libraries for data science.

For the project, the students work in small groups. The teachers and the industry expert in data science are available to answer any technical questions.

Grading

The students are assessed based on:

- Reports for the case studies (20%)
- Presentation and project report (80%)

Course support, bibliography

DataCamp, E-learning sur data science.

R.Arghandeh et Y. Zho, Big Data Application in Power Systems, Elsevier Science, 2018

T.Hastie, R. Tibshirani, et J. Friedman, Element of statistical learning: Data Mining.

Inference and Prediction, Springer, 2017.

Resources

Computer with Python installed.

Classroom with video projector and Wifi

Learning outcomes covered on the course

Understand the procedure of use the data science to process massive data on electricity consumption.

Learn to use IT tools like Python to implement data science methods.

Learn to analyze the consumption curve in order to draw useful information

Description of the skills acquired at the end of the course

At the end of this week, the students will have acquired the knowledge to apply the popular methods of data science in the field of electricity consumption, for example to forecast electrical consumption.

Programming skills in Python, in particular data science packages.