**Machine Learning Case Study**

**Appliance Energy Prediction**

# Dataset Description and Problem Statement

This dataset contains measurements related to energy consumption within a house over a period of 4.5 months. It includes features representing indoor temperature and humidity conditions from various rooms, as well as weather data from a nearby weather station (Chièvres Airport, Belgium). The main objective is to predict the energy use of appliances based on environmental and temporal features.

* Perform EDA to explore and understand the data.
* Clean and preprocess the dataset.
* Decide on the appropriate machine learning model to use.
* Train the model and evaluate its performance.
* Interpret the model results and key features.
* Draw conclusions and suggest possible improvements. (In the colab only and the convert it into a pdf)

# Variables Explanation

| Variable Name | Role | Type | Description | Units |
| --- | --- | --- | --- | --- |
| date | ID | Datetime | Timestamp of the measurement | YYYY-MM-DD HH:MM:SS |
| Appliances | Target | Continuous | Energy use in the house | Wh |
| lights | Feature | Continuous | Energy use of lighting | Wh |
| T1 | Feature | Continuous | Temperature in kitchen area | Celsius |
| RH\_1 | Feature | Continuous | Humidity in kitchen area | % |
| T2 | Feature | Continuous | Temperature in living room | Celsius |
| RH\_2 | Feature | Continuous | Humidity in living room | % |
| T3 | Feature | Continuous | Temperature in laundry room | Celsius |
| RH\_3 | Feature | Continuous | Humidity in laundry room | % |
| T4 | Feature | Continuous | Temperature in office room | Celsius |
| RH\_4 | Feature | Continuous | Humidity in office room | % |
| T5 | Feature | Continuous | Temperature in bathroom | Celsius |
| RH\_5 | Feature | Continuous | Humidity in bathroom | % |
| T6 | Feature | Continuous | Temperature outside (north side) | Celsius |
| RH\_6 | Feature | Continuous | Humidity outside (north side) | % |
| T7 | Feature | Continuous | Temperature in ironing room | Celsius |
| RH\_7 | Feature | Continuous | Humidity in ironing room | % |
| T8 | Feature | Continuous | Temperature in teenager room | Celsius |
| RH\_8 | Feature | Continuous | Humidity in teenager room | % |
| T9 | Feature | Continuous | Temperature in parents room | Celsius |
| RH\_9 | Feature | Continuous | Humidity in parents room | % |
| T\_out | Feature | Continuous | Temperature outside (weather station) | Celsius |
| Press\_mm\_hg | Feature | Continuous | Air pressure from weather station | mm Hg |
| RH\_out | Feature | Continuous | Humidity outside (weather station) | % |
| Windspeed | Feature | Continuous | Wind speed (weather station) | m/s |
| Visibility | Feature | Continuous | Visibility (weather station) | km |
| Tdewpoint | Feature | Continuous | Dew point temperature | Celsius |
| rv1 | Feature | Continuous | Random variable 1 | nondimensional |
| rv2 | Feature | Continuous | Random variable 2 | nondimensional |