

# Machine Learning Project (Predicting Appliance Energy Consumption)

## Data Description

date time : year-month-day hour:minute:second

Appliances: Energy use in Wh

lights : energy use of light fixtures in the house in Wh

T1: temperature in kitchen area. (Celcius)

RH\_1 : Humidity in kitchen area (%)

T2 : Temperature in living room area. (Celcius)

RH\_2: Humidity in living room area (%)

T3 : Temperature in laundry room area (Celcius)

RH\_3 : Humidity in laundry room area. (%)

T4 : Temperature in office room area (Celcius)

RH\_4:Humidity in office room (%)

T5 : Temperature in bathroom. (Celcius)

RH\_5: Humidity in bathroom. (%)

T6: temperature outside the building (north side). (Celcius)

RH\_6 : Humidity outside the building (north side). (%)

T7 : Temperature in ironing room. (Celcius)

RH\_7: Humidity in ironing room.(%)

T8 : Temperature in teenager room 2. (Celcius)

T9 : Temperature in parents room. (Celcius)

RH\_9 : Humidity in parents room. (%)

To : Temperature outside from chievers weather station. (Celcius)

Pressure from chievers weather station. (in mmHg)

Wind speed from chievers weather station. (m/s)

Visibility from Chievers station, (Km)

Tdew point from weather station. (AoC)

## Assumption

Feature that aquired from weather station not used in this project. It is because they can't represent exactly environment condition around the building.

## Methods

Load the dataset

Checking basic information of the dataset

Top 5 rows of the dataset

Checking dataset information with its data type

Checking statistical description of the dataset

Checking missing value in the dataset

Visualisation

Univariate

Checking target variable distribution

Checking potential predictor variable distribution

scatterplot between temperature and humidity each building location

Scatter plot between temperatur outside with temperature inside the building

Scatter plot between humidity outside with humidtiy inside the building

Bivariate

Correlation heat map among the dataset's features

Analyze and Visualize the data set

Analysis

outliers detection

multicolinearity detection

Hypothesis testing if possible

Remove unnecessary column

Remove outliers

Standardize predictor variable value

Preprocessing and cleaning the dataset

Splttiing data set into two parts: training dataset and test datatest

Choosing machine learning algorithm

Linear Regression

Random Forest Regression (optional)

Making baseline model

Making final model

Machine learning model building

mean absolute error (MAE)

Model Evaluation

## Discussion

Explain and interpret model evaluation's result

Give a sugestion to improve model performance

## Goal

Predict electronic appliance energy consumption in the building with environment condition data

## Problem statement

How can be environment parameter inside the building predict energy consumption?

How can be enviroment parameter outside the building predict energy consumption?

How can predict energy consumption of the building using environment parameter?

## Hypothesis

Environment parameter can predict electronic appliances energy consumption

Environment parameter can't predict electronic appliances energy consumption

## Literature Review

Weather parameter have been proven to predict the electricity energy consumption

The occupancy level of the building different locations could aslo help to determine the use of the appliances

Clothes dryer have large power demand

Refrigerators and entertainment system are important variable to determine daily minimum consumption

The pattern use of appliances can vary significantly ( nearly flat for refrigation equipment, while it's highly variable for devices such as cltohes washers, clothes dryer and dishwasher.

For highly insulated buildings, the thermal influence of appliances on internal gains become more important and relevant in building energy performance