Room Occupancy Estimation

Machine learning project proposal

AZZAM ALFURHUD

Design (Idea)

The goal of this project is to predict the number of people in the room using sensor collected information for temperature, light, sound, CO2 and digital passive infrared (PIR).

Data Description

The data was collected for a period of 4 days in a controlled manner with the occupancy in the room varying between 0 and 3 people. The ground truth of the occupancy count in the room was noted manually. (Dataset link: https://archive.ics.uci.edu/ml/datasets/Room+Occupancy+Estimation)

The data set has 10,129 observations and 16 attributes. Note that attributes can be collected from different sensors for example; we have **S1_Temp, S2_Temp, S3_Temp, S4_Temp** that refers to the temperature value collected from sensors 1-4. Different sensors collect different information as follows:

Sensor	Values collected
1	Temperature, Light and Sound
2	Temperature, Light and Sound
3	Temperature, Light and Sound
4	Temperature, Light and Sound
5	CO2
6	PIR
7	PIR

Attributes description:

Attribute Name	**Description**
Date	YYYY/MM/DD
Time	HH:MM:SS
Temperature	In degree Celsius
Light	In Lux
Sound	In Volts (amplifier output read by ADC)
CO2	In PPM (parts per million)
CO2 Slope	Slope of CO2 values taken in a sliding window
PIR	Binary value conveying motion detection
Room_Occupancy_Count (Target)	Number of people in the room (Manually Noted Ground Truth)

Model

The model chosen for this problem will be a classification model. The specific model will be decided by trying different algorithms and comparing them using the proper metrics.

Tools

I will be using Jupiter Notebooks and the following python libraries:

Data and math: Pandas and Numpy

Visualization: Seaborn and matplotlib

Machine learning model: sklearn