Machine Learning Challenge

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Introduction

- **Machine Learning (ML) has been applied in several research areas bringing innovation and improving processes.**

  - Virtual Personal Assistants

  - Traffic and Weather Predictions

  - Social Media Services

  - Shopping and Product Recommendations

- **Specifically, in health and medicine, ML can be applied on:**

  - Computer-aided diagnosis

  - Recommendation systems

  - Drug discovery

- **One of the most important aspects of learning data science is to put the learnings into practice.**

Objective

- **Put Learning Into Practice.** The student will be introduced to the smart home data analysis problem, of which they will be able to develop solutions to detect normal and abnormal behaviors.
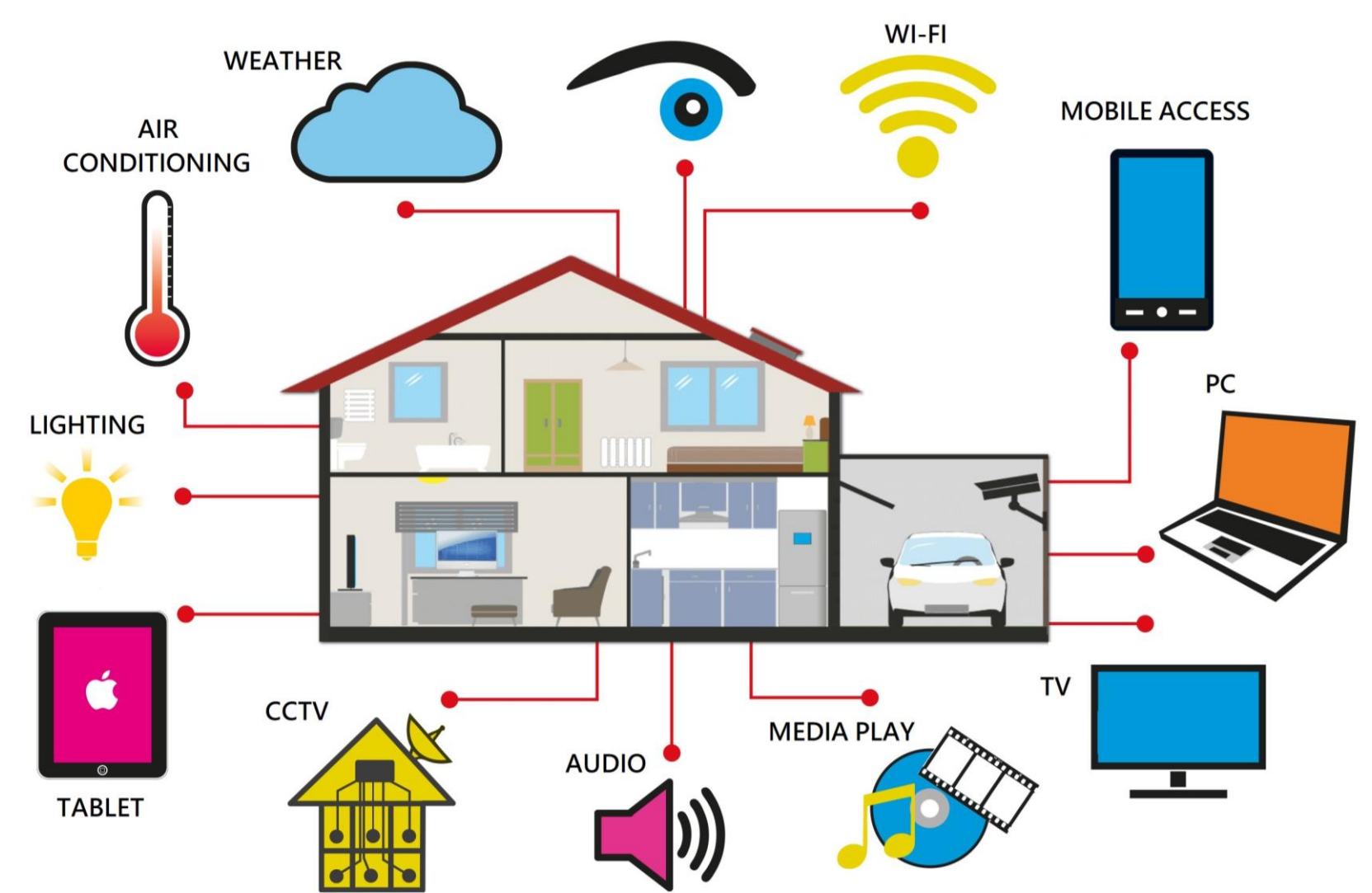

Figure 1 – Devices on a smart home.

Materials and Methods

- Students from four institutions worldwide will be sorted in teams and they will work together to develop a novel solution to the smart home problem.
- During the semester's course, the students will receive lectures and exercises about machine learning techniques.
- Two algorithms were specially prepared to be used in their solutions: K-Means and the Self-Organizing Maps.
- The students will receive some sample coding for a kick start along with a dataset with information collected from five smart apartments in Braunschweig, Germany. This dataset contains smart sensor information, such as air humidity, on/off lights, open/closed doors and windows, and others.
- Their solutions will be evaluated based on the project's correctness and their experience will be evaluated using a student evaluation form.

Expected Results

- The project is scheduled to happen in the Winter semester of 2023.
- We are planning that before the beginning of the project, more institutions join with their teams.
- By the end of the project, we expect to promote learning and knowledge sharing among the international teams.