|  |  |
| --- | --- |
| Name | Omar Ayman Mahmoud Sedky ElTohamy |
| ID | 20023750 |

**Intelligent Adaptive systems Project part 1**

**A diagram of a house layout

Description automatically generated**

**Intelligence:**

**Residents, External visitors, environmental conditions.**

**Adaptation:**

**The sensors & the system learn the preferred settings for every individual according to their habits and time of the year.  
  
The System should adapt to every resident’s habits.  
  
e.g a person with inclination towards cold environments in their bed room.  
  
e.g a person with tendency to linearly elevate bedroom temperature to a certain level before going out.  
  
Target audience:  
1. Residents  
2. Guests  
  
Desired outcomes:**

**1. Provide a customized experience for every family member.**

**2. Reduce environmental impact using energy.  
3. Increase dependency on clean energy.**

**4. Reduce energy consumption cost by depending on solar power during periods of high energy consumption to reduce electricity costs and bills.**

**boundaries of your model**

**1. Budget**

**2. Limited by number of daily hours and surface area of solar cells.**

**3. Wind speeds**

**4. CO2 Levels in the environment.**

**5. Rated power per power-generation plant.**

**Defining System Components:**

**Identify and describe the key entities, attributes, and relationships in your system.**

**Power Generation  
 Types {Wind, Solar, Electrical, Batteries}**

**Max-wattage double**

**Max stored energy double**

**Devices:**

**Type {Tv, Sensor, … } enum**

**powerConsumption double**

**ControlSystem:**

**inputData int[ ]  
 actionSignals double[ ]**

**Persons:**

**Type{FamilyMember, Guest} enum**

**We’ll use machine Learning to make the Control System learn the behavior of each family member as they keep using the system and after a while the system would be able to take decision in their place accordingly.**

**Define a method for assessing the performance and effectiveness of your system.**

**1. Family Weekly rating for the system**

**2. year to year difference in energy consumption**

**(e.g. 20% Less than last year)  
3. Monitor Solar and Wind produced energy in the system**

**describe how these will be measured.**

**Measuring samples should be taken at least 4 times per hour.  
  
Select 2 to 3 modeling approaches that best represent your solution.   
  
Agent Based Simulation (ABS)**

**As the simulation includes Residents and guests (humans).**

**Activity Diagrams**

**A diagram of a smart iot system

Description automatically generated**