Restroom Controller Midterm

The restroom is a space that is used frequently, and the temperature of the space and water is one that usually isn’t automated. As we wake or get ready for bed the space and water temperature can be automated. Solve this concern sensors, valves, and visual indicators will be used to implement the automation of the room conditions.

# Entry lights LED occupancy Sensor

Once the user walks into the space the light will turn on and after the sensor detects no heat from the person and no movement after a set amount of time the lights will turn off.

# Humidity sensor

The problem: Humidity levels in the restroom.

Solution: Once the humidity is above a certain threshold a dehumidifier will turn on to collect the water and once the humidity levels are in range the dehumidifier will turn off. The user can also manually turn on the dehumidifier through the WEMO and set a value with encoder 2. Once the value is reached the wemo will turn off the humidifier.

1. Pros
   1. collecting the water
   2. reducing the humidity in the restroom.
   3. reduce the possibility of mold.
   4. comfortable setting.
2. Cons
   1. The cost of electricity in comparison to the collection of the amount of water.

# Temperature of room

Problem: The room temperature typically isn’t what the user wants, and the room needs to change for comfort.

Solution: The wemo will turn on the heat register to warm up the room or turn on the AC/Fan to cool off the room (auto) to meet default settings.

As the room changes temperatures, the hue light will transition from colors according to the temperature of the room and once the room temperature is reached the hue light brightness will go from dim to bright repeatedly.

The manual mode: the user can turn the encoder which will be setting the value to the value of the BME and if the user wants cooler temp the new pixel strip (8LEDs) will light up according to the temp of the room.

If user turns encoder, Temp/neo pixel settings:

1. 90° red 1 pixels brightness 50
2. 89° yellow 8 pixel brightness 200
3. 80° yellow 1 pixels brightness 50
4. 79 blue 8 pixels brightness 50
5. 70° blue 1 pixel brightness 200
6. Pros
   1. Comfort level is increased.
7. Cons
   1. Have to stick to the scheduled time that is preset.

# Temperature Water (PHASE II)

Problem: The temperature of the water is typically cold once the water valve is turned on and the user will need to wait for the water until it is temperature.

Solution:

A user will need to set a temperature that they want and will turn on the water and once the water is at the temperature it will notify the user by a Hue light that the water is at temperature. The hue light will turn colors according to the temperature of the water.

1. Pros
   1. Water utilization is more efficient.
   2. The users’ time can be used more efficiently.
2. Cons
   1. Implementation of the system
      1. Servo/valve control according to temperature
      2. Extended amount of time to build out from conceptual to actual.

ROOM IS READY!!!

Once the temperature and humidity is at the set setting the neo pixels ring will do a random colorization cycling for a set amount of time(TIMER) and the hue light will flash morse code “READY”.

Supplies needed for project

Breadboard

Wire

Resistors – these are for the LEDs that are placed in the grille

Buttons – this is for the default setting for the room (ex.. temp, humidity and water temp)

Oled - display room conditions and when button pushed the OLED will also display the users default setting that is being requested.

BME/BME280 – read room conditions and will allow me to turn on the humidifier if needed.

Encoder – to manually adjust the temperature of the room this will override the default setting.

Huebulb – Indicator when the restroom is ready to occupy

Wemo – used to turn on the vent heater

Servo – this will simulate the mixing valve for the water

# Entry Occupancy

1. Occupancy sensor

# Room Humidity

1. Humidity sensor
2. dehumidifier

# Temperature of the water supplies

1. Water temp sensor
2. Servo or something to implement the opening of the mixing valve.

# Temperature of the Room

1. Room temp sensor
2. Register for the duct

Implementation

Use the photon 2 as the microcontroller.

# Temperature of the Space

In order to control the temperature in the room I will need to use the BME280 to read the temperature in the room

When reading the temperature values in the room I will need to turn on the heat if the room temperature is not at the demanded setting. I can visually show this by printing a small vent/grille that I will put a red and blue led into and when the user is calling for a hotter room the red light will light up until the temperature is reached. If the user calls for colder air the blue light will turn on until the temperature is reached.

# Temperature of the water