Assignment 3 - smart room

Giuseppe Pintus
Song Zhaohui
Giuseppetti Diego

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Introduction

The smart room system aims to provide an intelligent and automated environment to manage and control a room's lighting and roller blinds. The system is composed of five subsystems, namely Room Sensor-board, Room Service, Room Controller, Room App, and Room Dashboard. The Room Sensor-board monitors the room state using sensors and communicates with the Room Service, which functions as the main u nit governing the management of the room. The Room Controller controls the lighting and roller blinds based on the information received from the Room Service. The Room App allows the user to manually control the lights and roller blinds, while the Room Dashboard allows the room manager to track the room's stat e and control the lights and roller blinds.

Hardware Components

The Room Sensor-board includes an ESP32 board, a green LED, a PIR sensor, and a photoresistor analog sensor. The LED should be on when someone is in the room and off when no one is in the room. The PIR sensor detects the presence of a person in the room, while the photoresistor sensor measures the light intensity in the room.

The Room Controller includes an Arduino UNO board, a green LED simulating the lighting subsystem, a servo motor simulating the roller blind subsystem, and a Bluetooth module HC-05. The green LED simulate s the lighting system, and the servo motor controls/simulates the roller blinds. The roller blinds are fully unrolled up when the servo motor is set to 0 degrees, and they are fully rolled when the servo motor is set to 180 degrees.

System Behavior

The Smart Room system follows a policy to control the lighting system and roller blinds based on the room's state. The policy is as follows:

If no one is in the room, the lighting system should be off.

If someone enters the room and the room is dark, the lighting system should be turned on (if it was off). The roller blinds are fully rolled up automatically the first time someone enters the room, from 8:00 (if someone enters).

The roller blinds are fully unrolled at 19:00 (if they are up and no one is in the room), or as soon as someone who is still in the room at 19:00 leaves the room.

Through the mobile app, the user can turn on or off the lighting system and roll up/unroll the roller blinds, even partially. Through the dashboard, the room manager can track the room's state, in particular, the hours and how long the lights were on and fully control the light and roller blinds.

Conclusion

The smart room system provides an intelligent and automated environment to manage and control a room's lighting and roller blinds. The system comprises five subsystems, including the Room Sensor-board, Room Service, Room Controller, Room App, and Room Dashboard, each playing a specific role in the system. The system follows a policy to control the lighting system and roller blinds based on the room's state and provides the user and the room manager with the necessary tools to manually control and track the room's state.