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EE250 Lab Final Project

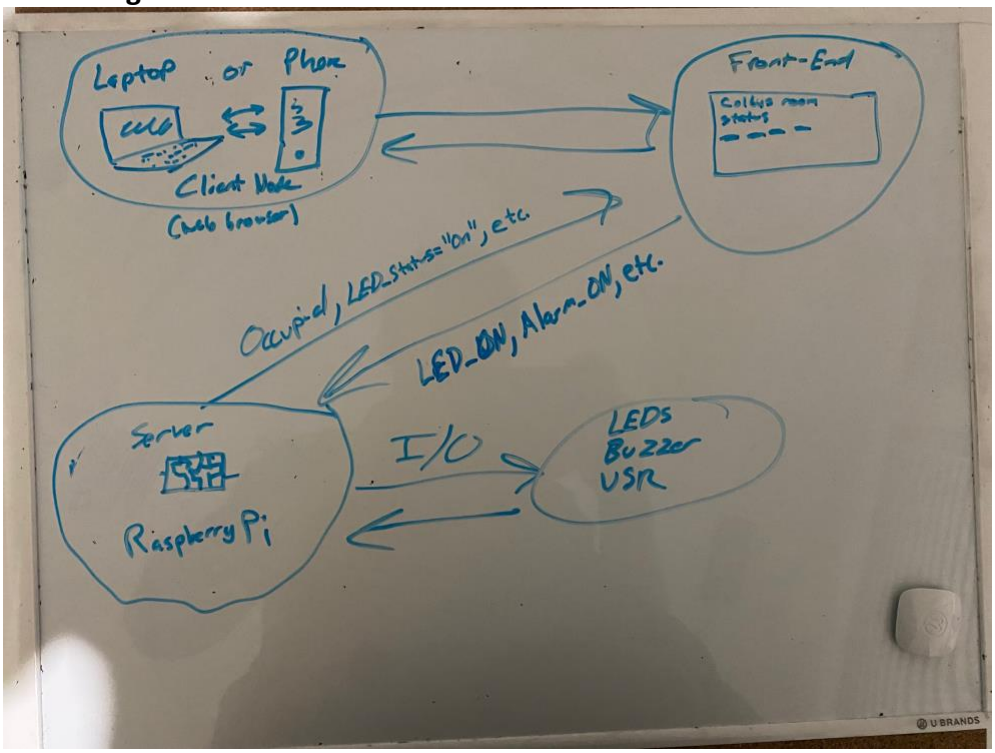
Project Description

The goal of this project was to create a smart room controller that allows remote control and security for my room accessible anywhere. To do this, I created a controller for my LEDs, and an alarm system using the GrovePi kit with my Raspberry Pi. The LEDs were purchased from Amazon and use simple pin connectors to connect to the GPIO pins of the Raspberry Pi. I used an open source library I found online that worked for my specific LED IC communication protocol.

Technologies Used

All the sensors and LEDs are connected to the Raspberry Pi. This is running a server that uses flask to accept and respond to HTTP requests. I use functions from the Adafruit Nanopixel library to adjust the LED color and to turn them on or off. I also use the grovepi to turn the buzzer on/off and to get measures from the ultrasonic ranger. These are combined to create the ledManager and alarmManager which handle the I/O and control the LEDs, buzzer, and ultrasonic ranger. These managers are imported into the server file which uses a Flask app that accepts GET and POST requests to turn the leds on or off, get the status of the leds, turn the alarm on or off, get the alarm status, and to check the occupancy of the room. These HTTP Requests are sent by the Front-End which I run on an Apache web server. The front end was written in HTML, CSS, and Javascript, and I use JQuery to help send the HTTP requests on button clicks and periodically to poll the RPI for occupancy status. This is all accessible from the ip address of my laptop by any phone or laptop.

Block Diagram:



Reflections/Limitations:

The major limitation of this project was the motion sensor. If I had a more accurate sensor to detect human motion and/or a camera, I would be able to use more advanced signal processing to detect when someone is in the room or not. I also could not setup port forwarding on my router because I did not have the login information, but if I had acquired this, it would be available anywhere with internet.