Architectural Design Description of A Home Automation System

1. Purpose and Requirements

The purpose of this IOT system is to control lights represented by an LED using a Web application.

- **System Management Requirement**: The system allows users to monitor and control the system functions from anywhere.

- **Data analysis Requirement**: the system performs data analysis to provide accurate data.

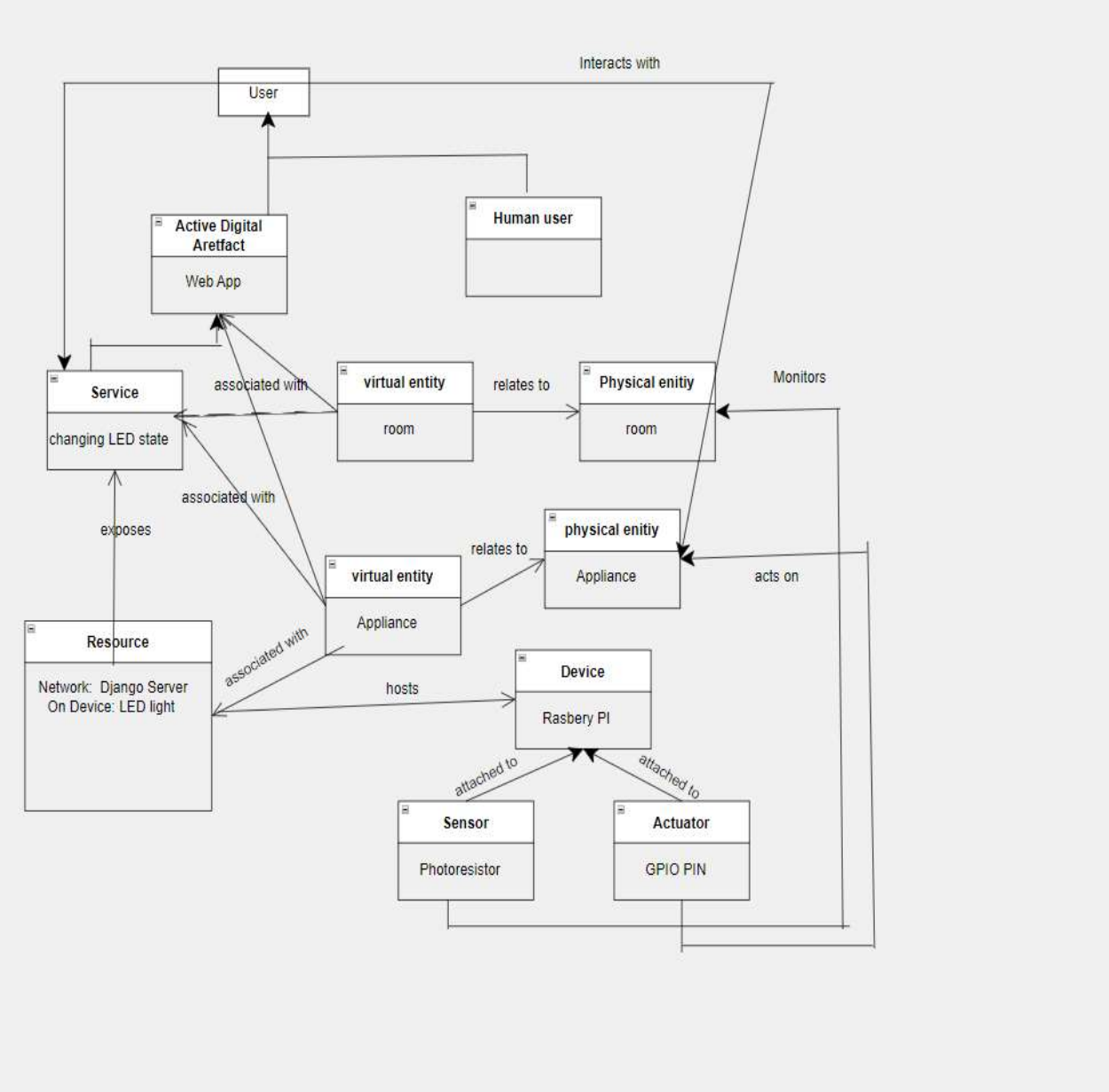
- **Application Deployment Requirement:** the application should be installed locally but accessed remotely.

- **Security requirement:** the system should ask for user identity to prevent information leaks and unauthorized access.

2. Process Model Specification

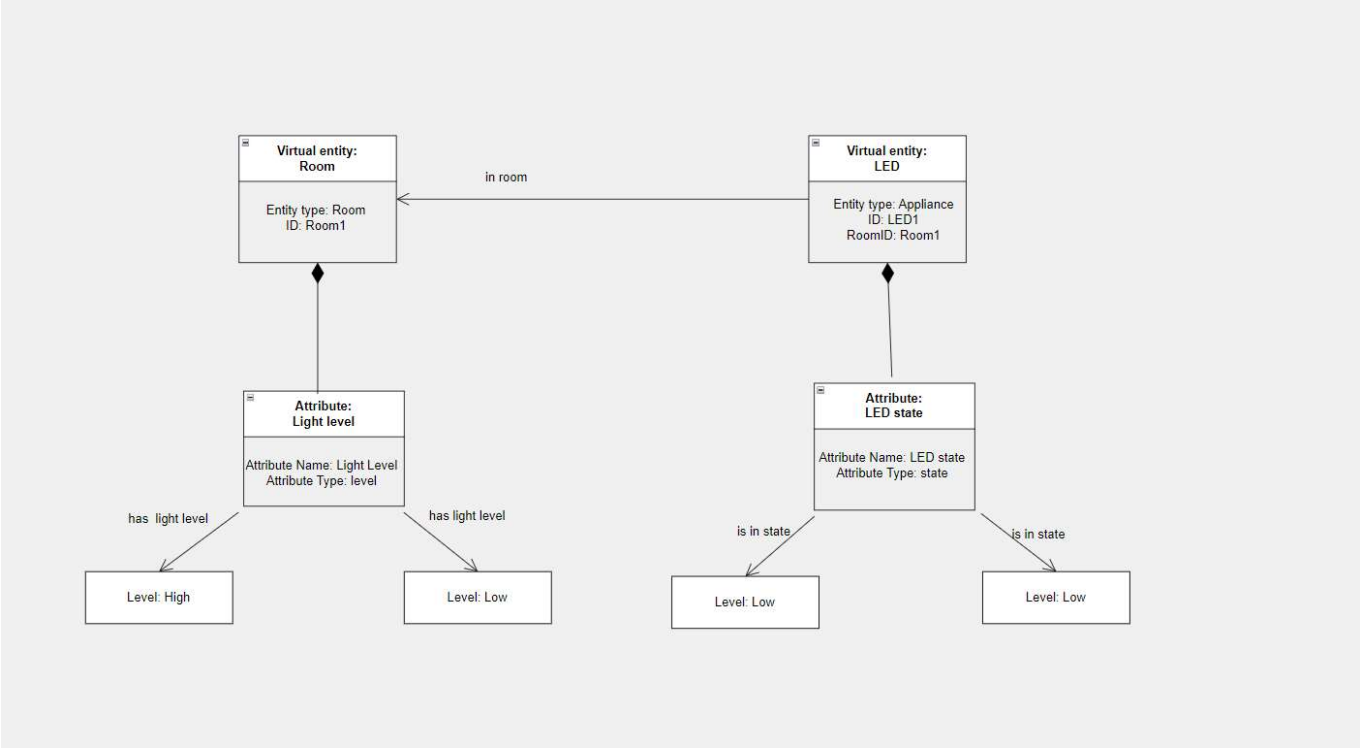
The IOT module states: The system module has two decision points, auto and manual. On auto the system will run data analysis to determine whether to turn the LED light level high or low. On manual mode, the system lets the user control whether to turn the lights on or off. Based on the decision made by the system the module will have the states on or off.

3. Domain Model Specification



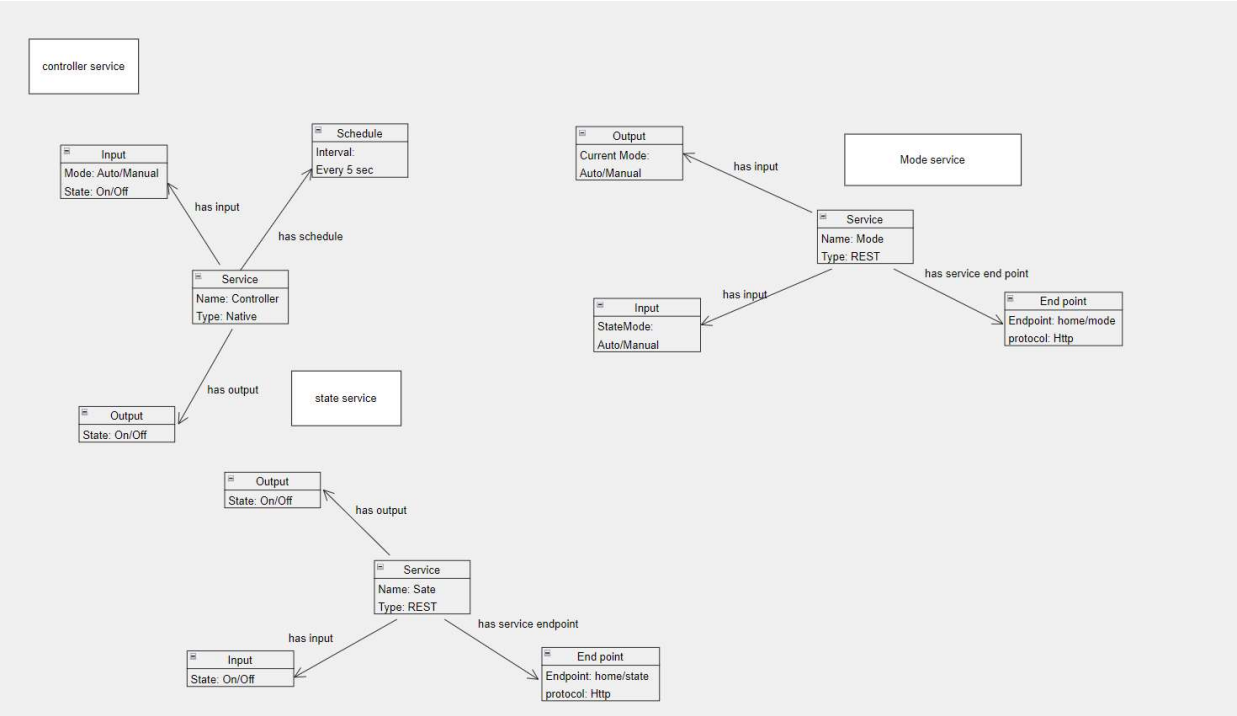
The domain model shows the different virtual and physical entities in the system and how they interact with different objects and components. The model also shows the sensor and actuator devices and what they do in the system. Another component in the model in the different resources (on device and network), these resources supply data to and from the system. Last component is the services the system provides.

4. Information Model Specification



This model explains the overall structural information of the system. Each virtual entity has two attributes, the light intensity(level) and the LED state. These two attributes have two values as well. The light intensity level attribute has the level high and low , whereas the LED state has the states On and Off.

5. Service Specifications

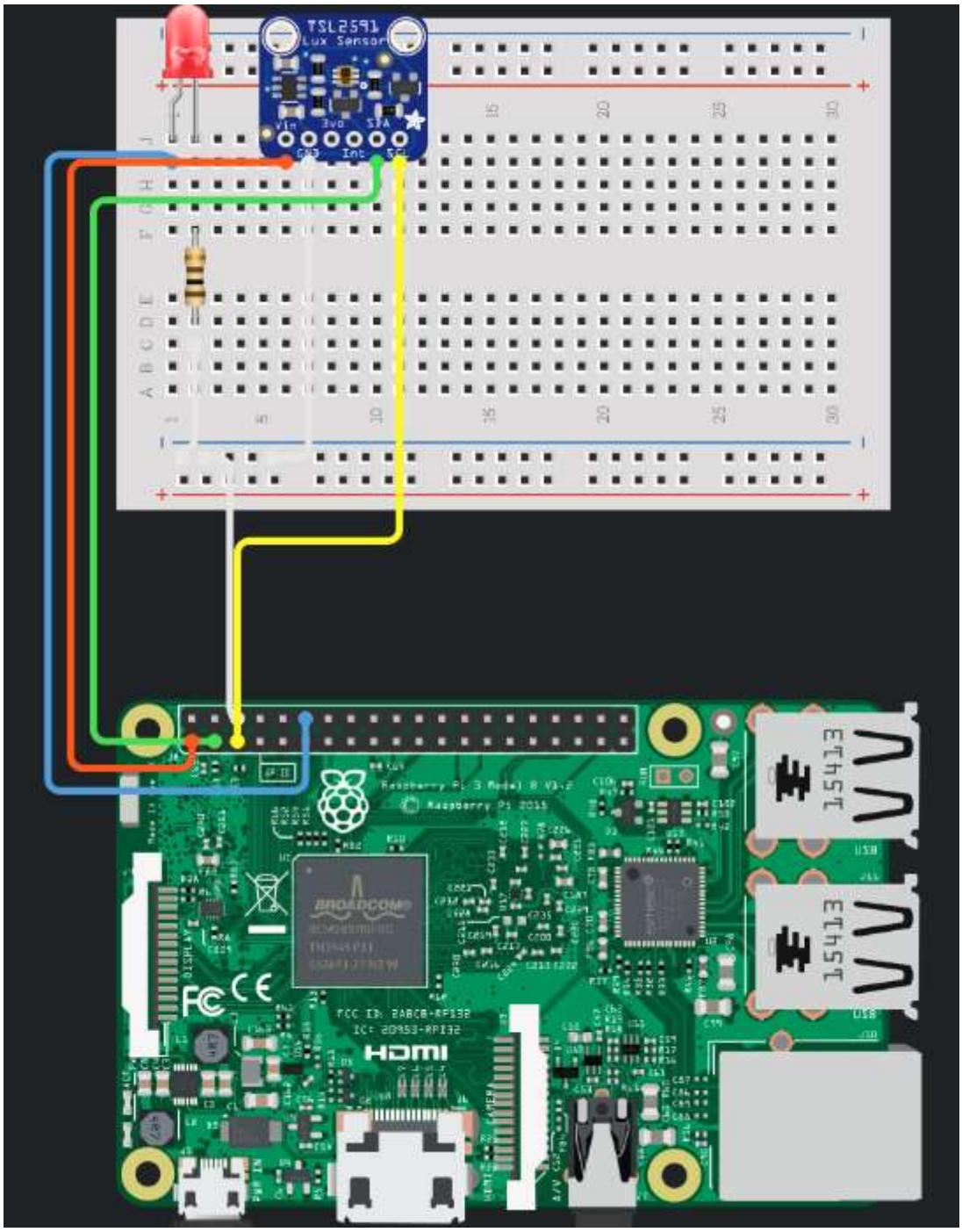


The Mode state handles the operating mode of the system. When Mode is set to auto, the photoresistor tracks the light level of the room and toggles the LED accordingly. When Mode is set to manual, the user can then change the State state to manually toggle the LED on/off. The Controller service running on the Pi gets state information from the server on a 5s schedule.

6. IOT Level Specifications

The system is deployed as a simple IoT Level-1 deployment with everything being handled locally/client-side.

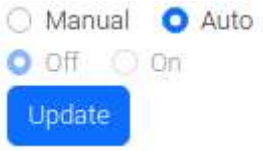
9. Device and Component Integration



(Photoresistor module and pinning aren't exact replicas of the system. Module was the closest approximation we could find and pinning can be changed in the code to match diagram if required.)

10. Application Development

Auto/Manual radio buttons control the Mode of the system, while Off/On control the State of the LED when in Manual mode.



Operation of the site could be a bit cleaner by having each radio button POST the form instead of having a submit button but the page refreshing with each click felt a little disorientating.

GitHub link: https://github.com/ibisol/SOFE4610A3