

Objective - Network

- Availability
- Accuracy
- Affordability
 - Amazon Lambda Price: \$0.0000000021 / ms of computation





Sensor Activated Home Hub Curtains

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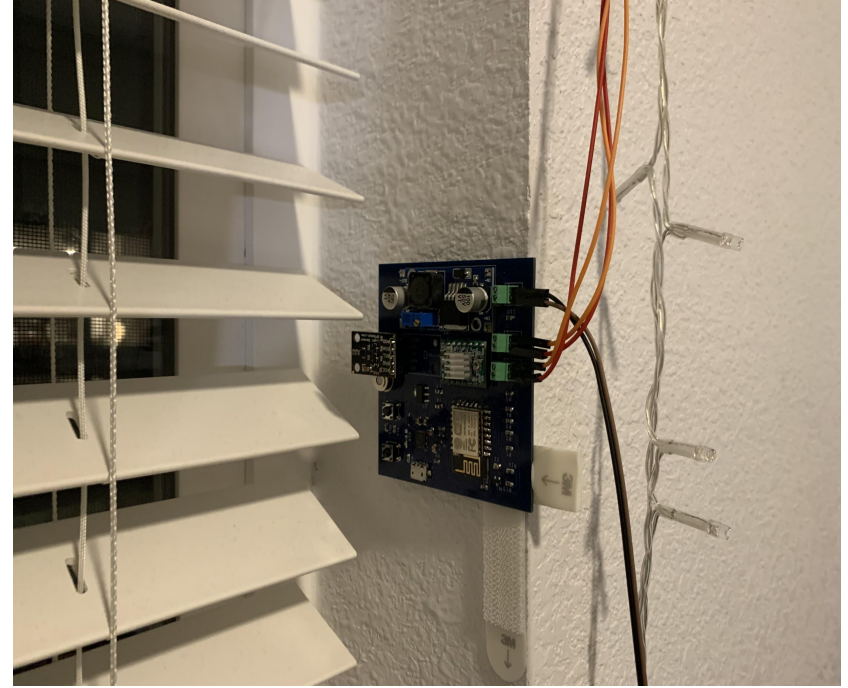
Introduction

- Energy Conservation
- “Closing the curtains during the winter helps reduce up to 10 percent in heat loss from a warm room[1]”
- ““increases in the level of the hormone serotonin, which is important to sleep [2]”

Objective

- Three Separate Modes
 - User Control
 - Complete Override
 - Device Control
 - Thermal and Photo Sensor
 - Alarm Control
 - Communication with Server

Final product



Design - Requirement and Verification

- Modules

- Power

- AC/DC converter
 - DC/DC step down
 - LDO

- Control

- Microcontroller (ESP8266)
 - Motor Driver

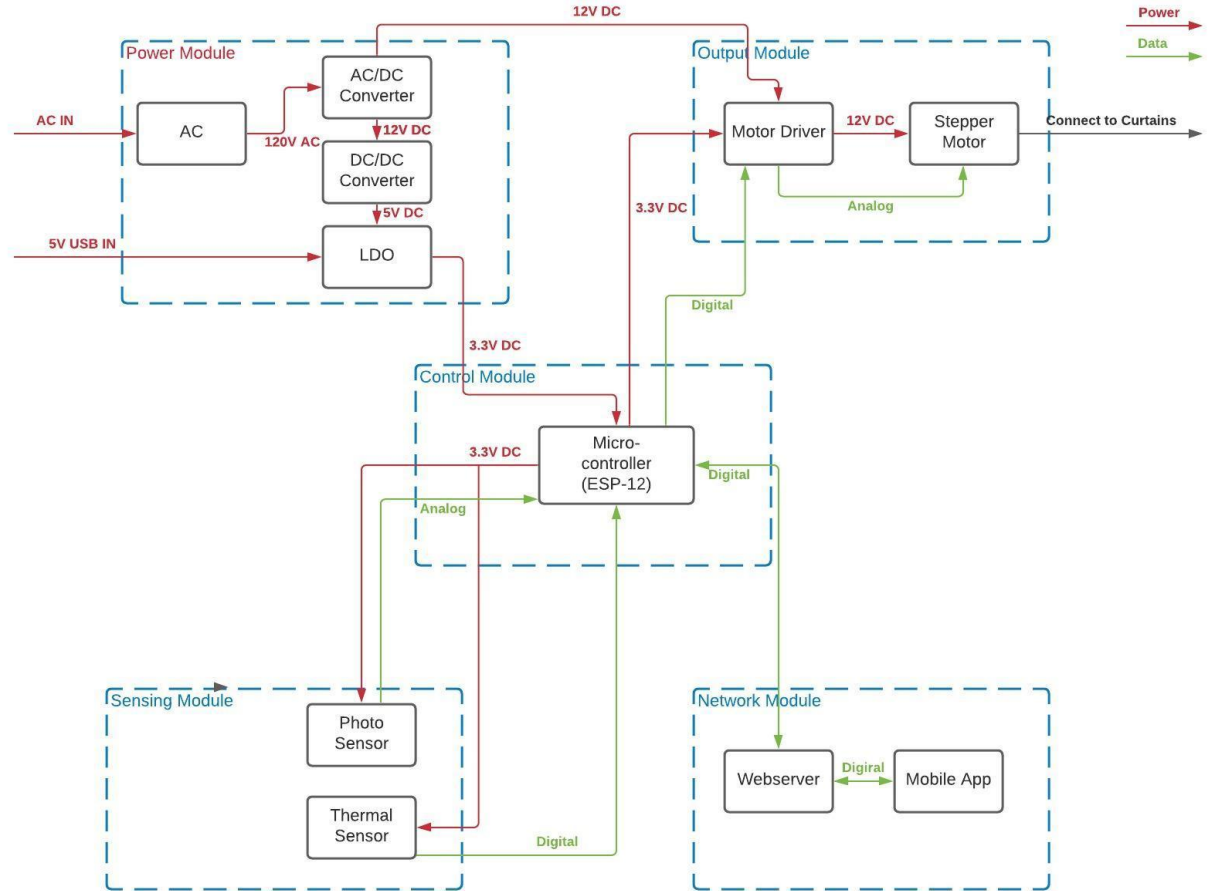
- Sensors

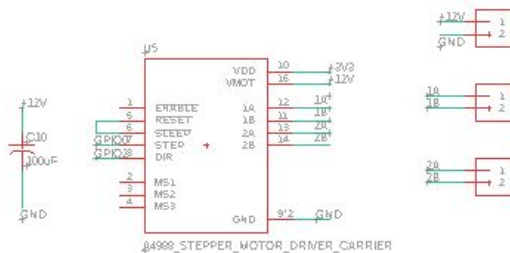
- Photo Sensor
 - Thermal Sensor

Design - Requirement and Verification, cont.

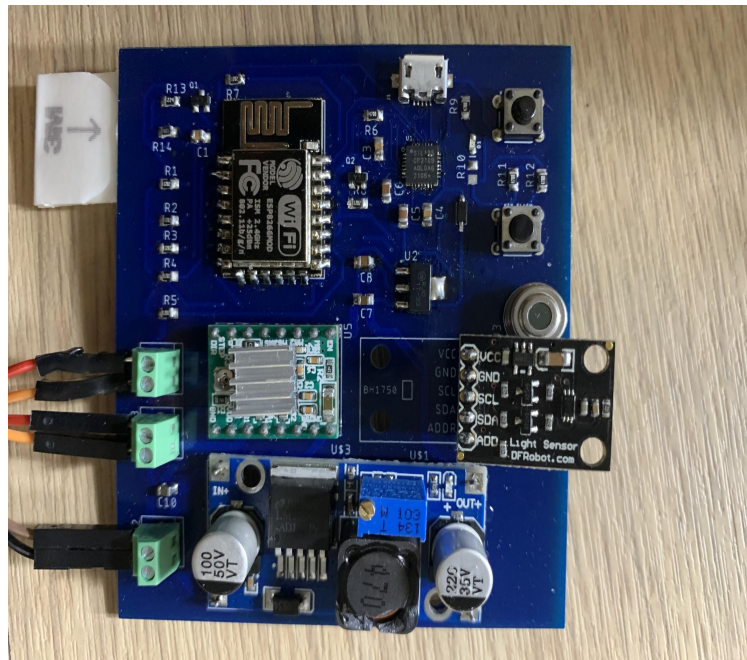
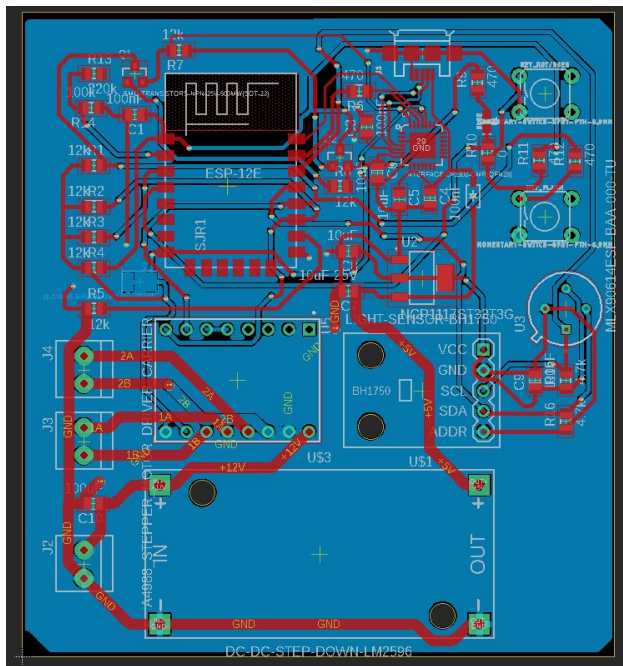
- Modules, cont.
 - Output
 - Stepper motors
 - Server
 - Web server
 - Wifi
 - User Interface
 - User Control
 - Data viewer

Block Diagram

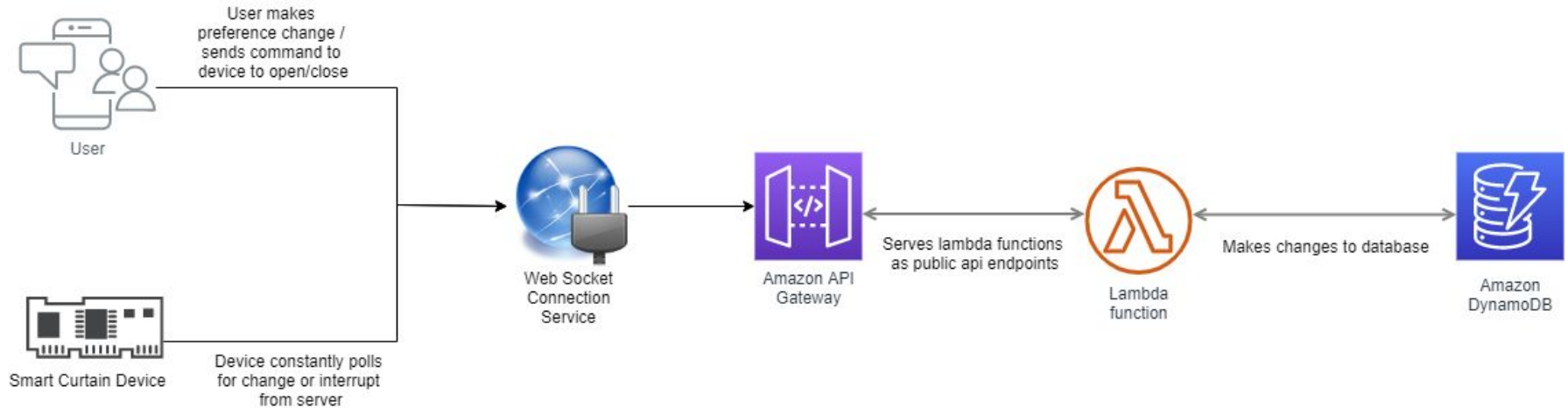




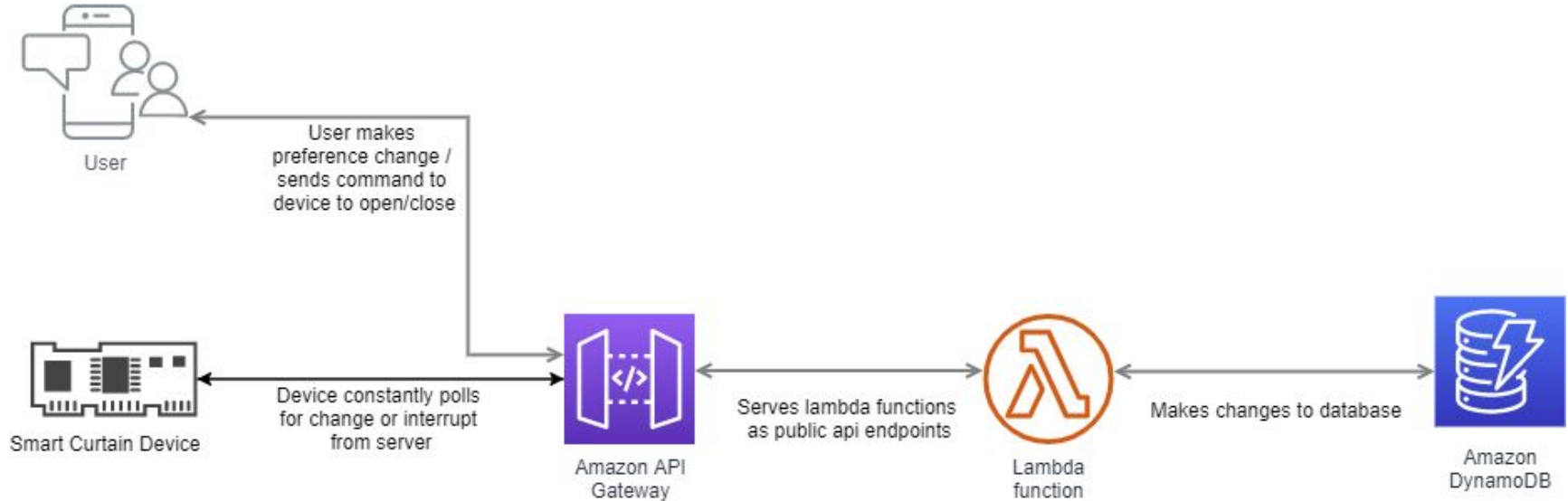
Design - pcb layout



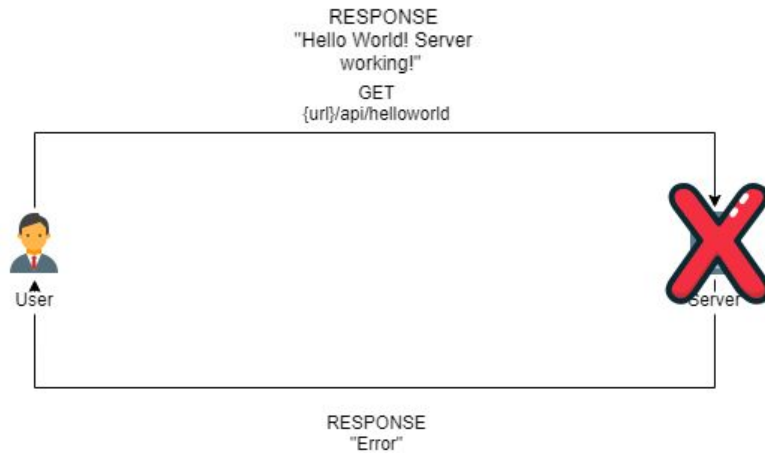
Design- Original Network Design



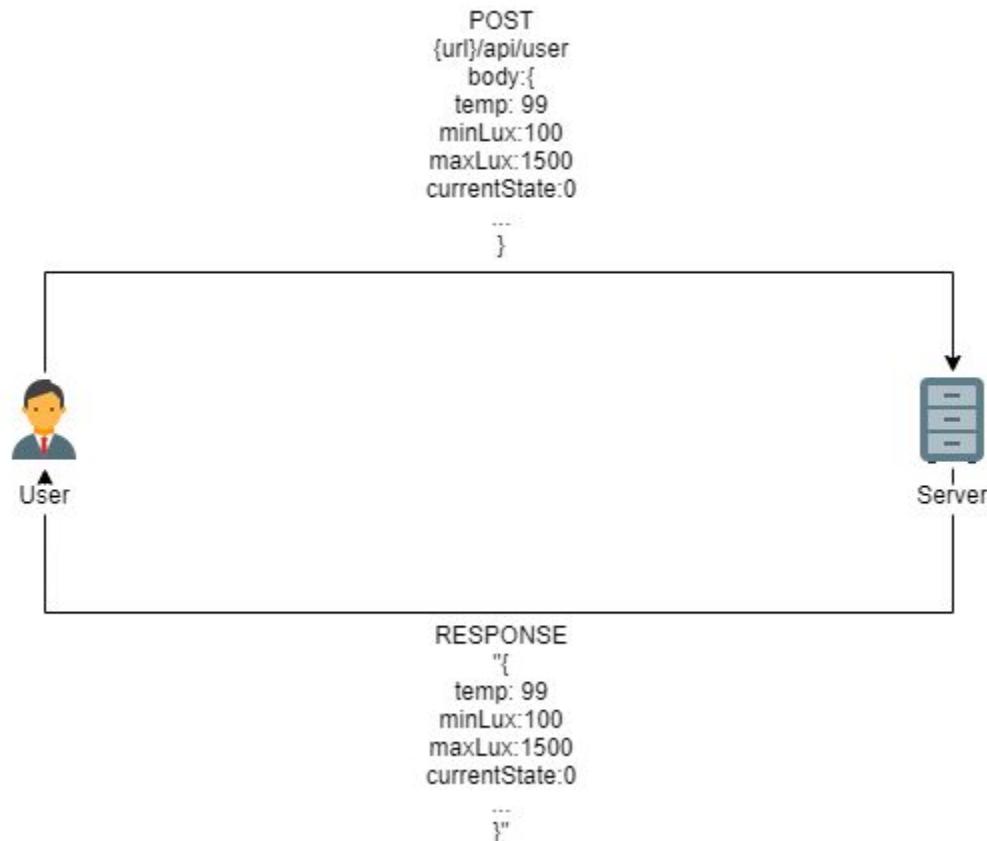
Design - Final Network Design



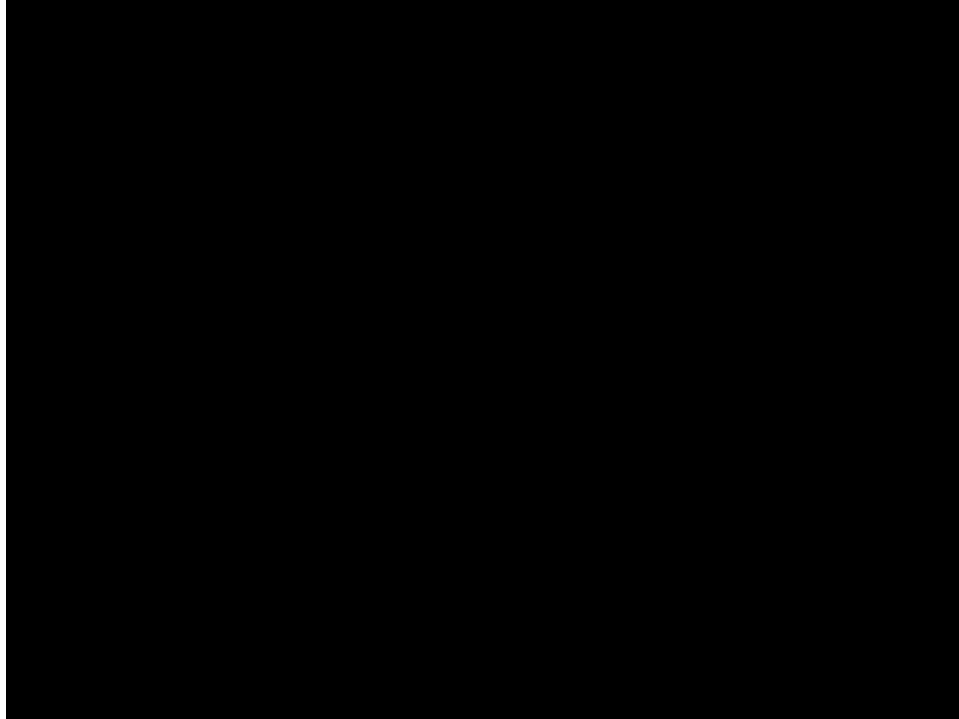
Network Tests



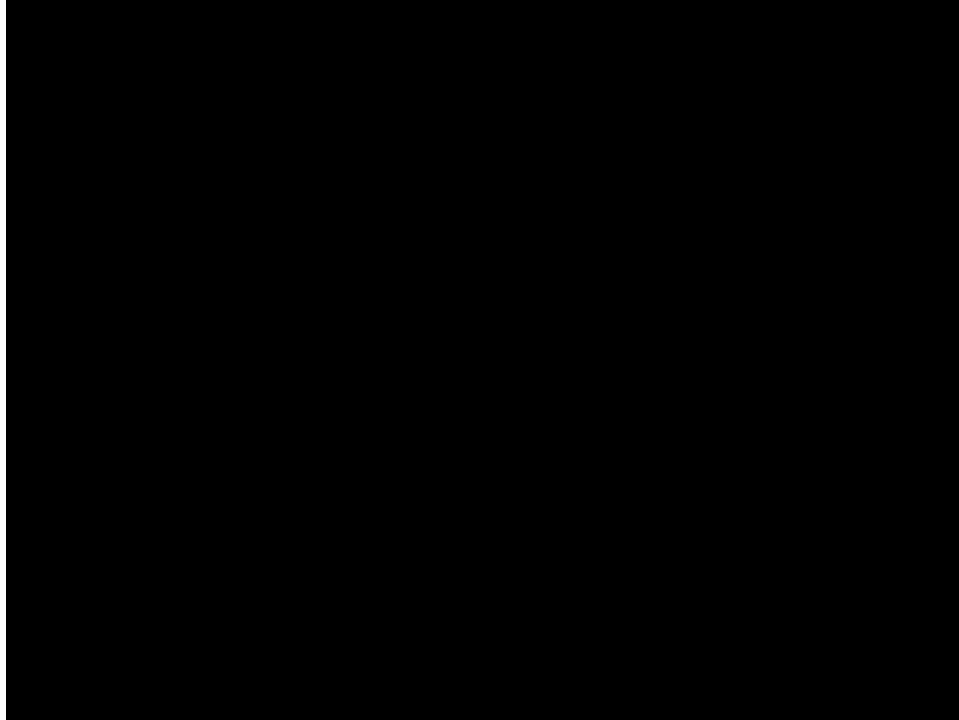
Network Tests



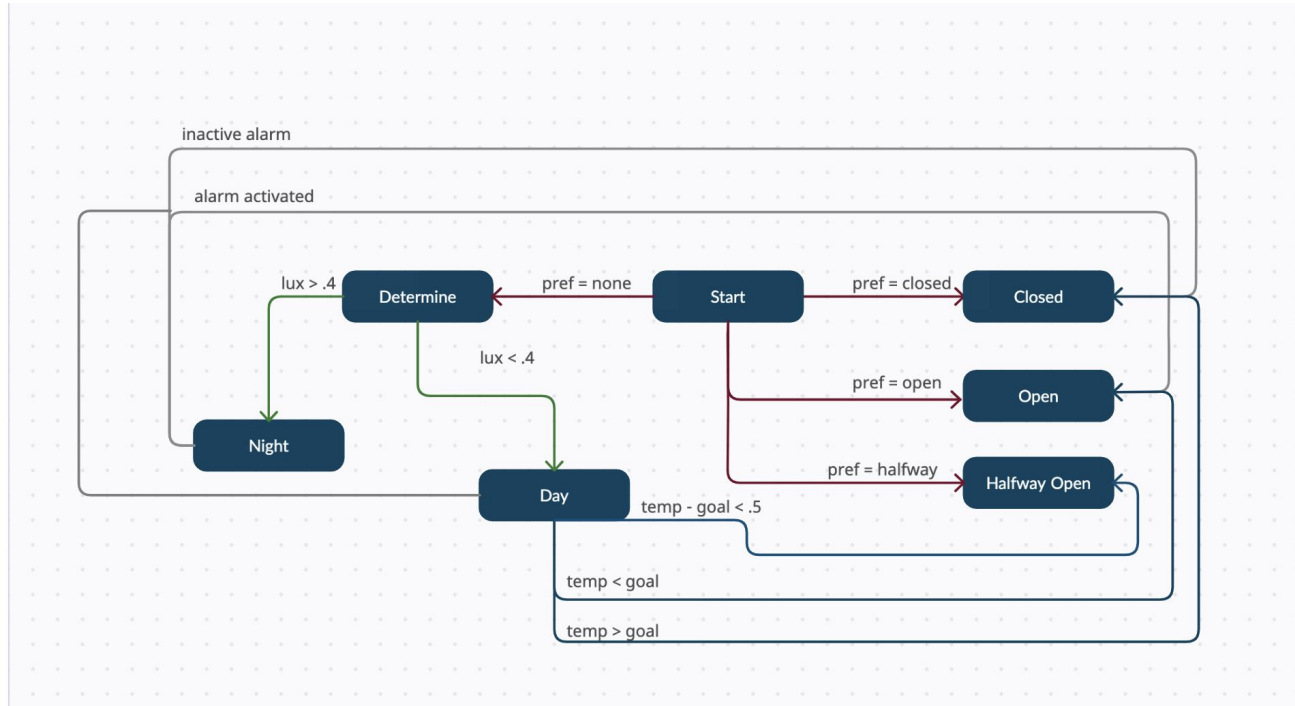
User interface



User Interface



Design - State Machine



Conclusion

- Objectives Achieved
- Future Considerations
 - Thermal anemometer
 - Wider range of Curtains

References

- [1] NRDC. 2020. 'How to Keep Warm and Save on Your Energy Bills This Winter'. [Online] Available at:
<https://www.nrdc.org/stories/how-keep-warm-and-save-your-energy-bills-winter> [Accessed 16 Feb 2020].
- [2] VeryWellHealth. 2020. 'Get Morning Sunlight and You'll Sleep Better'. [Online] Available at:
<https://www.verywellhealth.com/morning-sunlight-exposure-3973908> [Accessed 16 Feb 2020].