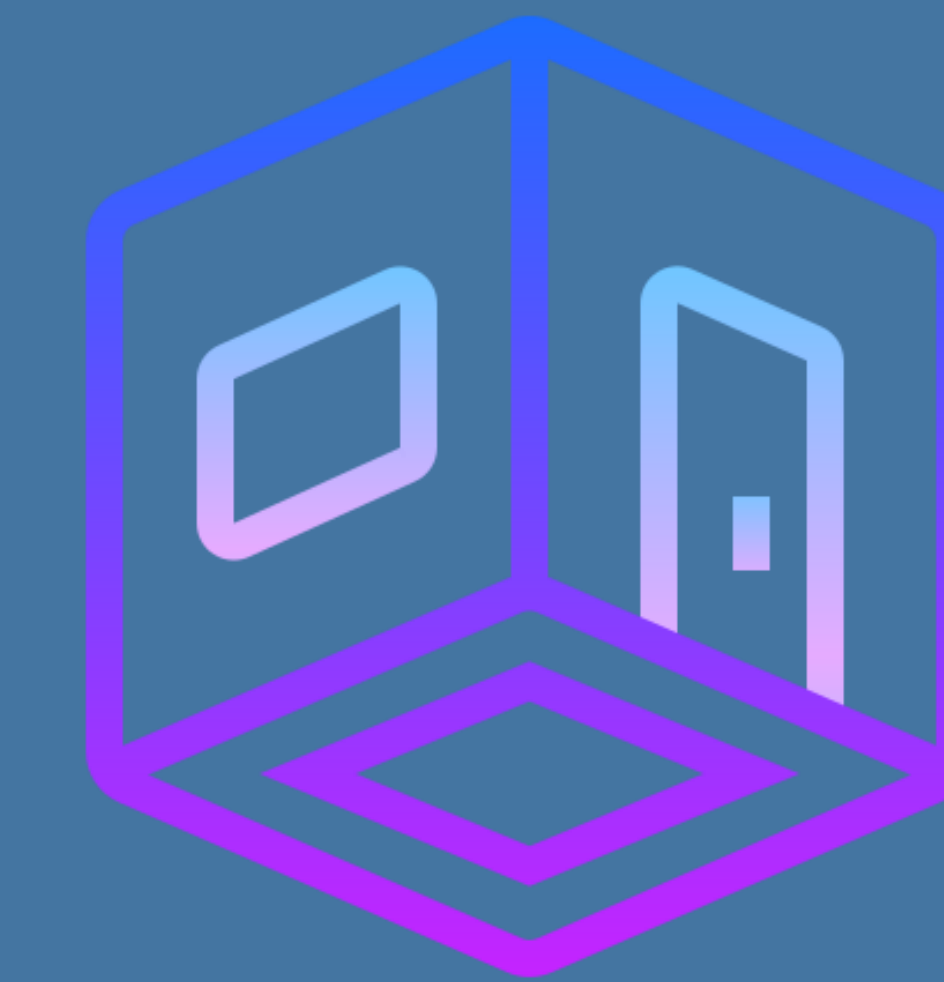


Room Monitoring System

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Introduction

The Room Monitoring System (RMS) is a system of fully integrated IoT devices that collect, store, process, and display information about a room.

Problem Seeks to Solve

The purpose of the RMS is to increase the efficiency of hotel staff by providing data at the glance of an eye.

This includes:

- Progress meter of when to clean the floor
- If water was detected on the counters
- If towels and paper needs to be restocked
- If the trash needs to be emptied

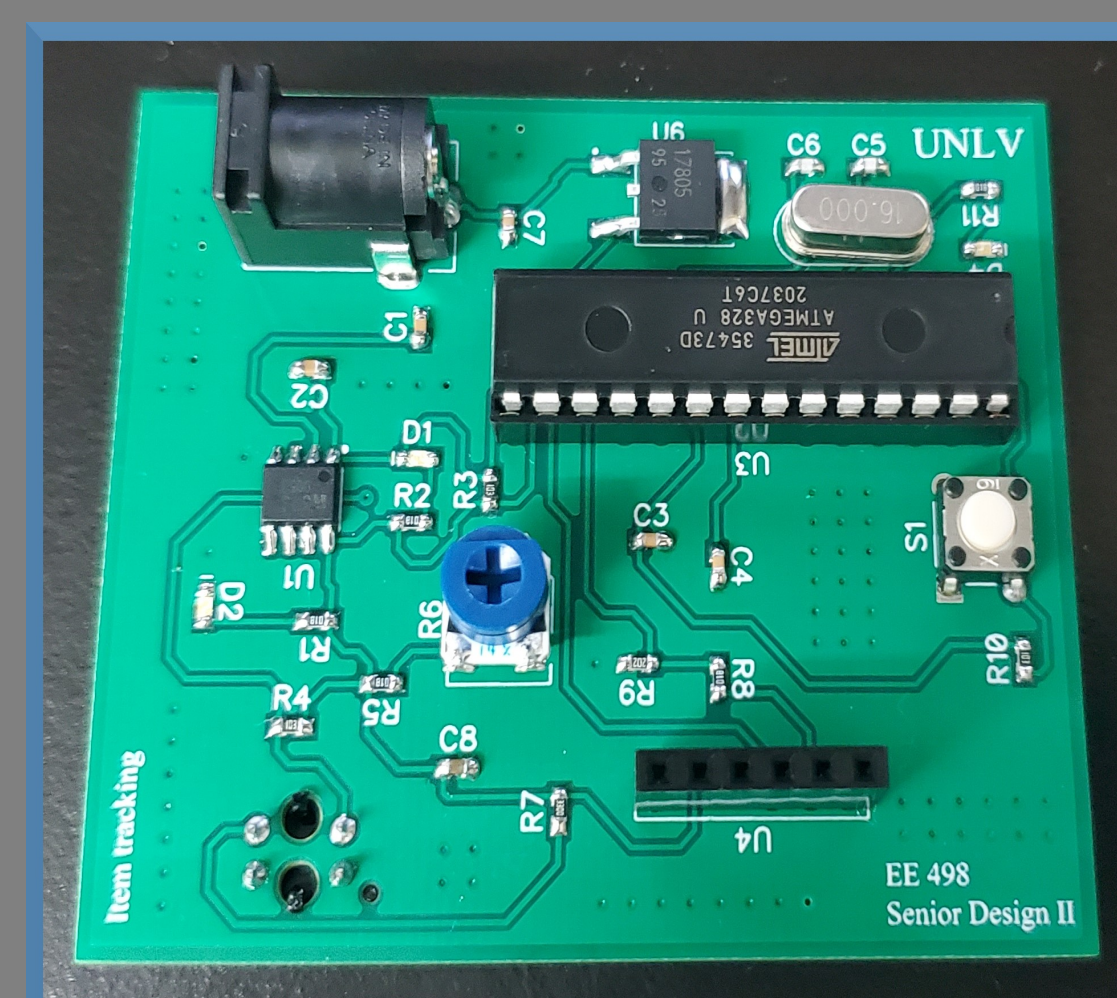
Components and Costs

- ◆ ATmega328P x 5 = \$6
- ◆ HC-SR04 Ultrasonic Sensor x 2 = \$8
- ◆ ESP8266 ESP-01 Wi-Fi Module x 4 = \$8
- ◆ HC-05 Bluetooth x 1 = \$3
- ◆ DHT 11 Sensor x 1 = \$3
- ◆ IR Obstacle Sensor x 2 = \$2
- ◆ Raindrop Sensor x 1 = \$1
- ◆ PCB = \$15

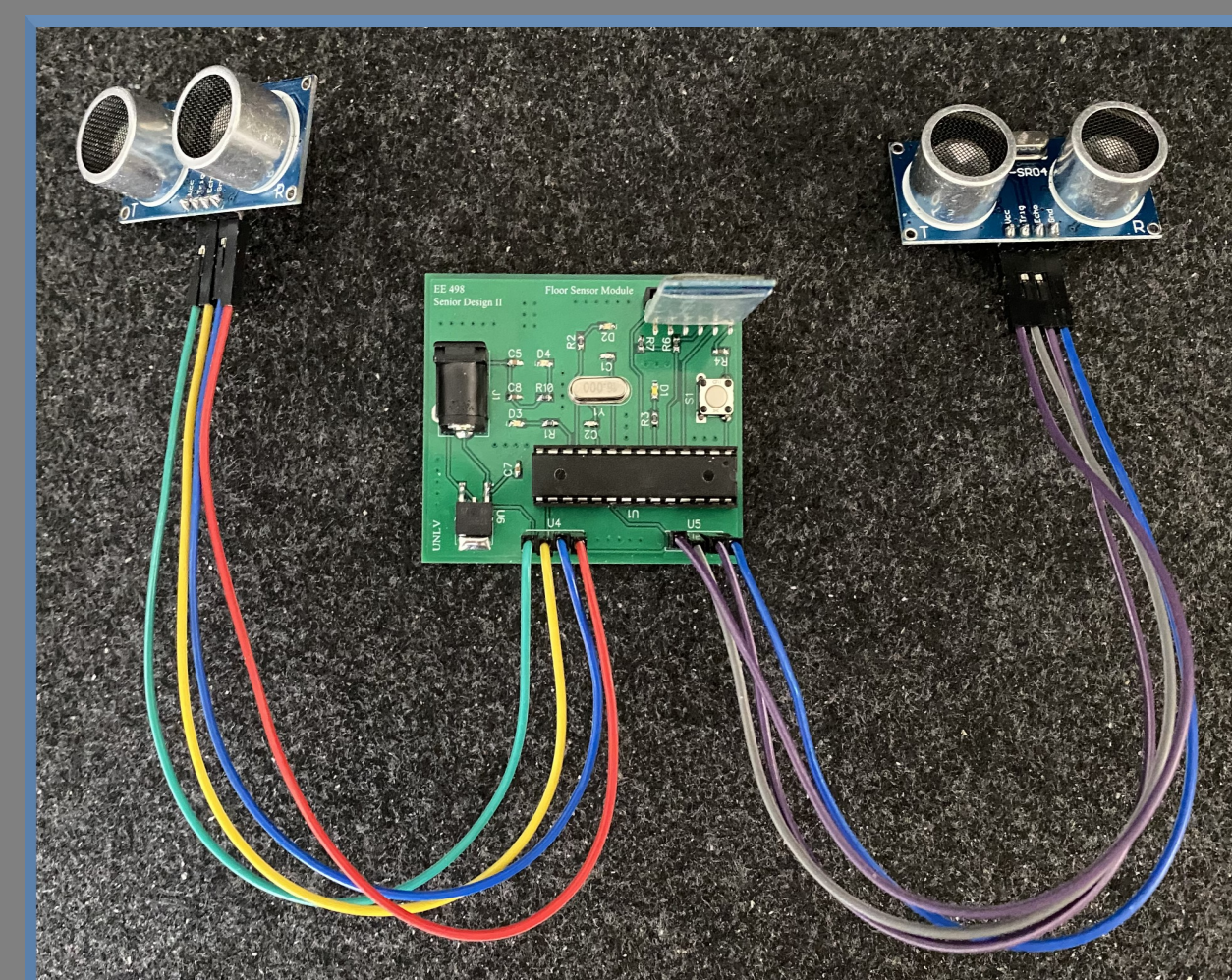
Total Cost \$46

Design

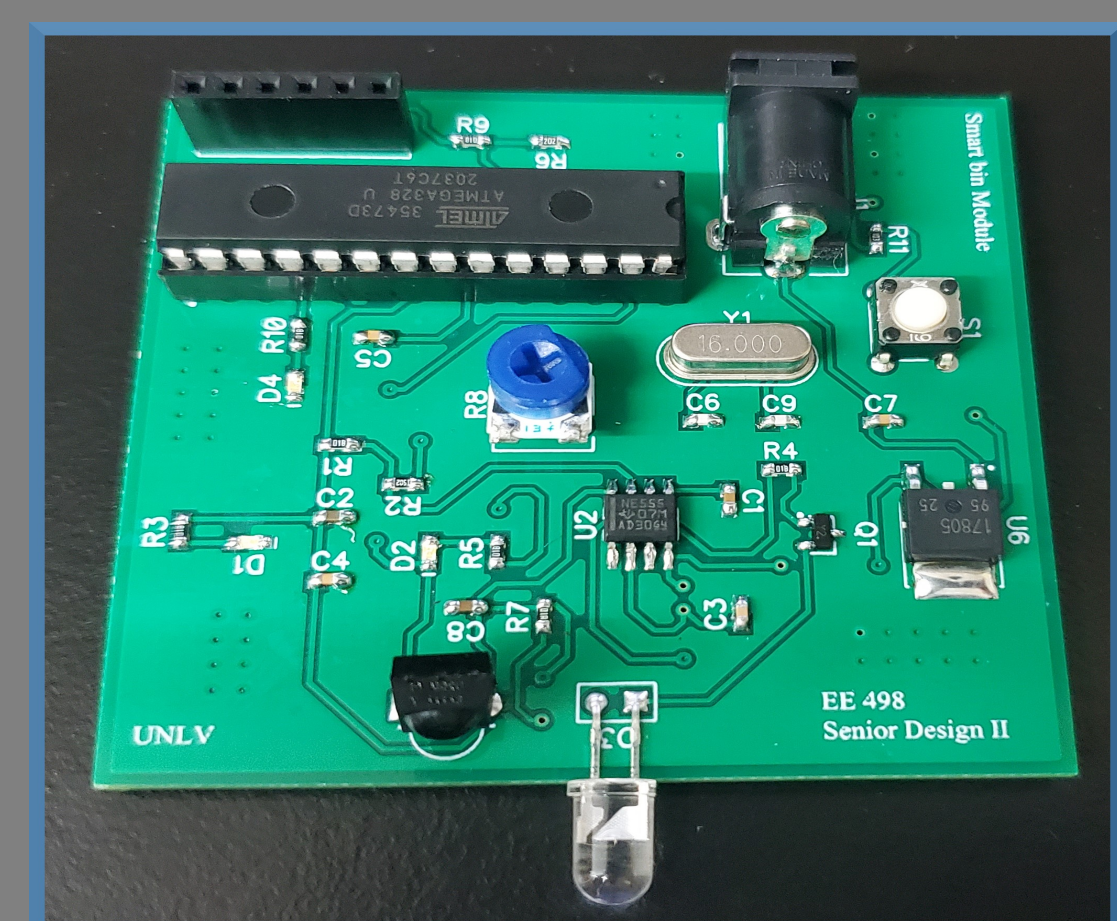
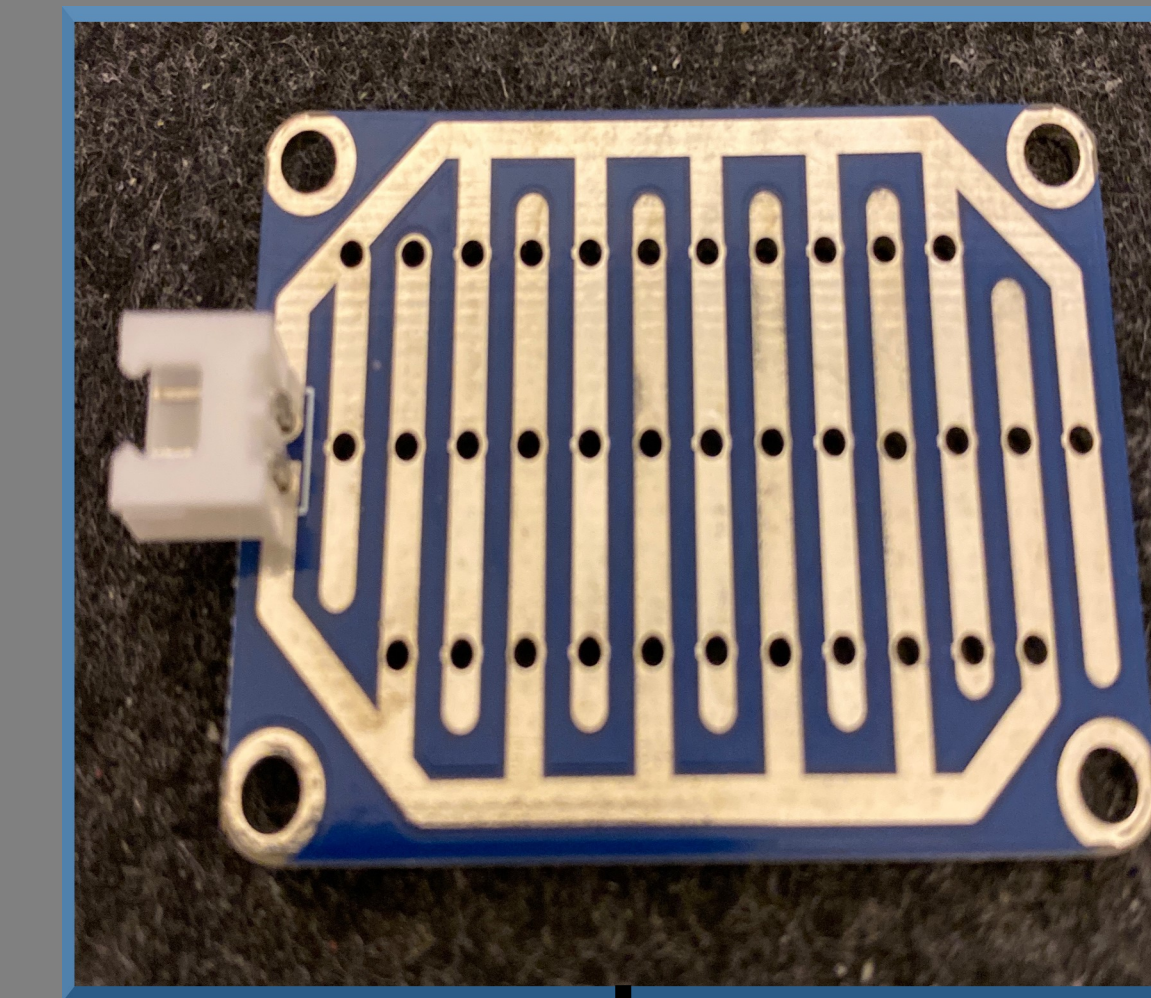
Inventory Checker Module



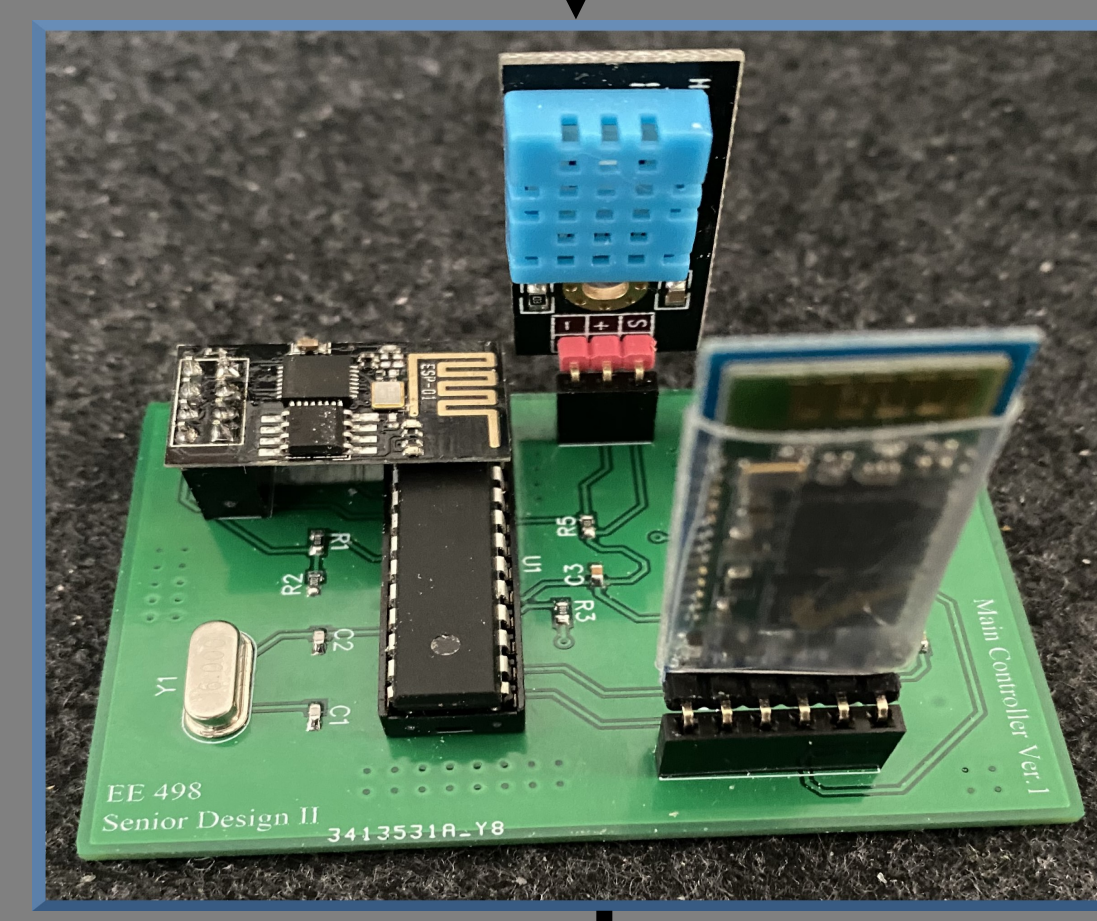
Floor Sensor Module



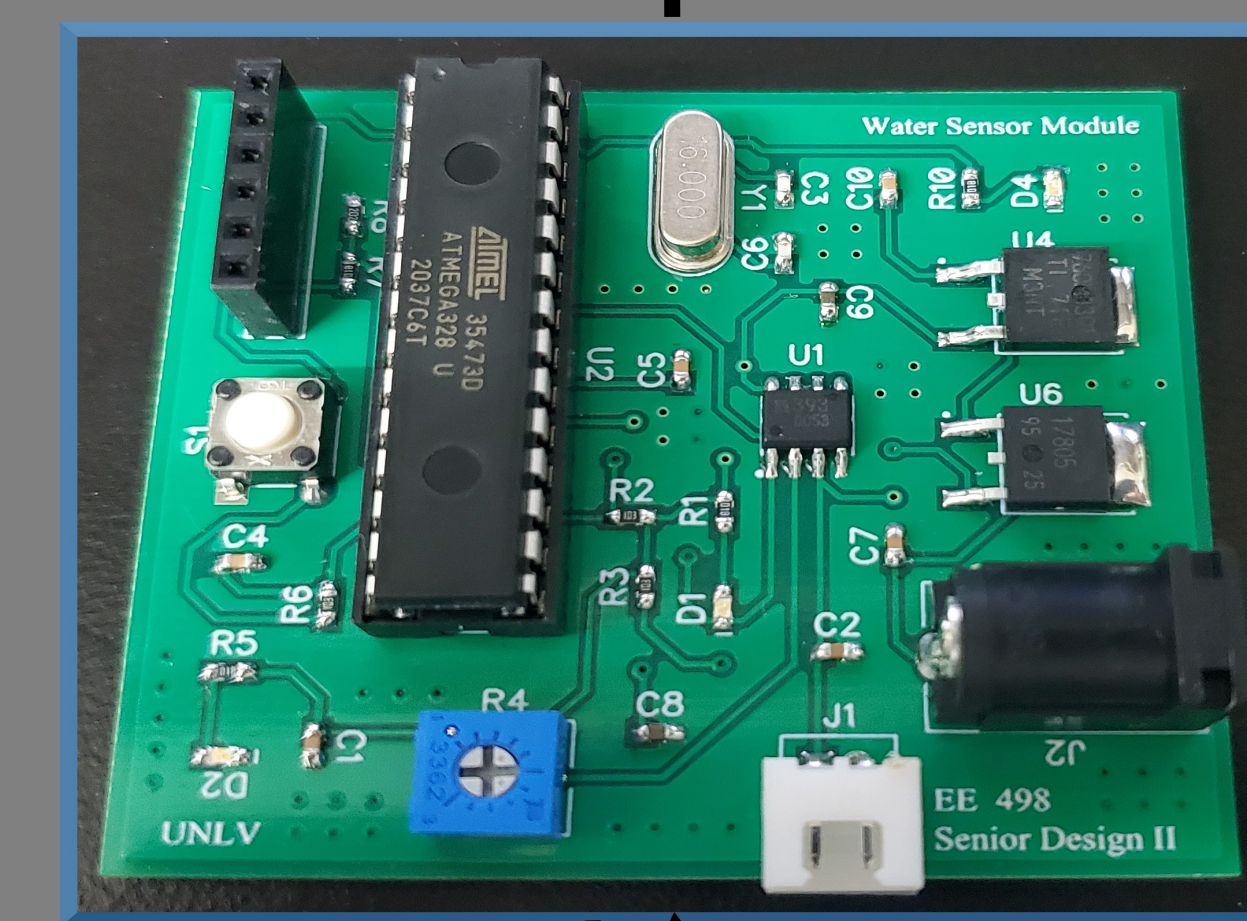
Water Detection Plate



Trash Monitor Module



Controller



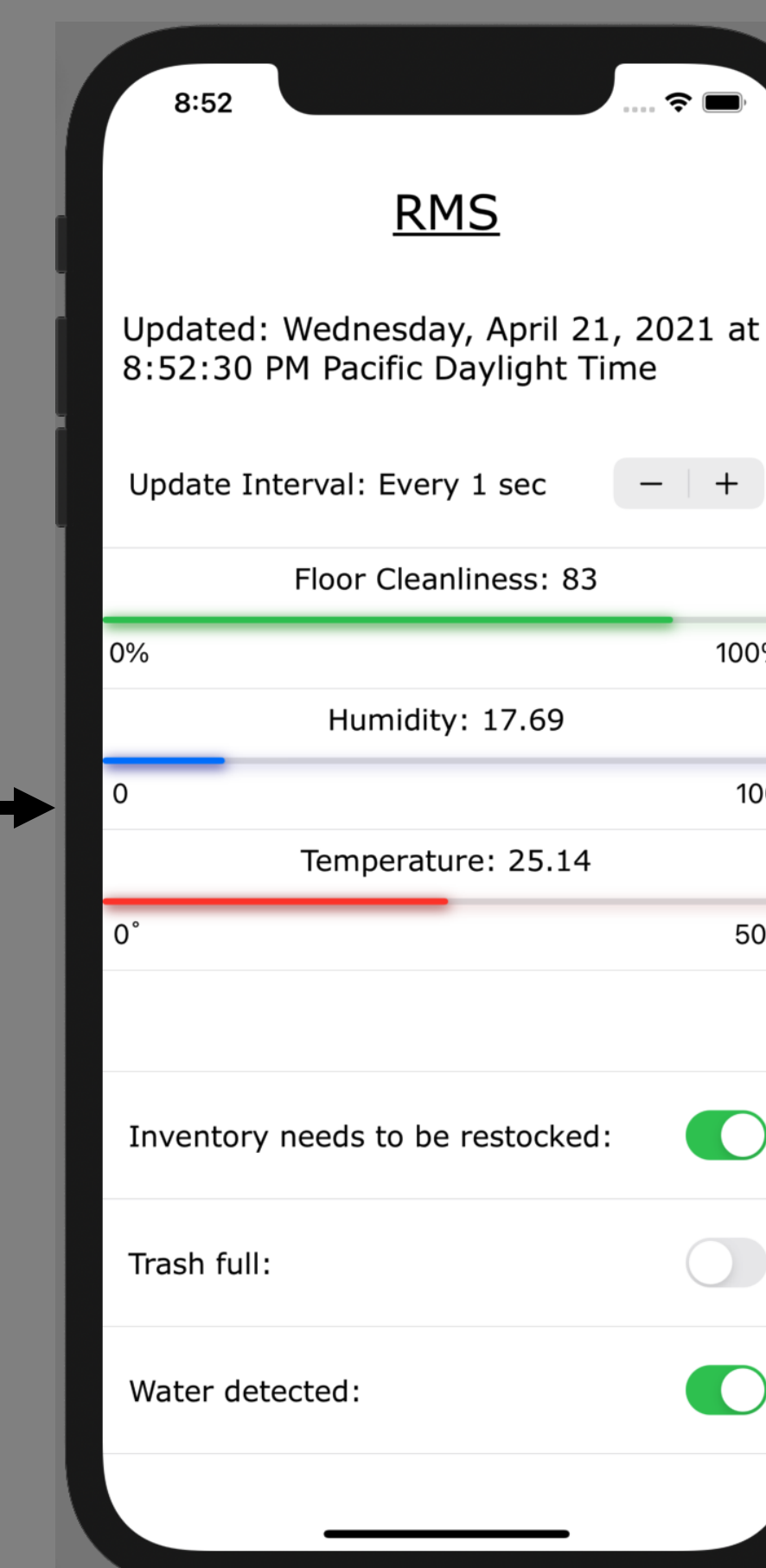
Water Detector Module

Cloud Server



Mobile App

Key	Value
cleanliness	83
humidity	17.69
inventory	true
temperature	25.14
trashBin	false
wetSurface	true



Operation

Our design consists of four tiers.

1. Sensors that collect and transmit data
2. Controller that receives and transmits data
3. Cloud server that receives and stores data
4. Mobile app that retrieves and displays data

The sensors and controller are implemented using custom PCBs. The sensors transmit data via Bluetooth and the controller via Wi-Fi.

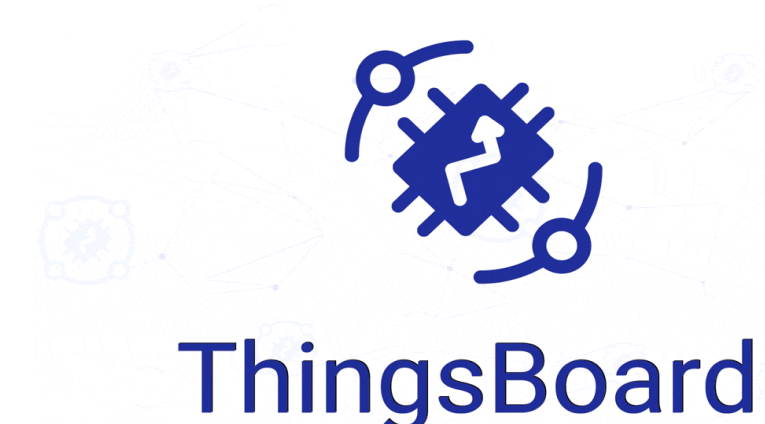
The cloud server receives data through MQTT. The mobile app retrieves JSON data through HTTP.

Conclusions

The RMS was built utilizing off the shelf components and open protocols and software. Compiled into a system that leverages the power of IoT, the RMS efficiently yet inexpensively completes a task.

Future Improvements

- Add support for other types of sensors
- Improve the capability of device by implementing a voice control function.



References:

- <https://learn.sunfounder.com/category/sensor-kit-v2-0-for-arduino/>
- <https://icons8.com>