EE / CprE / SE 492

Project title: Small-Form-Factor Solar-Powered Self-Sustainable IoT Sensors with

Long-Range Wireless Communication

January 13 - January 30

Group number: 7

Client &/Advisor: Dr. Cheng Huang and Dr. Meng Lu

Team Members and roles:

Calvin Condo - Solar Power

Qin Xia - Sensors

Chuxin Chen - Arduino / Sensors

Lun Zhang - Testing/Sensors

Yuchen Zhao - LoRa Wireless module/Arduino

Luke Healy- Testing/Sensors

Where we left off:

Before we left for break, we were able to create a device that could read temperature, humidity, and light, as well as send that data wirelessly through our LoRa module. After we gave our presentation in front of faculty, we were left to think about the future of our project and the parts we still need to implement which include: power management (solar power), testing the light sensor sensitivity, increasing LoRa range, custom PCB creation, and casing for the device.

Bi-Weekly Summary:

Advisor Meeting:

Our team met with both of our Advisors, Dr. Lu and Dr. Huang, to discuss the next steps in forwarding our progress. Ideas discussed included implementing a temperature-only sensor for added simplicity and size, as our temperature sensor also measures Humidity, using a mini Arduino for smaller size, and testing our device in Dr. Lu's lab.

Research parts:

We wanted to put together a parts list to order for the semester, so we researched some parts that we think we will need to implement into our project. The following are parts that we have looked into and will need to implement into our device.

1. Voltage regulator: 5V 1.5A Linear Voltage Regulator 7805 TO – 220. 7~35V down to 5V with 2% regulation, up to 1.5A current capability. 2V linear drop-out, must give it at least 7V to get a clean 5V.

2. New temperature sensor: After double check with Dr. Lu we found that the humidity sensor is unnecessary for our design, so we need some new temperature sensors. TMP36, Low voltage operation (2.7 V to 5.5 V) Calibrated directly in °C 10 mV/°C scale factor ±2°C accuracy over temperature (typ) ±0.5°C linearity (typ) Stable with large capacitive load.

Laboratory Requirements:

We will meet with Dr. Lu's students in the upcoming week to do more precise test for the light sensors in a biolab. We need to test the light emitted by the bacteria. Since the light emitted by the bacteria is extremely small, so we may need to calibrate our results to meet the final requirements.

Pending Issues:

Most of the pending issues from before break have not been dealt with yet. These issues include power management on our device, increasing our LoRa range, testing our light sensors, and designing a casing for our device.

Team Contributions

Team Member	Contribution	Hours this Period
Calvin Condo	Device Research, Laboratory Safety Requirements, Weekly Report, Parts List	17

Chuxin Chen	Device Research, Lab Safety Requirements, Weekly Report	14
Qin Xia	Device Research, Lab Safety Requirements, Weekly Report	14
Yuchen Zhao	Device Research, Lab Safety Requirements, Weekly Report	14
Lun Zhang	Voltage Regulator Research, Lab Safety Requirements, Weekly Report	14
Luke Healy	Temperature Sensor Research, Lab Safety Requirements, Weekly Report	14