EE / CprE / SE 491 – sddec19-19
Printed Miniature Nutrient Sensors
Weekly 4 Report

2/25/19 - 3/1/19
Client : Dr. Liang Dong
Advisor : Dr. Liang Dong

Team Members

Jonathan Hugen
Samuel Keely
Jeremy-Min-Yih Chee
Clayton Flynn
Ritika Chakravarty

Weekly Advisor Meeting 2/28/19

This week we learned more about the factors involved in placing the sensors in the field and how they are mapped. We also learnt about the type of sensor we will be using and how they will be planted in the field. The Arduino and its relevance to the project was discussed in detail. Methods of interpreting the data (a nitrate- voltage calibration chart) and their accuracy, along with the power requirement per unit (sensor-Arduino unit) were also discussed.

Weekly Group Meeting 2/27/19

This week we discussed possible designs for a final product of the system to better understand the needs of the smaller subsystems. We incorporated a little design thinking into our discussion to understand what our systems components needed to accomplish in order to be expandable. We discussed how a system might be deployed in a field and how a field might be split into a coordinate system to better manage data retrieved by the sensor. We imagined what a network of sensors might be able to accomplish. We also considered the possibilities of gps being used to accurately acquire a sensors position. We discussed what components we would need to be able to deploy such a system.

Past Week Accomplishments

Jonathan Hugen:
- Attended the weekly meetings and got some basic design constraints from Dr. Dong
- Researched bonding methods for polymers
- Developed possible long term deployment strategies for sensor system

Samuel Keely:
- Attended the weekly meetings and discussed some basic design constraints.
- Discussed network requirements
- Discussed App capabilities

Jeremy-Min-Yih Chee:
- Attends weekly meetings to discuss and compile questions for Dr Dong, in order to get a detailed overview of the project.
- Discussed App limitations

Clayton Flynn:
- Attended weekly meetings
- Discussed possibilities for self calibration of sensor.

Ritika Chakravarty:

- Attended weekly meetings.
- Discussed and compiled a list of questions to ask Dr. Dong during our weekly meetings.

Pending Issues

This week, we had most of our issues resolved. We are still waiting to see the sensor deployed on plants located in a greenhouse North of ISU campus. As of now, the group has a good basis for research for the next week and should keep us relatively busy. This is the first time since the beginning of our project that we actually have a good idea of where to start and what to research.

Individual Contributions

Member	Projects	Hours	Total Hours
Jonathan Hugen	- Attended meetings - Discussed questions to ask Dr. Dong regarding sensor placement - Research on ultrasonic bonding - Research Arduino to LoRaWAN connection	2	8
Samuel Keely	- Attended meetings - Research Php - Research Sql - Discussed questions to ask Dr. Dong regarding App capabilities	2	8
Jeremy-Min-Yih Chee	- Attended meetings - Research Php - Research Sql - Learned python	3	9
Clayton Flynn	- Attended meetings - Discussed questions to ask Dr. Dong - Research Arduino to LoRaWAN connection	2	8
Ritika Chakravarty	- Attended meetings. -Compiled questions for advisor meeting. - Maintain communication between our group and Dr. Dong regarding sensor requirements - Research Arduino to LoRaWAN connection	3	9

Plans For Upcoming Week

Jonathan Hugen

- Research Arduino ADC and external clock.
- Research LoRaWAN.
- Research Arduino to LoRaWAN connection.

Samuel Keely

- Research php

- Research sql

Jeremy-Min-Yih Chee
- Discussed the possibility and optimization of data transmission from the sensors to the app.
- Continue python lesson.

Clayton Flynn
- Research Arduino ADC and external clock.
- Research LoRaWAN.

Ritika Chakravarty
- Research Arduino to LoRaWAN connection.
- Discuss the possible methods of optimizing the sensor with Dr. Dong.
- Research LoRaWAN.

Future Plans

Our group would like to have a few Arduino's and a LoRaWAN transmitter to be able to start getting familiar with the technology and feasibility of using it in conjunction with a cell phone for transmitting data from the field. The arduino has the ability to be turned on and off by use of an external clock. We would like to look into the possibility of incorporating this into the project. The power consumption is currently about 1 watt for the entire system and we would also like to add LoRaWAN for transmitting over long distances. We would rather have some time in the lab with this device to see if we can make it work versus reading data sheets and having no true knowledge of its actual useability.