EE / CprE / SE 491 – sddec19-19
Printed Miniature Nutrient Sensors
Weekly 5 Report

4/8/19 - 4/12/19
Client : Dr. Liang Dong
Faculty Advisor : Dr. Liang Dong

Team Members

Jonathan Hugen - Manufacturing and Testing
Samuel Keely - Software and App Development
Jeremy-Min-Yih Chee - Software and App Development
Clayton Flynn - Manufacturing and Testing
Ritika Chakravarty - Circuit Design

Weekly Advisor Meeting 3/14/19

Due to Dr. Dong's busy schedule, the weekly advisor meeting was canceled this week.

Weekly Group Meeting 3/13/19

This week in our meeting we changed our regular meeting time and place and met in the 491 classroom. We each discussed our progress in our individual projects and asked for advice and help on some issues regarding sensor box troubleshooting. We also discussed what we needed to know from Dr. Dong to continue making progress on our individual projects. We noticed some communication errors between the graduate students and Dr. Dong and we considered a few of the options we had to eliminate the confusion. We talked about how to write emails and who to address problems to and also who to include in the emails. Our group decided that it would be beneficial to have the instructions we are given to be put in writing and able to be viewed by all the relevant parties.

Past Week Accomplishments

Jonathan Hugen:
- Met with Yun cong who is my advising TA
    - Discussed ISM safety and talked about waste mitigation
    - Learned how to handle the solvents associated with the project
    - Discussed what type of problems are associated with each sensor iteration
    - Learned how to operate and program the micro-fluid dispenser
    - Got detailed explanations of problems associated with micro-fluid dispensing process
    - Started working with old prototypes to learn more about the current manufacturing problems.

Samuel Keely:
- Enumerated proposed features for the application
- Began designing interfaces for application
- Started work on database design and information storage requirements

Jeremy-Min-Yih Chee:
- Continue working on debugging the bluetooth aspect of the app.
- Research on the possibility of changing the server's source code to PHP.
- Continue looking through and understanding the source code for both the microcontroller and server.

Clayton Flynn:
- Attended weekly meetings
- Worked on Design Project
- Met with graduate student Yuncung
- Practiced depositing the ISM in the copper electrodes
- Practice working with the solvent evaporating

Ritika Chakravarty:
- Attended weekly team meeting.
- Analyzed the correlation between minute voltage changes and abrupt changes in data sets.

Pending Issues

We are still waiting to gain access to the greenhouses North of the ISU campus. Our sensors will be tested in the greenhouse. Email communication from now on must be more structured and thought out to include all the relevant parties when discussing a problem, or discussing project details. We are starting to accumulate some communication errors that drastically affect the responsibilities expected of us. We are getting two sets of conflicting information from the grad students and Dr. Dong and we need a system to eliminate confusion.

Individual Contributions

Member	Projects	Hours	Total Hours
Jonathan Hugen	- Met with grad students for more project details - Practiced dispensing fluid on silicon wafer sensors - Practiced dispensing fluid on PCB sensors - Learned calibration methods for dispensing machine - Learned how to scale and rotate programs - Learned some simple problem troubleshooting for dispensing robot	4	18
Samuel Keely	- Set up database through ETG - Discussed questions to ask Dr. Dong	2	10
Jeremy-Min-Yih Chee	- Attended weekly team meetings. - Understand the software source code. - Research on different API to improve bluetooth connection.	2	18

Clayton Flynn	- Attended weekly meetings - Met with graduate student Yuncung - Practiced depositing the ISM in the copper electrodes - Practice working with the solvent evaporating	2	16
Ritika Chakravarty	- Attended weekly team meeting. - Studied the schematic for the circuit box. - Analyzed the data recovery process between the app and the sensor.	1	18

Plans For Upcoming Week

Jonathan Hugen
- Schedule times to meat with TA to start writing programs for micro-fluid dispensing machine
    - Read through instruction and setup manual
    - Practice scaling and rotation calibration and more simple programming
- Research printing materials and properties
    - UV stability
    - Heat Sensitive
    - Bonding strength
    - Nitrogen permeability
    - Mechanical/ thermal stability
- Get training on how to prepare batches of ISM
    - Get trained on how to measure viscosity using rotary viscometer
    - Get training on how to handle THF solvent
    - Get training on how to adjust viscosity

Samuel Keely
- Obtain and break down previous application versions
- Further elaboration of sensor data and storage methods

Jeremy-Min-Yih Chee
- Look through the source code (microcontroller, server, app) provided by the graduate student.
    - Have full understanding of the functionality and interaction between the different source code.
- Request a database from Etg and ensure that it is running.
- Consider the probability of changing the source code of the server to PHP.
- Optimize the provided source code in terms of stability.
- Add an error detection unit when the sensor failed.
- Calibrate the interval where the app will refresh and retrieve the data information from the sensor.

Clayton Flynn
- Look at the fluid dispenser manual to better understand how it operates
- Practice working with the evaporating ISM in the dispenser
- Practice sealing the ISM to the sensor with the bonding glue
- Start testing the printed sensors

Ritika Chakravarty
- Continue researching methods to reduce the discrepancies between voltage fluctuations and accuracy of data.

- Read the schematic of the power output, filter and op-amp circuits to overcome these discrepancies.
-Ask Xinran and Dr.Dong about the same.

Future Plans

We will soon be gaining access to the lab and greenhouse to test our sensors. We will also have to establish a better communication system to eliminate any possibilities of miscommunication between our team, the graduate students and Dr. Dong. Apart from that, we will continue working on our individual goals for next week.