EE/CprE/SE 491 Weekly Status Report 10

Dates: 4/2/18 – 4/6/18

Group #: 5

Project: Micro-Electro-Mechanical Systems (MEMS) Based Sensing System for Soil Conditions Monitoring

Client: Dr. Halil Ceylan

Advisor(s): Shuo Yang and Dr. Yang Zhang

Team Members:

Nathan Coonrod (Report Manager)

Kyle Kehoe (Communications Manager)

Jacob Verheyen (Meeting Facilitator)

David Severson (Web Master)

Sok-Yan Poon (Timeline Manager)

Weekly Summary

Our project team continued work on the two main areas of the project by continuing work in two main groups: hardware and software. On the hardware side of things, a board design was done using Eagle design software that implements both resistance and capacitance measurement circuitry on a single board (instead of having the resistance measurement circuitry on a protoboard and the capacitance measurement circuitry on a separate breadboard). This board design will be ordered as soon as possible. The software group downloaded an RTC library and used the SD library to start writing code to timestamp the data-logging measurements to an SD card.

Past Week Accomplishments

- Kyle: Worked on software development. How to format data to an SD card with timestamp. Researched Arduino interrupts and power saving features.
- Nathan: Helped revise PCB schematic and finalize front end design. Generated BOM and further hardware testing
- Jacob: Troubleshot issue regarding loading effects on our voltage reference for our resistance measurement circuit.
- David: Created schematic from our two measurement circuits and our prototype. Created a complete board layout in eagle.
- Sok-Yan: Working on Arduino code to read resistance measurement and troubleshooting the resistance measurement. Talked to Dr. Tuttle about the recreation of sensor.

Pending Issues

The lead time of the board and parts might prevent us from making much progress in assembling our refined solution. This "refined solution" is a PCB that has resistance and capacitance measurement capabilities on one board instead of having both capabilities on separate protoboards like we have been using for our prototype.

Individual Contributions

Name	Contribution	Hours This Week	Hours Cumulative
Kyle	Worked on software development. Formatting data to an SD card with timestamp.	4	38
Nathan	PCB Schematic revision, BOM generation, Analog front end design	3	36
Jacob	Troubleshot issue regarding loading effects on our voltage reference for our resistance measurement circuit.	3	34
David	Completed schematic and board layout for first version of our DAQ module.	5	40
Sok-Yan	Working on arduino code to read resistance measurement and troubleshooting the resistance measurement. Talked to Dr. Tuttle about the recreation of sensor.	3	37

Plan for Coming Week (4/9/18 - 4/13/18)

Place the order for our printed circuit board that combines capacitance and resistance measurement capabilities as soon as possible, so we can begin assembly on our more refined solution as soon as possible. On our prototype circuitry that we currently have, conduct multiple test cases for both the resistance measurement and capacitance measurement circuitry to test and quantify accuracy of the measurements.