EE/CprE/SE 491 WEEKLY REPORT 8

Nov 7th 2018 - Nov 14th 2018

Group number: 45
Project title: IoT environmental monitor
Client &/Advisor: Dr. Geiger

Team Members/Role:
Tyler Fritz – Software Developer,
Dong Xing – Hardware developer,
Ahmed Abuhjar – Hardware Developer,
Haoyue Ma – Hardware developer,
Yuanzhe Wang – Hardware Developer

- **Weekly Summary**

This week our team almost finished testing the data transmission work between leaf nodes to home node, and the home node to web server steps. Even though there are still some small bugs, but we can improve and fix them in next few weeks. We also finished the code and the circuit for data transmitting from 3G cellular to the web server. When the SIM card arrive, we can test the code and the circuit.

- **Past week accomplishments**

Tyler Fritz: Worked on getting dynamically sized messages to be sent by the nodes. Boy, do I wish I were working in Java! I'm quite confused about how inheritance works in c++ but I'm getting there.

Ahmed Abuhjar:

- Implemented the sensor node code to reduce the data transmission load. (2 bits of data instead of 10):
  Once we got the digital 10-bit value for the sensor data from the ADC, the range between the max and min values is splitted in 4 sub-ranges which can be represented in 2 bits instead of 10 bits of data.
- For testing purposes, right now the code gives 4 equal ranges for each state.
- Successfully confirmed that the output being transmitted is of a 2 bit wide data (0,1,2,3)

Dong Xing:

- Edited and compiled the code for data that transmit from 3G cellular to the web server. Built up the circuit for testing the 3G cellular.
- Tested the Arduino board performances by using arduino program.

Haoyue Ma:

- Worked on and compiled the code for data transmitting from 3G cellular to the web server. Ordered the SIM card. Built up the circuit for testing the 3G cellular.

Yuanzhe Wang:

- Developed and debugged the code to test the 3G internet connection.
- Tried to set up and collected data from the sensor.

- **Pending issues**
  - We are still waiting for our SIM card. We can only compile the code to make sure that there is no error in the code. We can't test whether the code works without a SIM card.
  -

- **Individual contributions**

NAME	Individual Contributions	Hours this week	HOURS cumulative
Tyler Fritz	Worked on sending and recieving dynamically sized messages.	6	48
Ahmed Abuhjar	Implemented the sensor node code to reduce the data transmission load.	5	44
Haoyue Ma	Worked on and compiled the code for data transmitting from 3G cellular to the web server. Built up the circuit for testing the 3G cellular.	6	39
Dong Xing	Tested both web server code and 3G cellular performances for preparing the SIM card work..	7	38
Yuanzhe Wang	Developed and debugged the code to test the 3G cellular connection.	4	34

o **Plans for the upcoming week** *(Please describe duties for the upcoming week for each member. What is(are) the task(s)?, Who will contribute to it? Be as concise as possible.)*

- **Tyler Fritz:** Get all message types and corresponding methods working. This will mean that we can fully record and send data all the way through the network. Once this is complete we can start field testing!!!

- **Ahmed Abuhjar:** Calibration and determine what range of resistance values should correspond to each state:
  - Will need to make another soil moisture sensor for calibration
  - Will measure the ADC value when the sensor is dry in the air, and the ADC value when the sensor is completely moist (put in water). The in between values represent the 4 states or the levels of the water contents.

- **Haoyue Ma:** When the SIM card arrive, we can start to test the code for transmitting data from 3G cellular to the web server. Connect our 3G Cellular(MKR GSM 1400) to the home node and test whether code works that data can transmit from home node to web server through 3G cellular.

- **Dong Xing:** Plan to start testing the web server work after receiving the SIM card, and once we make sure the web server works, our team may just start testing the whole project together.

- **Yuanzhe:** Ready to test the 3G connection after receiving the Sim card. Help my teammates to set up sensor and collect the data.

o **Summary of weekly advisor meeting**

The meeting this week was informative. The majority of the discussion was about some potential issues that could be caused during the transmission and receiving of the signals between the radio transceivers. The possibility of collision between the transmitted signal could cause the signal characteristic to change, and so it's important to have some sort of strategy to prevent the collision from happening. One way to resolve this issue, as our advisor suggested, is by transmitting and receiving on multiple frequencies. We will be looking into ways for us to implement this in our solution. We also discussed how to best calibrate the moisture sensors to get the lowest and the maximum level of the output that we can get from it. To get the lowest level, we decided to put the sensor in a soil, which was mixed with a specified percentage of water and left sat for one day. Dipping the sensor into the water to get the lowest resistance is not practical and could get the gypsum structure chemically changed, and so we decided to use the moist soil approach to get the lowest level for the sensor.