
EE/CprE/SE 491 WEEKLY REPORT 04

March 25

April 7

Group number: 07

Project title: Temperature sensors for veterans

Client &/Advisor: BAE / Dr. Gaffar

Team Members/Role:

1. ***Jared Cox / hardware***
2. ***Caleb Arnold / hardware***
3. ***Max Berthold/ hardware***
4. ***Michael McDonough / hardware***
5. ***George Makhali / software***
6. ***Bridget Schmitt / software***
7. ***Jamie Anderson / software***
8. ***Jamie Anderson / software***

- **Weekly Summary**

As a group this last week, the software has been working on the Bluetooth capabilities and planning the final steps of developing the software. We worked on making sure that the user is properly notified, and usability is clear. We created a popup to show that the user of the application has skin temperature that is out of the set range and dangerous. We also made the application produce a notification that makes the phone vibrate and ping. We also worked on making sure that the application would work after a long time.

These past two weeks on the hardware side we have worked on the following: implementation and testing of the battery charging circuit, implementation and testing of the RF module, implementation and testing of the Arduino Bluetooth programming, implementation and testing of the on-board low battery life indication, finalizing the circuit diagram in order to manufacture PCB, and researching possible device enclosures.

- **Past week accomplishments** *(Please describe/summarize as to what was done, by whom, when and, collectively as a group. This should be about a paragraph or two in length. Bulleted points are acceptable as well. Please keep only your technical details*

related to your project. Figures, schematics, flow diagrams, pseudocode, and project related results are acceptable, but please ensure that they are legible (clear enough to read) and to provide an explanation. If researching a topic, please add a few details about what was learned and how it is relevant to the project. If two or more people worked on a single task, be sure to distinguish how each member contributed to the task. Specific details relating to the assistance provided to other members may be included here. ***Do not include classwork, such as individual reflection assignments, and group meetings as part of your duties.)***

- 1: Michael: I have spent the last two weeks working on implementing and testing the RF module and battery charging circuit with Max and Caleb. Both components have been integrated with the device, but in testing we have not obtained the desired results up to this point. We have troubleshooted these issues thoroughly, but we are still unable to determine the root causes. I have communicated these issues with the Client to retain transparency in our current progress and will continue troubleshooting these issues this weekend and early next week before any decisions are made on scope exclusions. In addition, I have worked on the implementation and testing of the on-board low battery level indication for users. I have been researching different designs and believe using a NPN transistor that has a gate voltage relative to 30% of our device's battery life is a viable solution. I am working on implementing and testing this design this weekend.
- 2: Caleb: I have spent most of the last two weeks with Michael and Max on combining our hardware systems and testing functionality. This included finalizing the temperature sensor calibration as well as adding the external power and radio frequency modules to the circuit. We have confirmed functionality of the push-button power and temperature sensing, but are still working on troubleshooting the LoRa RF connection.
- 3: Max: The last two weeks, I worked with Mike and Caleb on fully implementing the RF modules and the battery charging circuit. We have most of the components working together, but we are now experiencing issues with putting the RF module code into the final code.
- 4: Jared: I along with the software team have been working on the Android Studio Code for BLE. The java code has been implemented and tested to find that the app does now connect with the nano. Since then, the code is currently being worked into our app and being formatted to send receive the appropriate data and have it displayed in our app.
- 5: George: with a great help from Jared, we changed the bluetooth code on the android studio side because the old one wasn't connecting to the bluetooth module, now the code is integrated into the project and waiting on further testing.
- 6: Bridget: The last two weeks I have created a popup within the application to warn the user that their body temperature is out of the set range. I also created a phone notification that will show in the banner bar and produce a vibration with a noise if the user has their phone allow that. I worked to find a few bugs that were not allowing the app to open all of the pages. I also worked on labeling all parts of sensor screen to make sure that the user knows what they are looking at. I also increased the size of the warnings to make sure that the user does not miss the notification.
- 7. Jamie: I've been adjusting my schedule from code-focused to documentation-focused. I did some minor routing changes to the app (instructors go to a different page upon login than students) and added some last-minute adjustments. Other than that, most of

my time has been on compiling my documents of what I've done into a document for future reference.

- **Pending issues** *(If applicable: Were there any unexpected complications? Please elaborate.)*
  - 1: Michael: We need to determine the root issue with the LoRa modules not communicating and the battery charging circuit not working as intended. Currently for the battery charging circuit, the on-board voltage regulator has proven to be working which means the module is working to some degree, but the batteries are still not charging. At first, I believed the USB charger when plugged into a computer was not being recognized as a charging device and instead a data transfer device, so I plugged the charger into a wall socket to test this theory, but still no results. My next assumption is that, for some reason, the battery holders are not allowing current flow into the batteries. I am currently stumped beyond these ideas. As for the LoRa module, we have troubleshooted the transmitter's ability to send correct commands across the network which it has proven to be doing. We have troubleshooted to make sure both modules are configured correctly, which they are. We have troubleshooted to make sure that the receiver is checking to see if commands are available on the network, which it is, yet we can not determine why the receiver is not obtaining the commands and taking the respective actions. We originally achieved communication when using very basic programming to just send strings of text which would correlate to the format of the temperature data being sent, and it worked, but when using temperature data in the form of strings, the data is not being received. We ordered and will receive new LoRa modules on Monday to see if there may have some how been an issue caused to the LoRa module that was used in Max's Arduino when it was shorted and hope that using a new, configured module will solve the issue.
  - 2: Caleb: We need to find out why our LoRa modules aren't communicating. They seem to be functioning on individual devices, but they aren't linking with each other. We also need to review the charging system for our batteries to ensure functionality.
  - 3: Max: The LoRa RF modules not properly communicating is the main issue that I ran into myself. I had them working and communicating when that was the only component I was testing, and I added the same code to the final code, but it is not working for some reason. In addition, we need to further troubleshoot the battery charging circuit.e
  - 4. Jared: BLE is connected, sending data from our app to android hasn't been fully tested.
  - 5: George: we are trying to use the code we have but at some point it crashes, we are still trying to figure out what is causing this problem.
  - 6: Bridget: Currently the settings page will not open and I am not sure why. Earlier, the application crashed because it was overworked, but I believe we fixed that. We need to test more to make sure that this was fixed. Additionally, later the application crashed again at the sensor page but it appeared to be because of Bluetooth additions. We need to look further into this issue.
  - 7. Jamie: My organization style seems to have changed over the semester, so documents I wrote are in different places than I expect. The bluetooth module is currently unfit for the app, so that needs looking into.

- **Individual contributions** *(Creating this section is optional, but it is **Required to include the "Hours Worked for the Week" and their "Total Cumulative Hours" for the project for each member somewhere relevant in your report. Your individual weekly hours should be at a minimum of 6-8 hours for this course. So please manage your time well. Also, ensure that individual contributions support your claim to the weekly hours. Be honest with the reports.**)*

NAME	Individual Contributions *(Quick list of contributions. This should be short.)*	Hours this week	HOURS cumulative
Max	RF module research	6	56
Caleb	Hardware systems integration.	6	54
George	Bluetooth connection on the android side	6	46
Bridget	Popup and notification addition to application	10	52
Jared	BLE Hardware/Software	10	62
Jamie	Compiling documents, routing changes	5	51
Michael	Power optimization and control	30	78

- **Comments and extended discussion** *(Optional)*
  Feel free to discuss non-technical issues related to your project.

We are not sure how to write this document without personal pronouns. Some of our hardware has been shorted out so we were a bit behind on some of the hardware.

- **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.)*
  - 1: Michael: This weekend and upcoming week I will continue troubleshooting the issues with the battery charging circuit and LoRa module. I will also continue implementation and testing of the on-board, low battery life indication. With extra time, I will shift towards working on integrating the Bluetooth Arduino code with the existing code being used for temperature data measurement, RF communication, and alerting to ensure compatibility. Once completed, the final program will be uploaded to the Arduino and tested.
  - 2: Caleb: Helping troubleshoot battery charging and LoRa module communication, finalizing PCB design once functionality in current circuit is confirmed
  - 3: Max: I plan to continue working with Mike and Caleb on troubleshooting the RF modules and the battery charging circuit. In addition, I plan to research enclosures for the hardware both premade and 3D printed.
  - 4. Jared: finish integrating the BLE Java code into the application. Test data transfer between app and nano.
  - 5. George: fixing the crash issue and complete the testing.
  - 6. Bridget: For the next few weeks, I plan on trying to fix the settings page and add all capabilities. I also need to make sure that the sensor page istnot crashing. Additionally, I plan to work on setting the flags to give the user and instructor different capabilities.
  - 7. Jamie: Help Bridget where possible on front-end; continue testing; finish compiling

documents and finish write-ups.

- **Summary of weekly advisor meeting** (*If applicable/optional)*
  (Provide a concise summary on the contents and progress made during the advisor meeting.)

  Our advisor continues to advise that we make sure to document absolutely everything that we are doing, especially all the testing that we are doing on various parts of the device. We were also advised to be aware of poster and project presentation

Grading criteria

Each weekly report is worth 10 points. Scores will be awarded as follows:

- **8 – 10**: Progress for your project seems to be suitable. Documentation and hours reported by team members are adequate.
- **6 – 8**: There is scope of improvement both in your report and your project progress. Can consult with instructor/TA after class for further inputs.
- **< 6**: Please talk to instructors/TA after class hours about any difficulties that you/your team is facing.

Each weekly report should be unique in that they have a unique set of supporting details for your contributions. So please do not just copy your reports from the previous week. In addition, please avoid any personal pronouns (he, she, I, you). Try to keep your reports as neat as possible.