sddec18-17: IoT Remote Monitoring Mobile App for Commercial Appliances
Week 6 Report
March 10 - March 23

Team Members

John Fleiner — *Android Development Lead*
Ben Young — *iOS Application Lead*
Thomas Stackhouse — *Backend Lead*
Hongyi Bian — *Hardware Test*
Yunabo Zheng — *Meeting Facilitator*
Casey Gehling — *Meeting Scribe / Backend developer*

Client

Greiner Jennings Holdings
Taylor Greiner
Connor Jennings

Faculty Adviser

Goce Trajcevski

Summary of Progress this Report

In order to create the most fluid process for reserving a set of washing machines and dryers, the development team spent Spring Break working on a complete redesign of the application. The team felt that the process could be reduced to fewer screens and the information could be presented in a cleaner format. Our new design incorporates the use of google maps which allows us to utilize customer locations, import openstreetmap data, and develop routing capabilities for users. Last week, the hardware team was able to complete their LED test by turning an LED on/off using their relay system. Since the relay system is able to send control messages to an electrical end, the next step was to swap out the LED. The team changed the DC LED to an AC home lamp powered by a 110V AC home supply. Since the hardware team is using AWS IoT as part of their relay system, the backend team must interface AWS and Spring Boot. To do so, AWS deployment was researched, although the actual deployment has yet to happen yet. We are being slower than normal with this deployment because we do not want to do it incorrectly and possibly waste our client's money. We also evaluated the benefits of using Docker to more closely model the production ecosystem on our local machines for development, however it was decided that this would increase overhead more than it would be a benefit. Therefore, we will not be using Docker.

Pending Issues

Status report five listed several pending issues including: obtaining a washing machine controller, obtaining and storing a full-sized washing machine, and obtaining a portable washing machine. These pending issues have not yet been resolved. Rather, the week was spent aligning individual contributions from Spring Break with group interfacing goals.

The current pending issues are as follows:

Washing Machine Components
Our clients have informed us that we will be receiving washing machine components for the Fisher & Paykel GWL 15 Full-Sized Washing Machine. We are expecting to obtain the components during the next reporting

period.

Portable Washing Machine
Our clients have informed us that we will be receiving a Best Choice Products SKY2767 Portable Washer in replacement of a full-sized washing machine that can't be stored with us on campus. We are expecting to obtain the portable washing machine during the next reporting period.

Plans for Upcoming Reporting Period

Front-End
Next week marks the start of Lightning Talks #3. Our team would like to demo both the mobile application and the raspberry pi's ability to control a light source. In order to demo the mobile application, we would like for both apps to adhere to the same user interface design. To do so, the android application will begin modifying its UI design to match that of the iOS application. It can be expected that next week, the two applications will begin to look and feel like one.

Back-End
We will be focussing on research for deployment on to AWS, as well as finishing up the back end so that it is able to better meet the needs of the front end. We would like to be able to have a solid plan for backend deployment AWS by the next report.

Hardware
The hardware team will be writing and running a bash script on the raspberry pi to automatically send the team an email with its dynamically assigned IP address so that the raspberry pi can be used on the Iowa State University campus network.

Summary of Weekly Adviser Summary

As the due date for version 2 of the project plan approaches, our advisor asked that we write-up a hypothetical test plan for testing the raspberry pi - washing machine components.Our advisor also mentioned that his SE 492 *Smart Laundry* team was able to successfully identify whether a washing machine is in the washing cycle or spinning cycle. From that information, they were able to provide customers with an expected wash and spin duration. He asked that we reach out to the SE 492 team to discuss their method of implementation to see if it is possible to apply it to a portable washing machine.

The second part of our meeting focused on the user interface design of the mobile application as the mobile team wanted feedback regarding their design. A brief demo was provided along with supplemental images of prior designs outlined in our project plan.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
John Fleiner	To provide our clients with more prototype ideas for the mobile application, we decided to develop a second possible method for reserving appliances. The new prototype entails a simplified method of reserving appliances that uses two screens: map,	10	76

	reserve. Maps Activity (Screen): The maps activity utilizes the Google Maps SDK to provide the user with a similar user interface to Google Maps. From the maps activity, the user may search for a laundromat location using either their current location or from a known street address. The closest laundromat will then be selected. Once selected, the screen transitions to a reservation page. Reservation Activity (Screen): The reservation activity is a simplified version of our past design. Instead of asking the users to select from a list of appliances and then select a day and time, we now use a "search" based feature similar to that of hotels.com. Users are taken to a screen where they must enter a reservation time frame (from x to y), a date, the number of washing machines needed, and the number of drying machines needed. Once they submit this information, we query for the best result and return that information to the user for confirmation.		
Ben Young	During the week of spring break I worked on redesigning the look of the application. The android and iOS teams decided that we wanted to go with a a design that incorporates google maps. Tod do this i imported the cocoa pods provided by google to have a mapView, add markers to the map view and get the location of the user. I also changed the project file and code layout to conform to the MVC design pattern. I did this because this is how apple suggest structuring a iOS project and it makes it easier to expand and lowers the amount of duplicate code that is in the project. I was also about to connect to the database through the APIs that the backend team has provided for us. Aftering confirming that I was able to send and receive information from the server I implemented the login and register systems. Right now I check for a username and password match locally in the application but in the future this will be changed for security reasons and be done on the server.	13	55
Thomas Stackhouse	This week I started looking into deployment options with Spring Boot and AWS, as well as	8	52

	evaluated Docker for local development. I decided that using Docker would be too much overhead for the benefits, therefore it was not introduced into our development ecosystem.		
Hongyi Bian	This week was about to get the actual 110V home supply control working. Since we have finished a LED test from last week, we proved that our relay system works in in terms of sending control messages to the electrical ends. So that we carefully changed our DC LED to an AC home lamp which empowered by 110V AC home supply. After several tests, we were able to send exactly the same control message to light up a lamp in house. At this stage of our development, the lamp is only for testing our relay system. Later on when the wash machine components are ready in use, we will perform a AWS message control over the actual wash machine.	10	43
Yunabo Zheng	Last week, we've built a test panel which enable to control a LED light by using AWS cloud to turn it on/off. Then we need to use that technology to control a home lamp with the 110V home supply. We decide to use a relay system as an electronic switch to turn on/off our home lamb. After we can get it work by using AWS cloud with 110V home supply. It means our relay system also works. That is a crucial part since we try to use the lamb as our washing machine and what we've done is to turn on/off the lamb as we turn on/off a washing machine remotely by a relay system. If we get a washing machine component, we could send some messages through the AWS cloud and turn it on/off remotely.	10	47
Casey Gehling	While I was out of town for the entirety of spring break, I made some decent progress the following week. First, I edited both the external database as well as the embedded to allow us to more realistically simulate our application. This included foreign key adjustments, a couple of format changes, as well as adding addresses to each laundromat and a size to each appliance. From there, I	9	46

	was able to write a query to retrieve available machines during a specific time period at a particular laundromat. This took a few additions to our backend; first I had to get all of the appliances available at said laundromat, separated by size. After that, I had to retrieve all reservations at that laundromat during a specific time period. Next, I compared the lists, and determined if the results met the requested number of machines (of each type), and returned the results if they were sufficient. I ran some manual tests being that there is a decent amount of dataflow, however, we may need to make the operation more efficient in the future, so I didn't formally write any tests yet.		