

## **sddec18-17: IoT Remote Monitoring Mobile App for Commercial Appliances**

Week 4 Report

February 18 - February 27

### **Team Members**

John Fleiner — *Mobile Application Development Lead*

Ben Young — *iOS Development Lead*

Thomas Stackhouse — *Backend Lead*

Hongyi Bian — *Hardware Test*

Yuanbo Zheng — *Meeting Facilitator*

Casey Gehling — *Scribe / Backend Developer*

### **Client**

*Greiner Jennings Holdings*

Taylor Greiner

Connor Jennings

### **Faculty Adviser**

Goce Trajcevski

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### **Summary of Progress this Report**

During the last week, several team decisions were made involving team roles and expectations. A new set of roles were created for the team including: iOS Team Lead and Android Team Lead. Ben Young has taken over as the iOS Team Lead and John Fleiner has stepped into the position of Android Team Lead. Hongyi Bian is now the Hardware Team Lead. The decisions were made according to interest and expertise and our team feels that these new roles will best help our team deliver a successful product. In addition to the role changes, the backend team requested access to an external database hosted by Iowa State University. The external database allows for real-time data access, but requires a lengthy addition to the mobile development phase. To connect to an external database, both iOS and Android will need to implement different frameworks/libraries. It can be expected that adding the Volley HTTP library to android will take approximately two weeks. Similarly, it can be expected that implementing a PHP Restful API Framework will also take approximately two weeks. The mobile teams will begin working on the database integration over the next two progress reports. The Android application has seen significant improvement over the last week and includes screens that allow users to login, allow users to select among a list of locations which expands to a list of appliances at the selected location, the ability to view appliance information, reservation price, and a calendar to select a date for reserving an appliance. The hardware team installed the raspberry pi operating system and relevant libraries so that communication between the single-board computer and IoT may begin development. With our new external database, the backend team began creating MySQL tables to house user data, laundromat data, and appliance information.

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### **Pending Issues**

Last week, several pending issues were listed including: iOS merge conflicts, obtaining hardware, and washing machine storage. The iOS team decided to void the storyboard and programmatically build the user interface. By doing so, main.storyboard conflicts are mitigated. As of Wednesday, our team has received a raspberry pi single-board computer from our clients so that we may begin looking at IoT and hardware interfacing. Current pending issues include: Washing Machine Control Board and Washing Machine Storage.

### Washing Machine Control Board

Since we have received a raspberry pi single-board computer from our clients, the next step is to obtain a washing machine control board so that we can interface and communicate between the two hardware components. During our next client meeting, the discussion topic will need to focus on formulating a decision for purchasing the washing machine controller.

### Washing Machine Storage

Similar to the washing machine control board, it will be required that progress is made during the next client meeting on figuring out where to house a washing machine on campus and who to reach out to so that permission can be granted to do so.

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## Plans for Upcoming Reporting Period

### Mobile Application:

As we approach the end of February, our team would like to deliver a phase 1 prototype of the iOS and Android mobile application. The idea of having a phase 1 deliverable is to provide our client and advisor with a general idea of how a user may interact with our mobile hosted reservation system. By doing so, our team can collect feedback early on to improve, revise, or redesign how the mobile application feels from a user design experience. During the upcoming reporting period, the iOS team and Android team will prepare the mobile application for a phase 1 demo. Tasks include finalizing the core functionality of the application and cleaning up any major usability issues so that the early stage application prototype may be properly tested by our client and advisor.

### Server:

As of Wednesday, February 21st, our team received an external database server hosted by Iowa State University. Previously, our team was using a localized Spring Boot server. The backend team will work on porting over data from Spring Boot to [ssdb.ece.iastate.edu](https://ssdb.ece.iastate.edu).

### Mobile Server Integration

Since our team has switched to an external database, the mobile applications will need to move away from an internal sqlite database. To connect to an external database, Android will need to implement the Volley HTTP library. Volley is an HTTP library that allows the transmitting of network data to an android application. More information can be found at:

<https://developer.android.com/training/volley/index.html>

<https://github.com/google/volley>

iOS is a bit more complex since there is no Apple supported HTTP library. Therefore, a PHP Restful API framework will more than likely be required. Research will be conducted for determining the most ideal option moving forward.

### Hardware

Now that we have received a raspberry pi from our client and have installed the raspberry pi operating system and its required libraries, the hardware team will begin looking at how to build communication between a washing machine control board and the single board computer.

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## Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
John Fleiner	<p>This week, I continued to make development progress on the Android application. Login Activity (Screen): Last week I developed a basic login screen. To login, an email address and password is required. This week, I added username and password validation checks. If no email is entered, a “field required” message is displayed. If an email address doesn’t follow email syntax, then an “email address invalid” message is displayed. If the password is not of the required length, a “password too short” message id displayed. If an email or password doesn’t match an existing user, then a warning message id displayed. If valid credentials are entered, the location activity is displayed. Location Activity (Screen): The location activity uses an expanding list to display each laundromat location. If a laundromat is selected, the list expands to display the washing machines and dryers available for that location. If an appliance is selected, the appliance activity is displayed. Appliance Activity (Screen): The appliance activity displays information about the appliance including brand name, model number, load size, placement in laundromat, and the price for that machine reservation. If a user clicks “reserve appliance”, the calendar activity is displayed. Calendar Activity (Screen: The idea behind the calendar activity is to view a calendar, select, and then select a time on that day to reserve the appliance. Currently, I added a calendar, but click functionality is still needed.</p>	13	51
Ben Young	<p>This week I continued work on the login part of the iOS application. The main login interface is functional with UITextField for both email and password inputs, UIButton for the login, register and forgot password actions. I started on the backend of the login system to allow a user to actually create an account and login. To do this I will making an API call to a local test server that the backend team of Casey and Thomas have setup for testing purposes. To do this asynchronously</p>	10	34

	<p>the code to perform the api calls will be in the background so when the data is being grabbed from the server the user does not have to wait. This way of implementing the api calls helps achieve some functional requirements such as allowing a responsive interface. Along with making the api calls for a user login action I have also started on the implementation of getting locations from the database and machines at that location and displaying those in a list.</p>		
Thomas Stackhouse	<p>This week, I worked on setting up our development database schema and test data. I created a reservation table in the database, and created test data populated through the month of May that has a Reservation object for most days (except the 31st day in months). I also created a custom query example that allows searching the database for reservations between 2 dates. I also created a path through the service layer and created an API endpoint that allows this to be queried externally. Finally, I worked with the display of the data being returned, and tried to make the dates understandable by humans. By the next report, I want to have created an HttpResponseMessageConverter that will allow more streamlined (and automatic) date formatting, and I want to flesh out the API functionality available for reservations.</p>	7	27
Hongyi Bian	<p>This week, we got the Raspberry Pi single board computer from our client. So the work for this week was to set up the pi and get used to the relevant knowledges. Since the raspberry is pretty new to our hardware develop team, we had to put in some time figuring out how to install operating system as well as install relevant libraries. Also, as for a deeper dig into the hardware study, we had to find the way to construct a communication between the pi and washing machine component. This work will be critical in the future works in order to make our project functional.</p>	5	23
Yuanbo Zheng	<p>This week, we have confirmed the hardware component by using the raspberry pi board. We just got it from our client at Wednesday</p>	5	27

	<p>night. After receiving it and reading the tutorial for the raspberry pi. I know that it was wrote by C or python. Since we were experienced with C, I began to prepare and learn how to use the python to implement the raspberry pi. Beside that, we've start it and try to use the raspi-config to change some settings. I also start to learn how to use the Debian operating system on the hardware so we can connect the microcontroller with our washing machine. I didn't have so much time to do some deeper tests with the raspberry pi since I had two exams on Thursday and Friday and we just got it at Wednesday night.</p>		
Casey Gehling	<p>This week, our mobile development team requested a remote database to facilitate testing between the two mobile platforms. I reached out to ETG and was granted access to a remote database. Then I built out the most basic tables that are fundamental to our application and its primary uses. Next, I set up foreign keys to try and keep the database clean, and entered some test data into the tables. To allow access through the server to the database (from the mobile apps), I started tearing down our h2 database set and tried wiring up our server to the database. I ran into issues when trying to build the application and was unable to figure it out immediatly. I pushed my code base to the remote repo to a new branch, and I plan on sitting down with the backend lead to debug, as spring boot is not the easiest technology to debug. I didn't have as much time this week as it was a busy midterm week.</p>	5	28