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

Week 2 Report
February 3 - February 11

Team Members

John Fleiner — *Mobile Application Development Lead*
Ben Young — *Hardware Lead*
Thomas Stackhouse — *Backend Lead*
Hongyi Bian — *Hardware Test*
Yuanbo 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

The past week marked the beginning of the development phase for our team. The iOS developers began implementing a calendar-based reservation system. The first view displays a list of locations which can be expanded to display available hardware appliances. When a hardware appliance is selected, the user is taken to a calendar view where they may select a day and time to reserve the machine. Currently, data is being written to an internal SQLite database, but will eventually be pushed over to our Spring Boot server. Similarly, the Android developers began implementing a listview similar to the one described above. Listviews are more difficult to implement in Android Studio, but offer more support. Therefore, the iOS listview may require an external library to expanded list functionality. The hardware engineers are currently waiting to receive the necessary hardware components to begin interfacing. They have continued to research our requested microcontroller and single-board computer.

Pending Issues

Before development progress can be made towards interfacing hardware components - a single-board computer, microcontroller, and washing machine control board - they must first be obtained. Similarly, the Internet of Things is currently on-hold until our back-end team receives AWS IoT login information from our client. It is important to note that both of our pending issues were to be expected and will be resolved during our upcoming meeting with the client. At that time, we plan on receiving the hardware components and AWS IoT information.

Plans for Upcoming Reporting Period

Our team will be meeting in-person with our client on Wednesday, February 14th. We have requested to obtain an arduino Yun, a raspberry Pi, and a washing machine control board from our client during the meeting. Under the assumption that our client will have gathered the above hardware, it can be expected that the hardware team applies begins interfacing the microcontroller/single-board computer with the washing machine control board.

To progress towards our anticipated Mobile Development phase 1 delivery schedule, the iOS team will continue further implementation of the calendar-based reservation system. The Android team, which also consists of two of our hardware developers, plans on starting the calendar-based reservation system in Android Studio. Now that the backend server team has delved into Spring Boot, test data will be populated into an embedded (probably H2) development database for the iOS and Android team to pull data from. Our Server-hosted database will be used once the web application has been deployed as a UAT environment.

Summary of Weekly Adviser Meeting

Previously, our Advisor had asked us to clarify the scope of the project with our Client. We were also asked to present our research in regards to technology selection, requirements, and proposed architecture with the client. After meeting with our client, it was decided that Amazon Web Services Internet of Things (AWS IoT) would be selected as our choice for a cloud web service. Our Advisor challenged us with a few questions surrounding the decision to use AWS IoT as opposed to IBM Bluemix IoT or Microsoft Azure. We were also asked to submit an analysis detailing the need for an IoT stack as a 492 team that he advises is in development of a similar project that doesn't require the use of IoT. Since our advisor advises a 492 team that has been working with washing machine appliances, he requested a multi-team collaboration meeting to discuss overlapping similarities between our two projects and to identify what technology may be shared. It is expected that we present our Advisor with a project plan during our next team meeting, so he asked that we present a plan to test each portion of the project: iOS, Android, AWS IoT, Server, Database, Washing Machine Control Board, Arduino Yun, and Raspberry Pi. Prior to the meeting, our team had yet to propose a testing plan. He also requested a gantt chart to be included in the project plan and to be presented on Monday, February 12th. Next week, we have two meetings scheduled with Goce: one to review our project plan, and another to discuss overlapping project requirements with our client and his 492 team. The backend team created a basic Spring Boot REST project to allow for the mobile teams to test API requests. Research is currently being conducted for adding an embedded database to our project.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
John Fleiner	This week marked the beginning of the development stage for the Android and iOS mobile application. It is expected that during the last week of February, our team delivers a prototype calendar-based registration system on the mobile application. I developed an iOS calendar using UICollectionViews. Finger swipe gestures slide calendar months leftwards or rightwards on the screen to display a new month. Each mobile application is given 32 mb of internal storage with a pre-build SQLite Database. I initialized the iOS SQLite Database with a years worth of calendar data: January 2018 - December 2018. Similarly, I am currently writing several	19	26

	Android SQLite initializer classes for the Android team so that they may towards completion of the calendar-based registration system on the Android platform. The remainder of my time has been spent working with our team members on the Project Plan v1. Since our backend team has made significant progress with Spring Boot, I created a basic iOS API call with a test url endpoint.		
Ben Young	For this week I mainly worked on the iOS application. Implemented a UICollectionView controller that lists all the resident halls on the ISU campus as place holders for the time being. In the future the list will be filled with laundromats in the area and how many washers and dryers are free at that location. Along with the list of places that a user with washers and dryers I implemented a collection view with a list that lists the washers and dryers at that laundromat and whether they are reserved or not. All the data that populates these lists is fake, the actual data that will populate the lists will come from the database. I further spent more time working on my sections of the project plan. Along with all this I pushed the base/blank projects for android and iOS to the gitlab provided to our team.	11	18
Thomas Stackhouse	In this week, I mainly focused on starting the server backend. I created a basic Spring Boot REST project that will start allowing the mobile teams to test that REST API requests are working correctly, and I pushed it to the team's gitlab repository. I also started looking into adding an embedded (probably H2) database and populating it with test data so that we can have consistency when the mobile team is ready for test data. By using an embedded database, we will be able to clear out test data by just restarting the Spring Boot application, which allows test repeatability but also modularity so that one developer does not interrupt work being done by another developer. I will be focusing on finishing the setup of the embedded database and creating the test data scripts, and then expanding the REST API to allow the	8	14

	mobile team to pull the information they require. I have also worked on my sections of the project plan, as well as read more into integrating embedded databases with Spring Boot. Team member 3 - hours worked		
Hongyi Bian	As for this week's project working hours, I have put up some times into the research of hardware components as well as starting the Android project with some simple prototypes. The research went smoothly about digging into the hardware parts. Since we realized that Arduino Uno is somehow lack on the memory connecting to the Amazon Web Service, I proposed Arduino Yun as another option for us. In addition to that, Raspberry Pi 3 is also a good microcontroller for this project. I decided to do more researches on the Arduino Yun in terms of data sheets and project examples in the past week, which I believe will be useful in the future when we start the hardware workings. For the Android part, our team have created a basic project and tried to recover from what was learned about Android in the past semesters. This will be a quick process since we have done something before. The SQLite prototypes needed more attention and we are both working on it to reach the final outcome.	7	12
Yuanbo Zheng	In this week's meeting, we've discuss how to allocate the work for the project plan and finish our parts individually. I analyze if our project is feasible based on the difficulty and the cost-efficient. Our project should be able to have the internet connection between the washing machine and our mobile applications. And other than the meeting stuff, I have started to make the android application. With the experience in CS309, I start it with android studio and work with implement the ListView which include the washing machine and dryer so we can control the operation by some buttons. By doing this step, I need to recover what we've learned about the database and calendar stuff with android studio. Also I search the Arduino Yun and learn the details of that. In addition, I spent some time with the hardware about the microcontroller since we need to combine	9	15

	all the stuff in the end.		
Casey Gehling	Other than attending meetings and working diligently on the project plan, this week was all about running through spring and spring boot tutorials as well as connecting to the database and verifying the server. While our backend lead has had considerable exposure to spring boot, I personally have never used it and thus have a pretty sizable learning curve. Our backend lead was able to upload a base spring boot project to our repository, so after running through multiple tutorials I pulled the main branch and started inspecting the codebase. We talked about populating the database with test data, but for now the plan is just to get requests between the ios application and the spring boot server to work as they should.	10	16