Start Date – End Date:
October 9 - October 22

Group number:
sddec18-17

Project title:
IoT Remote Monitoring for Commercial Appliances

Clients:
Taylor Greiner
Connor Jennings

Advisor:
Goce Trajcevski

Weekly Summary
The goal of our fourth reporting period was to make major leaps towards completing our prototype that is expected by October 31st. The mobile team worked towards implementing the entire administrator or client side of the mobile application, including building screens for selecting a laundromat, viewing energy consumption, viewing active hours of appliances, and giving admins the ability to override machines. A *Charts* library was implemented to help design elegant graphs to visually represent analytics information for running appliances. The backend team worked with the mobile team to write Spring boot API requests that query our database for information. The backend team wrote several APIs for retrieving appliance information and checkout information for completing a reservation. The hardware team combined the LCD, matrix keypad and relay module to complete a working prototype of the hardware. The hardware team also worked with the backend team to implement MQTT queue APIs on the raspberry pi to send/receive messages to/from the backend server. The updates made by the hardware and backend team allow for the mobile application to retrieve on/off status of appliances. Our team is on track to completing our prototype and preparing a demo for our clients on October 31.

Past week accomplishments

Team Member 1 - Name
John Fleiner
Team Member 1 - Role
Android Development Lead
Team Member 1 Contribution
Android User Interface
- Due to the iOS team's changes to the UI wireframes, the android UI needed to be updated to reflect the removal of the navigation menu and addition to a bottom bar menu
- Implemented DatePickerDialog, a popup for selecting a date
- Implemented TimePickerDialog, a popup for selecting reservation start time and end time
- Refactored code for MapsActivity
- Implemented AdminActivity, the home screen for admins
- Implemented OverrideActivity, the screen for allowing admins to override appliances and power them on/off
- Implemented EnergyActivity, the screen for displaying energy usage statistics per appliance
- Implemented AnalyticsActivity, the screen for displaying the number of active machines per hour at each laundromat

Android APIs
- Updated Login API → removed callback and interface and implemented editText error handling
- Implemented RetrieveCardAPI to retrieve customers card on file
- Implemented AddReservationAPI to submit a customer reservation
- Implemented RetrieveApplianceAPI

Android Algorithms
- Created DateTextWatcher algorithm to translate user input into correct data format and refresh UI in realtime. The algorithm is no longer needed as the DatePickerDialog
- Created TimeTextWatcher algorithm to translate user input into correct time format and refresh UI in realtime. The algorithm is no longer needed as the TimePickerDiallog

Android MPAndroidChart Library
- Added android library for creating charts and graphs
- Implemented horizontal bar chart to display active machines / hr
- Customized bar chart xAxis and yAxis labels, colors, and design
- Implemented pie chart to display energy usage per machine
- Customized pie chart animation, colors, labels, and design

Team Member 1 - Hours Worked
30 Hours

Team Member 2 - Name
Ben Young
Team Member 2 - Role
iOS Development Lead
Team Member 2 Contribution
- Implemented the Current Reservation screen to display the user's currently available reservations
- Implemented the Past Reservation screen to display the user's past reservations
- Admin Interface
    - Created the tab bar controller to show buttons to the four screens. (map, energy, active and override)
    - Configured the map and tab bar so that the user would not be able to view the other 3 tabs unless they select a laundromat location on the map
    - Implemented the UI for the OverrideViewController
- Imported Stripe into my xcode project, need to work with the backend team to get that finished up
- Imported the graphs api to show stats about the machines at a given laundromat

Team Member 2 - Hours Worked
25 Hours

Team Member 3 - Name
Thomas Stackhouse
Team Member 3 - Role
AWS & Spring Boot Backend Lead
Team Member 3 Contribution
- Met with hardware developers to get hardware connected to Backend
    - Using MQTT message queues on AWS IoT (one for each hardware device)
    - Hardware posts to message queues
    - Backend listens to MQTT queues
    - Backend processes, sends response back to queue
    - Hardware receives response to queue
- Looked into development to connect Spring to MQTT queues, started prototyping

Team Member 3 - Hours Worked
12 Hours

Team Member 4- Name
Hongyi Bian
Team Member 4 - Role
Hardware Engineering Lead
Team Member 4 Contribution
- AWS association. Implementation of the MQTT queue API on raspberry pi to send/receive messages from/to our backend server.
- Embedded scripts integration. Combine LCD, Matrix keypad, and the relay module to complete the prototype on the hardware side. Trying to get ready for the entire prototype integration.
- Hardware usability testing. Perform tests on our circuit as well as the Python/bash scripts to maintain the robustness prototype and fulfill the goal of the product.
- Final prototype mounting strategy. Thinking a way to gather the components and integrate with the portable washing machine.

Team Member 4 - Hours Worked
20 Hours

Team Member 5 - Name
Yuanbo Zheng
Team Member 5 - Role
Hardware Engineer
Team Member 5 Contribution
- Continue the testing on our hardware components :
  - To test our circuit functionality.
  - To test our Python scripts if match our function as expected.
- Work with our hardware leader to implement the MQTT queue API on Raspberry pi, to make it associate with our backend server
- Try to combine all the components together with our hardware lead:
  - Integrate entire prototype: **LCD screen, relay, portable washing machine and keypad**.
  - Try to find a way to mount the **keypad** and **LCD** screen on the portable washing machine, maybe we can attach a box on it.
- Research on the matrix keypad interruption implementation.
Team Member 5 - Hours Worked
18 Hours

Team Member 6 - Name
Casey Gehling
Team Member 6 - Role
Spring Boot Backend Developer
Team Member 6 Contribution
- Implemented HTTP requests for the front end developers
    - Remove credit card information (so users can delete a card associated with their account)
    - Return selected customer information given customer ID
    - Return list of appliances given some criteria (location, etc)
- Updated data model to include on/off flag for the appliances to allow the front end to tell if a machine is currently in use
- Fixed a bug which was preventing the insertion of new appliances, customers and laundromats to the database
- Continued integration and unit testing on the server

Team Member 6 - Hours Worked
12 Hours

Individual contributions

Team Member	Contribution (Quick list of contributions. This should be short).	Hours this reporting period	HOURS cumulative (this semester)
John Fleiner	- Implemented six new android user interface screens - Implemented four new android APIs and callback handling - Implemented two textwatcher algorithms - Implemented MPAndroidChart library for creating pie charts and bar graphs	30	80
Ben Young	- Implemented current and past reservation screens - Setup admin side navigation and override screen UI - Added stripe and graphs sdk to app to finish the UI	25	57
Thomas Stackhouse	Connecting Spring to MQTT and backend	12	42
Hongyi Bian	- AWS association - Embedded scripts integration	20	50

	● Hardware usability testing ● Final prototype mounting strategy		
Yuanbo Zheng	● Implement MQTT query APIs for hardware ● Testing of hardware components ● Keypad LCD integration	18	50
Casey Gehling	● Implemented HTTP requests ● Updated data model to include status of appliances ● Fixed insertion bug ● Continued testing server	12	53

Pending issues

Our team has resolved the pending keypad soldering issue outlined in several of the past bi-weekly status reports. Our prototype is on track to being completed by October 31st. The primary pending issue that needs to be resolved is front-end back-end integration for the Stripe payment transaction platform SDK. Stripe allows for our product to securely handle payment transactions between our clients business and the user. Implementation is required on both the client end and server end to authorize transactions. Our timeline has assumed that the Stripe integration will take 2 weeks to complete so it's important that any issues that occur over the next two weeks are resolved immediately to prevent delays to our strict timeline.

Plans for the upcoming weeks

Team Member 1 - Name
John Fleiner
Team Member 1 - Role
Android Development Lead
Team Member 1 Plans
- Implement remaining APIs for populating Admin Screens: Energy, Active, Override
- Finalize tokenization and authentication of Stripe transactions on the application side
- Work with the backend team to integrate Stripe server-client interaction
- Implement Payment and Checkout Screen
- Implement "favorite laundromat" option at the request of our clients
- Code Refactoring to clean-up code implementations
- Localize all UI strings for future expansion
- Verify/correct one-to-one UI between iOS and Android

Team Member 2 - Name
Ben Young
Team Member 2 - Role
iOS Development Lead
Team Member 2 Plans
- Finish the UI for the admin side and the CardViewController on the user side
- Start running UI and usability tests
- Work with the hardware and backend teams to test all the separate parts together

Team Member 3 - Name
Thomas Stackhouse
Team Member 3 - Role
AWS & Spring Boot Backend Lead
Team Member 3 Plans
- Finish prototyping and implement MQQT queue setup
- Test hardware connection

Team Member 4 - Name
Casey Gehling
Team Member 4 - Role
AWS & Spring Boot Backend Lead
Team Member 4 Plans
- Implement requests as necessary for the front end team
- Implement the hardware with the server
- Continue testing

Team Member 5 - Name
Yuanbo Zheng
Team Member 5 - Role
Hardware Engineer
Team Member 5 Plans
- Work with our hardware lead to complete the function of whole components
- Try to find a way to mount on portable washing machine, consider safety issue
- Continue testing

Team Member 6 - Name
Hongyi Bian
Team Member 6 - Role
Hardware Engineering Lead
Team Member 6 Plans
- Completing prototype of hardware
- Continue testing
- Research on mounting strategies

Summary of Bi-Weekly Advisor Meeting

The goal of our fourth Bi-Weekly advisor meeting with Goce Trajcevski was to finalize our team's timeline for the remainder of the semester. The mobile team provided a live demo of the android and iOS mobile application to give a better idea of where the product stands. The hardware team provided a recorded demo of the working LCD - keypad integration that had been a previous pending issue. Based on the current progress of our final prototype, we have agreed upon a prototype completion deadline of October 31st. Two weeks are allotted to writing the final documentation with updated design choices and testing/security implementations and remarks. The final documentation will be completed by November 14th so that an additional two weeks can be spent completing our team's poster. Important information gathered from the meeting include: updating/adding new UML design diagrams to our final documentation, including validation and verification for testing