Start Date – End Date:
August 27 - September 10

Group number:
sddec18-17

Project title:
IoT Remote Monitoring for Commercial Appliances

Clients:
Taylor Greiner
Connor Jennings

Advisor:
Goce Trajcevski

Weekly Summary

With the second semester of senior design swinging into full motion, our team had several main objectives that needed to be accomplished in order to define a timeline for second semester deliverables. The first goal from the mobile team was to develop UI design artifacts that identify the remaining screens that must be developed to achieve total functionality. The second goal from the mobile team was to finish writing API callbacks to AWS for login, registration, and reservations. The third goal form the mobile team was to begin integrating the Stripe SDK in iOS and Android to handle payment transactions. The first goal from the hardware team was to order + receive a keypad and LCD display for entering reservation access codes. The second goal from the hardware team was to solder the keypad with the LCD and perform simple test inputs to validate that the LCD is receiving keypad commands. The goal from the backend team was to update the AWS endpoints to handle new information sent from the mobile application. The mobile team successfully completed their goals by designing a completed v1 of the UI. Likewise, they finished writing the API calls to AWS for login, registration, and reservation and began implementation of Stripe. The hardware team received the keypad and LCD display, soldered the hardware, and were able to perform initial input tests. The backend team updated the handling of AWS endpoint data being received and performed API tests with the mobile team.

# Past week accomplishments

Team Member 1 - Name
John Fleiner
Team Member 1 - Role
Android Development Lead
Team Member 1 Contribution
User Interface Design
- Redesigned last semesters login, registration, and location screen designs using InVision Studio, a professional tool for creating design artifacts.
- Designed UI Customer Screens for: Profile Menu, Add Credit Card, Current Reservations, Selected Reservation, Payment, Checkout, Reservation Complete
  - Profile Screen: Select "Current Reservations", "History", "Add Card", "Settings", and "Logout"
  - Add Card: saved credit card information utilizing *Stripe SDK* card verification
  - Current Reservations: Browse current reservations, their location, and the access code for unlocking the reserved appliances
  - Selected Reservation: Browse location, washers selected and their times, dryers selected and their times, price paid, and the access code for unlocking the reserved appliances
  - Payment: Checkout via *Stripe SDK* payment authorization.
  - Checkout: Confirm reservation
- Designed UI Admin Screens for: Location, Energy Consumption, Active Machines, Override Machines
  - Location: allows user to select laundromat marker (pin) and choose to view energy consumption, active machines, or override machines
  - Energy consumption: View total energy consumption of all machines, view individual energy consumption of each machine, view pie chart of energy consumption
  - Active Machines: View active/not active washers and dryers, and view a bar graph displaying 24-hour usage data
  - Override Machines: Allows admin to override individual machine status and power them on/off.
- Implemented Login API Callback which connects to AWS, authenticates the user and performs login
- Implemented Register API Callback which connects to AWS and registers the user.
- Integrated Stripe Android SDK with the Android Application
  - Implemented Credit Card Verification and Validation
- Refactored code for LoginActivity.java and RegistrationActivity.java
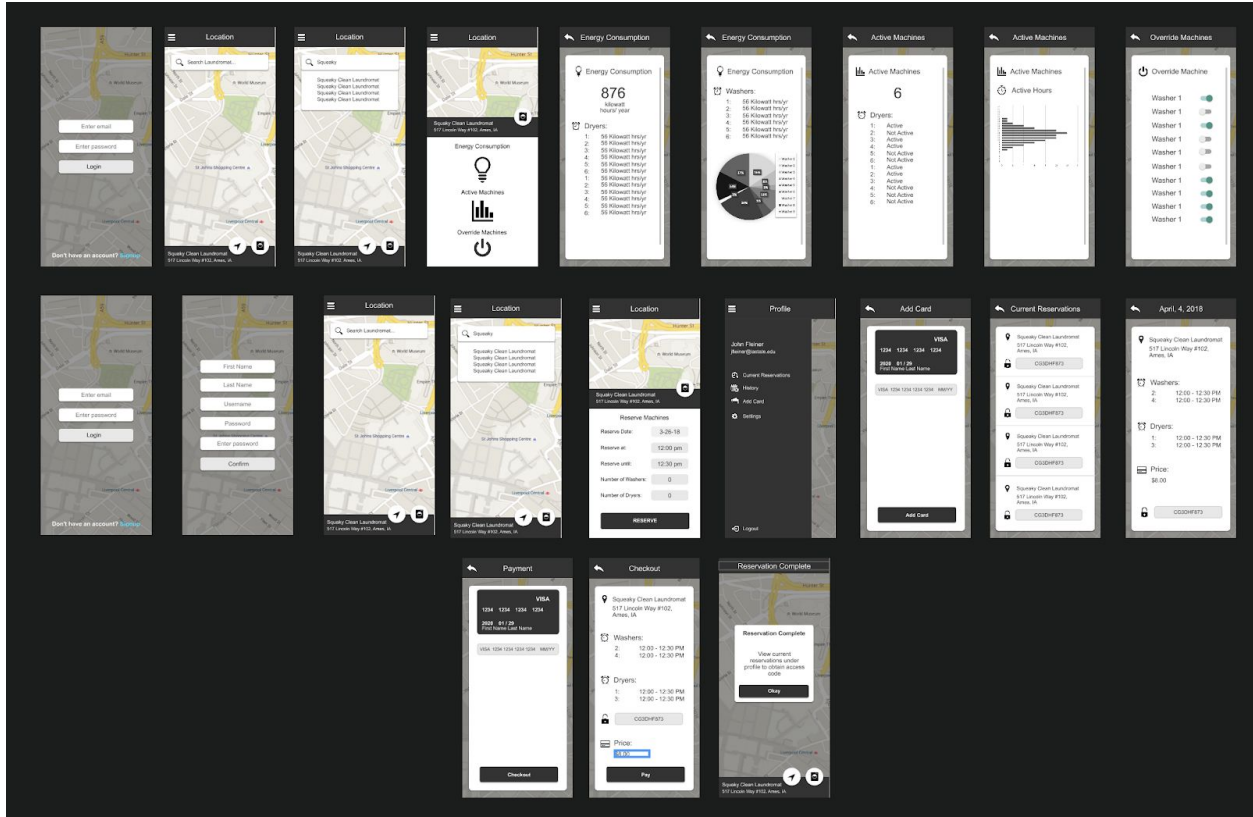
[UI Design Artifacts created via InVision Studio]

Team Member 1 - Hours Worked
20

Team Member 2 - Name
Ben Young

Team Member 2 - Role
iOS Development Lead

Team Member 2 Contribution
- Refactored my code my last year to make for easier expansion in the future
- Started implementation with the iOS Stripe API to get the payment system in place
- Updated API endpoints
  - Converted the api endpoints that I was hitting from the provided local data to the AWS endpoints

Team Member 2 - Hours Worked
10

Team Member 3 - Name
Thomas Stackhouse
Team Member 3 - Role
AWS & Spring Boot Backend Lead
Team Member 3 Contribution
- Started implementation of Spring Security
  - Includes research into how it works and what configuration would most benefit us
    - Custom login information that encodes the password, checks it against the encoded password in the database, and returns a token encoded with Principal user information. Token passed back will be Base64 encoded, and will have a custom ID for the login session that can be authenticated with username and session ID on each request.
  - Started to implement Spring Security configuration, need to work on integrating existing Customer details into Spring Principal
- Started research on automated AWS deployment
  - Some initial looking into writing Terraform scripts
  - Initial prototyping with Docker and Docker-Compose
    - Entrypoint scripts and how to run a Spring Boot project with Docker

Team Member 3 - Hours Worked
12

Team Member 4- Name
Hongyi Bian
Team Member 4 - Role
Hardware Engineering Lead
Team Member 4 Contribution
- Continue the works done from previous semester
  - Raspberrypi communication to AWS through MQTT protocol optimization
  - Solve the issue for adaptation between our plug and actual portable washing machine's outlet
- Received keypad & LCD components from client and started implementation
  - Hardware initial assemble including soldering pins and connection to Raspberrypi
  - Simple tests for keypad input and LCD output on breadboard test bases.
  - Optimizing the number of GPIO uses on the Raspberry Pi to avoid excess pin usage therefore to allow more components in future works.
- Research for the possible ADC modules which could be used in our system to give extra information of the running status of the washing machine.
  - Including mutual inductor basics
  - Suitable ADC modules for Raspberry Pi
  - Possible implementation strategies

Team Member 4 - Hours Worked
14

Team Member 5 - Name
Yuanbo Zheng
Team Member 5 - Role
Hardware Engineer
Team Member 5 Contribution
- Review Hardware team's work last semester
  - Rebuild the communication between Raspberry Pi with our AWS cloud
  - Check if all of them work and try to make connection between our portable washing machine with our Raspberry Pi (Plug the washing machine in)
- Implement the Keypad & LCD Screen
  - Work with our hardware lead to do tests on Keypad and LCD screen with the breadboard.
  - Try to use Python to implement the Keypad so our user can enter reserve code on it
- Do further research on Security issue with our hardware
  - Learn on the Raspberry Pi SSH security
  - Research for the MQTT channel security

Team Member 5 - Hours Worked
12
Team Member 6 - Name

Casey Gehling
Team Member 6 - Role
Spring Boot Backend Developer
Team Member 6 Contribution
- Implemented an API endpoint to make a new reservation for front end team
  - New endpoint takes in a date, start and end time, # of washers/dryers, and a location
    - Returns a list of washers/dryers that were reserved
    - Previously we had discussed providing a map of the laundromat and allowing the user to choose which machines to reserve, which complicated the reservation process a little
- Cleaned up some code from last semester that we weren't able to get to prior to the final presentation and added some documentation
  - Controllers: Appliance, Customer, Location, Reservation
  - Services: Appliance, Location
- Added a new common function to parse date and time inputs to the new API endpoint
- Started implementing JUnit tests while waiting for functionality enhancements once the hardware team gets rolling with the newly acquired keypad
  - Reservations (successful & unsuccessful)
  - New/updated users and appliances

Team Member 6 - Hours Worked
14

Individual contributions

Team Member	Contribution (Quick list of contributions. This should be short).	Hours this reporting period	HOURS cumulative (this semester)
John Fleiner	● Created 21 User Interface Screens to complete Mobile Front End UI v1 ● Implemented Android API Callbacks for login, registration ● Performed Android Code Refactoring ● Integrated Stripe Android SDK	20	20
Ben Young	● Performed iOS Code Refactoring ● Began Stripe iOS SDK integration ● Updated iOS API endpoint http requests	10	10
Thomas Stackhouse	● Started implementing Spring Security ● Did some initial research into setting up automated AWS deployment	12	12

Hongyi Bian	- Began implementing Keypad + LCD Display functionality - Researched ADC Modules	14	14
Yuanbo Zheng	- Implemented Keypad and LCD Display - Reviewed Previous state of Hardware - Researched Hardware Security	14	14
Casey Gehling	- Began implementing JUnit tests to test backend functionality - Updated AWS API endpoints	14	14

Pending issues

The 3x4 Phone-style Matrix Keypad that we were planning to purchase with help from our clients was no longer in stock. We decided to purchase a different 3x4 matrix keypad model which required additional soldering steps to attach to a breadboard. After receiving the purchased hardware, our team began implementing the keypad - LCD display. The keypad is not fully working as there was an error with the soldering step. The middle row of buttons are not currently responding.

Plans for the upcoming weeks

Team Member 1 - Name
John Fleiner
Team Member 1 - Role
Android Development Lead
Team Member 1 Plans
- Implement Profile Navigation Drawer Screen
- Implement Add Card Screen
    - Connect with AWS to store credit card information
- Implement Current Reservations Screen
    - Connect with AWS to retrieve reservation data
- Implement Selected Reservation Screen
- Implement Payment Screen
    - Connect with AWS to retrieve credit card information
- Implement Checkout Screen
- Implement Confirmation Screen
- Tokenize payments in Android via Stripe

Team Member 2 - Name
Ben Young
Team Member 2 - Role
iOS Development Lead
Team Member 2 Plans
- Implement the UI that was created in Invision.
- Incorporate Stripe with the new UI
- Get stripe connect to the AWS server so we can do tests transactions

Team Member 3 - Name
Thomas Stackhouse
Team Member 3 - Role
AWS & Spring Boot Backend Lead
Team Member 3 Plans
- Start to implement and deploy spring security
- Document changes to authentication system and let the mobile team know if they have to do anything differently to hit the endpoints or authenticate a user
- Automatically deploy AWS
    - Start using terraform scripts
    - Run it using instances of Docker
- Create server side algorithm to generate the access code the user will input at the washer/dryer

Team Member 4 - Name
Casey Gehling
Team Member 4 - Role
AWS & Spring Boot Backend Lead
Team Member 4 Plans
- Finalize Junit tests for the current Spring Boot controller and model functions
- Create Junit tests for the soon-to-be created Spring Boot controller and model functions
- Create AWS endpoints to store credit card information, historical reservations, current reservations
- Create AWS API Key endpoint for storing Stripe and Google Maps API keys
- Finalize reservation endpoint so user on the app can make reservations, see their passed reservations and current key for their upcoming reservation.

Team Member 5 - Name
Yuanbo Zheng
Team Member 5 - Role
Hardware Engineer
Team Member 5 Plans
- Finish the implementation of the Keypad & LCD Screen
    - Finish testing the keyboard the LCD screen with the breadboard. Connect the keyboard and lcd to the microcontroller.
    - Write a python script to accept the access code inputted by the user

Team Member 6 - Name
Hongyi Bian
Team Member 6 - Role
Hardware Engineering Lead
Team Member 6 Plans
- Re-solder keypad to LCD Display to fix unresponsive keypads
- Identify and purchase ADC module to retrieve washing machine running status
- Begin integration of ADC module
- Integrate keypad enter command with AWS to validate locking/unlocking

Summary of Weekly Advisor Meeting

The focus of our first weekly advisor meeting back with Goce Trajcevski was regarding our plans for second semester. It was discussed that ideally, it'd be best to have a working prototype by mid October. That way, our team has sufficient time for performing full stack testing and to help finalize our design documentation. In order to keep our hardware engineers busy, we looked into the possibility of integrating *Smart Laundry's* Washing machine component into our prototype. However, after speaking with the lead for *Smart Laundry*, it may be difficult to acquire the component for use. We also looked at the possibility of pulling bank and atm location data from openstreetmap.org. The bank and atm data could then be used as part of a routing algorithm for utilizing customers time in-between cycles. For example, it may be beneficial to show users atm machines nearby that they may need to visit. The last major topic discussed during our meeting was whether or not our team is interested in performing some sort of data analytics or machine learning model to our product. A decision has not yet been made.