

## **EE/CprE/SE 492 BIWEEKLY REPORT 4 (10/12/2019 – 10/25/2019)**

**Group Number & Project Title:** (5) Road Safe Phone Case

**Client:** Christine Shea-Hunt

**Advisor:** Dr. Diane Rover

**Team Members/Role:** (Software) Zixiao Lu, Yifei Wang

(Hardware) Kedan Xin, Yue Chen, Sarah Baratta

### **Weekly Summary**

For the past two weeks, the team has primarily focused on the emergency messaging system. At this point, the team has made steady progress on the message system and are ready to create a connection between microcontroller and cell phone through Bluetooth. Also, the team is redesigning the case layout so all the components can be fitted into the case nicely. Preliminary alterations have been made by using a soldering iron to melt the plastic on the life-sized case.

Documentation has also been worked upon in the last two weeks. The design for the state diagram was reviewed with the team's advisor and adjustments will be made to make the operation easier to understand and more definitive. A manual for using the produce has also started being developed.

### **Past week accomplishments**

The team is currently using Firebase as the message sending system. Firebase is an application backend service launched by Google Cloud Platform for application developers (especially full-stack development). With Firebase, application developers can quickly build application backends, focus on developing clients, and enjoy the stability and scalability of Google Cloud. Firebase provides the following functions for background development: Realtime database User Authentication (Authentication), Custom API (Cloud function), Message Push (Cloud messaging), Static Web Hosting Cloud Storage (Cloud storage). In this project, the team is mainly using the first three of them.

By providing SDKs for Android, iOS and Web (JavaScript), front-end developers can easily read and write Firebase databases (no-SQL, Json). Authentication Firebase provides email-based user authentication. Through the client SDK, developers can easily implement account registration, logout, password change, and forgotten passwords. Also, it is easy to integrate third party authentication (Google Signin, Facebook Login, Github, Twitter) and any custom authentication service. It also supports mobile phone number login, SMS function.

Custom API (Cloud function) Cloud function is equivalent to a node.js server provided by Firebase to add Firebase integration with other functions (such as the case of integration with Authentication), which is similar to Amazon AWS's lambda. Through the Cloud function, developers can define the cloud API themselves, migrate some of the original client functions to the server, and lightweight the client. Cloud messaging Firebase provides messaging capabilities. The token is generated by the client side SDK and registered to the firebase server, and any message push is automatically monitored. Developers or administrators can send push messages to any device anywhere (server or PC) to improve engagement.

Two weeks ago, the team drew a state diagram to show different states of the case and how one state transmit to another state. As the previous reports shows, there are three states. During the meeting with Prof. Rover, she focused more on how driver status related to the diagram. She came up with some circumstances, for example, the user (likely to be a teenager) needs to have access to car key but their phone is lost, or the key needs to be given to someone when the car is in repair. These circumstances all fits into one state in respect to the diagram we have currently. However, Dr. Rover thinks that it should be distinguished in terms of driving status. Changes to the state diagram are still in the works, and the team will expand on it next week.

Described below is what each individual team members worked on:

Zixiao Lu: Set up the Google Firebase, implemented the chat app which can successfully send and read the message from the database or to the database

Yifei Wang: Attended the meeting with Professor Rover, worked on message sending system with Lu.

Kedan Xin: Meet with advisor, helped to rework the state diagram, buy bluetooth module and fingerprint sensor for our system

Yue Chen: Reworked on the state diagram. Worked on the case layout design with Kedan and Sarah. Researched on the Bluetooth module.

Sarah Baratta: Making adjustments to the life-sized cased with Kedan, researching Bluetooth functionalities that are compatible with the Arduino, reviewing and revising the state diagram with the professor

### Individual Contributions Table:

Name	Individual Contributions	Hours This Week	Hours Cumulative
Zixiao Lu	Set up the Google Firebase, implemented the chat app which can successfully send and read the message from the database or to the database	7	69
Yifei Wang	Attend meeting with Professor Rover, worked on message sending system with Lu	5	72
Kedan Xin	Meet with advisor, helped to rework the stat diagram, buy bluetooth module and fingerprint sensor for our system	6	84
Yue Chen	Attended the meeting with advisor. Reworked on the state diagram and case design with Sarah and Kedan	6	78
Sarah Baratta	Revision of the state diagram, meeting with the professor, editing the case, testing the message system	6	81

### Plans for the Upcoming Week

For the upcoming week, the team will continue work on the texting function of the project to verify that it works on more than the tablet. The code will be modified to work with the API of an older android phone. This test will first be performed on Sarah's Samsung Galaxy S7 and then other phones as well. At the same time, different ways to achieve the emergency texting function will continue to be researched as this has proved to be the main technical difficulty for the group to overcome.

Additional changes will be made to the case to fit the battery, latch the lids of the case, and so on. The 3D model of the phone case will also be modified on the software to remain consistent with the physical changes that are made to the life-sized prototype.

Described below is what each individual team members plans to work on:

Zixiao Lu: implement the user registration and login page, connect the phone app to the bluetooth module of the case. Help the team

Yifei Wang: Work with Lu on the messaging functionality, explore on bluetooth and set it up.

Kedan Xin: Finding method to disable the case (emergency situation). Improve the case model for the life-sized prototype and the 3D model on the software to match the physical changes.

Yue Chen: Continue to work on the state diagram and case design with Kedan and Sarah. Help to implement the Bluetooth function on the microcontroller.

Sarah Baratta: Work with Kedan to design a fixture inside the case that will hold the battery to power the circuit. Spend time defining the project functionality better so that its usage can be defined in the user manual.