Dr. Sam Slishman

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Introduction

Project Overview

The Pre-R House Call app allows the user to contact a doctor in their area and explain their symptoms and medical needs, receive a diagnosis on the phone, and request a house call visit. If the prefered doctor is busy, users can fill out a form containing their information and symptoms. They will be placed on a queue and will be contacted by the doctor when it is their turn. We will enable doctors to have a status (available, busy, working, etc.) so patients know if they can be contacted. The app will be free, but the service will be donation based in the beginning. There will be an app for Android and iOS, and an accompanying website. Overall, we hope to implement the technology behind a service that will provide an efficient and cheaper option than a hospital (for minor injuries and sicknesses). In addition to working with Dr. Sam Slishman to meet all his goals as well as our own for the project, a group of graphic designers have also been included to the team to create the ideal aesthetics for the application and website. A doctor app also went into development where the certified doctors that would appear on the patient application can change their availability status as well as attend to the forms that they receive from the patients.

Client and Community Partners

Our main client is Dr. Sam Slishman who has provided quality health service in places such as New Mexico, Wyoming , New Zealand and Tasmania. He is also a licensed practitioner in Hawaii and California. Shortly after meeting and marrying his wife, Vanessa, together they started the project "Pre-R." His goals include providing as much medical care to individuals before they conclude that their only option is Emergency Room attention. The project is no alternative to life threatening or other emergency situations, however, Dr. Slishman sees too often that patients receive care, and an overwhelming bill, from the Emergency Room, when a quick phone or house call presents equivalent care. He wishes to expand his clientele in San Luis Obispo by becoming more accessible to people through phone calls, emails and making house calls.

Stakeholders

Possible stakeholders would be potential doctors who share the same goal as our client, Dr. Slishman: to make medical service more accessible and affordable. These doctors would be able to participate and provide service to their respective areas, and possibly turn this service into their career. Similarly to Dr. Slishman, other doctors would use this application to provide medical care to patients as a quicker, simpler, and more affordable alternative to receiving ER attention. The central goal focuses on the patient obtaining the care they need as opposed to billing them unnecessarily. Those who will immediately be affected by our the first working build of our project are those who reside in San Luis Obispo, as they are the ones who will receive the care of Dr. Slishman. As a significant portion of the patients includes college students, they would use the application because not only is quick care important, but affordability also plays a key role in their medical needs.

Framed Insight and Opportunities

Dr. Slishman first presented the project as a general idea called "Pre-R House Calls." In some ways, it is an extension of his other project, "Pre-R." This project entails having a website and a mobile application in which Dr. Slishman, and possibly other doctors in the future, could give medical advice over the phone or make a house call on a donation-based service.

In an email, Dr. Slishman provided a document giving a brief overview of himself and the four components of "Pre-R": basic telemedicine, house calls, after hours consults, and healthy living activities. With these four components, Dr. Slishman will be able to give advice over the phone, make house calls, have an availability setting, and have his patients join him and his wife in some healthy community activities.

In the first meeting, Dr. Slishman met with us as well as the "Pre-R" group to discuss in more detail about each project as well as talk about his availability. It was concluded that the team would help develop the website already started by his wife, as well as create an Android and an iOS application. Because our group has six members, creating two different applications was more likely, having the work divided equally. For Dr. Slishman's benefit, we also filled out a spreadsheet with our personal contact information as well as our strengths, such as backend, frontend, and website development. Because our primary goal is for the website and applications to work for Dr. Slishman, the development would be based of his needs, prior to that of other doctor's needs. He encouraged us to take small steps, including designing what each screen of the application would look like. The basic design is key before any code development can happen. This design step includes such things as what buttons we would want and where they would lead to as well as what placement of items on the screen would be most comprehensive for a user.

The application will be a resource in which patients can contact Dr. Slishman, if available, by phone, e-mail, Skype, or whatever means is most convenient, in order to obtain basic medical advice. However, if they are in need of more thorough service, the application will provide a distance range in which Dr. Slishman can travel to make a house call. It will also provide an automatic dialog, asking if client would like to make a donation for Dr. Slishman's services. The intended goal is to receive donations, commending Dr. Slishman for his services, without having to pay hospital prices. In the future, if we can get the website and application functioning properly for Dr. Slishman, there is a possibility that other doctors will be added to this service, therefore expanding the range. This is but one example of the future opportunities of this project.

Because the purpose of this application is to get quality medical services without the hassle of going to a hospital, the patients' and potential other doctors' needs are important to production. The needs of the patients are to be able to save money as well as time by contacting a doctor by the phone or through a house call to attend to any possible medical issue they are experiencing. They would need to be able to find the availability of Dr. Slishman and contact him easily through the application. The needs of potential other doctors would be to be able to change their availability as well as contact information as they see necessary. Being able to update the application and website easily is vital to the production of the website and mobile applications.

Project Goals and Objectives

The goal of this project is to create a mobile app where users can see Dr. Slishman's availability and approximate location (if he's available) and contact him if needed. Users will have the ability to contact him in order to describe their symptoms and receive a form of telemedicine and if needed, set up a house call. If Dr. Slishman is busy, users will be prompted with a form to fill out, and will then be placed in a queue. When their form is brought to Dr. Slishman's attention, Dr. Slishman may contact the user via the information on the form and provide a diagnosis or set up a house visit. Dr. Slishman receives this information from the doctor app where there is a list of potential patients along with the forms they have filled out. Once the user has received their service, either by telemedicine or a house call, they can use the mobile app to tip Dr. Slishman using their credit card and review their experience.

The objectives for this project are: create a layout for the app that is intuitive and easy for users; to configure an ability to find an approximation of a doctor's location based off of their phone's GPS; look up the doctor's availability status from the website; to provide the doctor's contact information if they are free; and implement a review/tip system for the doctors' services.

Outcomes and Deliverables

When this project is finished Dr. Slishman will be able to use his Pre-R website and mobile app to provide health care services for people in the San Luis Obispo area. Our group will leave behind documented code for the iOS, Android and web apps on GitHub. The initial design of the user interface for the mobile app and website will be done by the end of Fall quarter. The user interface will have pages for registration, locating doctors, doctor's availability/ contact informations, reviews and "tip your doctor". The designs will be finished by the first or second week of November. The prototypes for the iOS and Android apps will have no functionality, they will illustrate how the user will navigate through the different pages of the app. The prototypes will be finished by the end of November. Winter quarter is when functionality such as: locating a doctor via their phones GPS, looking up the doctor's availability status, sending the doctor a message through the app, reviews and "tip your doctor" will be added.

Background

Pre-R House Calls is a mix of telemedicine and in-home service. Currently, there are no existing products. However, there are products that share common features: Cleveland Clinic, Uber, ITriage, and Healthtap. The Cleveland Clinic [3] offers a wide range of information like different symptoms and conditions. On their website online, a patient can choose from their list of physicians and specialists nearest to them, view their medical records, receive a second opinion from another specialist, schedule appointments, and request a copy of their images. In addition, they provide an option for home visits, but these visits are more for the elderly and patients who have mobility issues and have requested to receive visits regularly. However, for our app, we are aiming to provide fast and convenient access to a doctor through talking on a phone, sending a message, or an in person house call. Therefore, the service we aim to provide should be faster due to patients not having to wait an indeterminate amount of time to get assistance from a doctor. Next, is Uber [4], a location-based private driving service that one can access using his or her phone or computer. A person can use the app to get picked up at a specific location, and any Uber driver nearby can respond. The downside is that the app is not worldwide and more drivers are needed for the app to be more effective. Our app will also run into the same problem in the future, but with there being not enough doctors instead of drivers. For our project, we are interested in emulating the process of the users picking a location and having a doctor respond as well as an automatic prompt from a donation and review. ITriage and Healthtap are the products that provide telemedicine. ITriage [2] is an app that manages your health information, answers your medical questions, and finds as well as connect with care options. It also offers a lot of information about medical care: symptoms, conditions, common tests for diagnosis and treatments, estimated price information, common specialists and doctors nearby, advice lines, and the address of nearby medical facilities. While a large amount of information can be given to a user, the usefulness varies by how much user understands as well as the accuracy of the information with how medical care varies from place to place. On the other hand, having the address of nearby medical facilities could be a feature we may implement and the other information could be incorporated into the Pre-R website. Lastly, HealthTap [1] offers Uber like services for seeing a doctor as well as a large question and answer (Q&A) website. Patients are charged a monthly fee for the ability to text message or video chat with a doctor any time they want, but the Q&A on their website it open to all user. Our app will differ from HealthTap because a patient will not be charged a monthly fee to be able to

contact a doctor. Other than that, our app will be try to implement the ability to message and possible video chat with doctors.

Engineering Specifications

The emergency room can be expensive and most of the pre-treatments provided by emergency rooms are not necessary to aiding people with minor injuries or infections. Our goal is to provide a cheap and convenient alternative for basic and minor medical needs as opposed to resorting to the emergency room. We plan to develop a phone application that will allow for patients to locate near-by, available doctors and ask for their aid. This aid includes consultation or writing of minor prescriptions.

Personas and use cases best explain the project specifications. The primary personas created for the project include a dependent college student, Marek Zhang, with a skateboarding injury, Shawna Silverwood, a woman recently becoming independent of her parents and entering the workforce, and finally, Enrique Haltertop, an elderly man with no home, making a living by working odd jobs.

Use Case 1:
- Actors - Patient
- Goal - Open application
- Description - The patient clicks the application and the splash screen appears. Immediately after, the patient is sent to the doctor list.
- Justification - This case is the initial step of beginning the service.

Use Case 2:
- Actors - Patient
- Goal - Sign up for service
- Description - The patient already opened the application for the first time and swipes left from the doctor list and clicks the "Sign-up" buton. The patient fills out the form or connects the application through Facebook login. The home screen becomes accessible.
- Justification - The patient must sign up or login through Facebook to begin using the service.

Use Case 3:
- Actors - Patient
- Goal - Locate closest doctor
- Description - The home screen is the "Doctor List." The list provides a list of doctors, their availabilities, and range from patient's current location and the patient chooses the one most applicable to situation.
- Justification - The patient must locate the nearest doctor in the event a house call is necessary.

Use Case 5:
- Actors – Patient, Doctor
- Goal – Call Doctor
- Description - The patient opened the application, signed in, and chose the nearest doctor. The doctor is currently on the phone with a different patient. The patient chooses the pre-evaluation form, fills it out and requests a call. The patient then waits for the doctor to call the patient.

- Justification - This use case is the second most common because they must fill a pre-evaluation form prior to speaking to the doctor.

See appendix for all use cases

Because this project is strictly software, uses cases best explain the engineering specifications. However, the table below shows other aspects applicable to creating the mobile application.

Performance	- Accurate wait time - Accurate distances - Speed of accessing the phone call functionality
Functionality	- Calls doctor - Fills out pre-evaluation that gets sent to doctor - Waiting room for doctor already in a call - Review system - Donation system - Locating doctor
Privacy	- Payment information confidential - Pre-evaluation forms confidential - Doctor's exact location confidential
Reliability	- Doctors are certified - Accurate information given - Does not crash unexpectedly
Usability	- Usable for college students and older - Minimal functionality for ease of use

Table 1: Major project specifications

Design Development

The fact that this project is being designed from the ground up, there leaves a significant amount of room for possible directions to go. Our team worked very closely with Dr. Slishman to make sure each decision matched his vision for the product. Because there are six people working on this team, we divided the work with three people working on the Android application and three people working on the iOS application. We knew the difference in operating systems would be an obstacle we would have to overcome. We discussed all design elements as a collective group that way we would implement each application as similar as possible, despite the restrictions. Additionally, because none of us have prior mobile application development abilities, no one strictly programs just front end or just back end.

In our initial discussion with Dr. Slishman about the application, we discussed the base functionality as well as additional features he wanted to see in the application. The functionality included calling the doctor, seeing the doctor's availability and location, having a schedule in the event of a necessary house call, donation system, and review system. However, through discussion, Sam decided that having an exact location could potentially cause problems for the doctor. We also determined that the doctor would make the decision on whether or not a house call is needed, making the schedule in the application viewable by the patient unnecessary.

After several meetings with Dr. Slishman, we added other functionality to be in the initial prototype. The design included a waiting room and pre-evaluation form for patients to fill out as they wait

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for the doctor to be available. Additionally, instead of having a GPS of the doctor, the doctor list contains the availability and relative distance from the patient. We brainstormed frequently before we created an actual flowchart. We did not design a flowchart until we believed we had the best possible plan for the application. The most current flowchart can be seen in Figure 1.

The actual interface will function as intuitively as possible. Patients will have already pre-downloaded the app and will have created an account which will remain signed in. Then, upon opening the app, will be prompted with a list of doctors who are on call and their corresponding information. The patient will then select the doctor they wish to contact and the application will automatically call the respective doctor. If the doctor is available and is able to answer the phone, the two will have a conversation. This will either result in the doctor visiting the patient or the doctor being able to help the patient over the phone. If the doctor is unavailable (is not able to answer the phone), then the patient will be prompted with a pre-evaluation form where they will fill out their symptoms and their current status. After submitting this form, the patient will be filed into a waiting room. This flow is diagramed in Figure 1 below. The interpretation and implementation of the flow chart for iOS and Android can be seen in the application screenshots in Figure 2 and Figure 3, respectively.
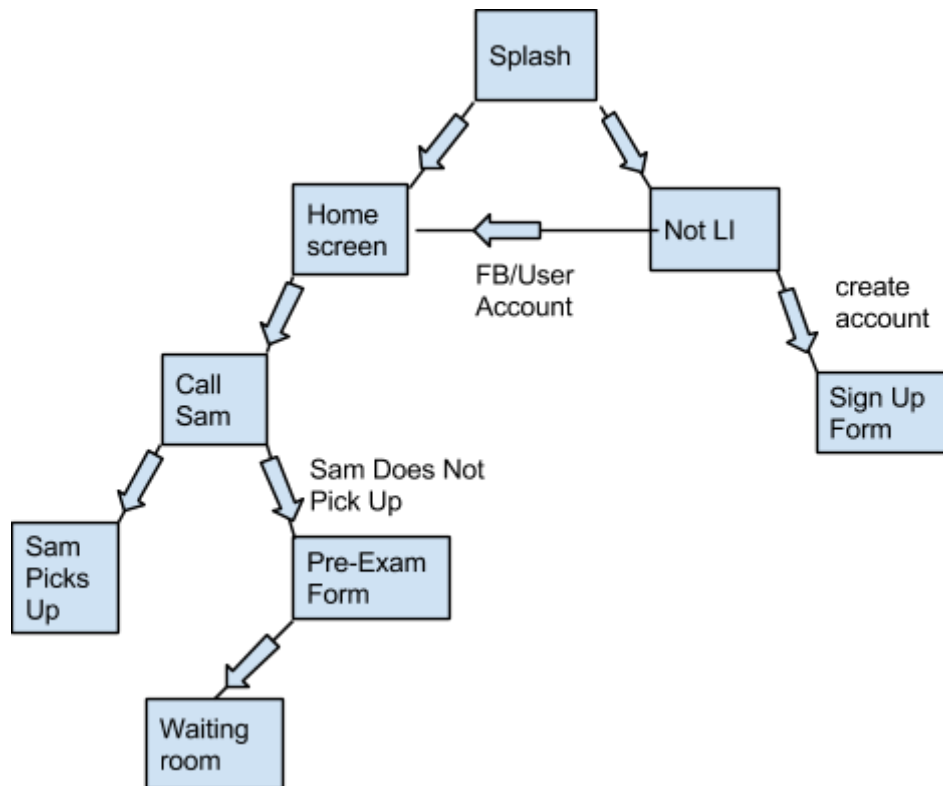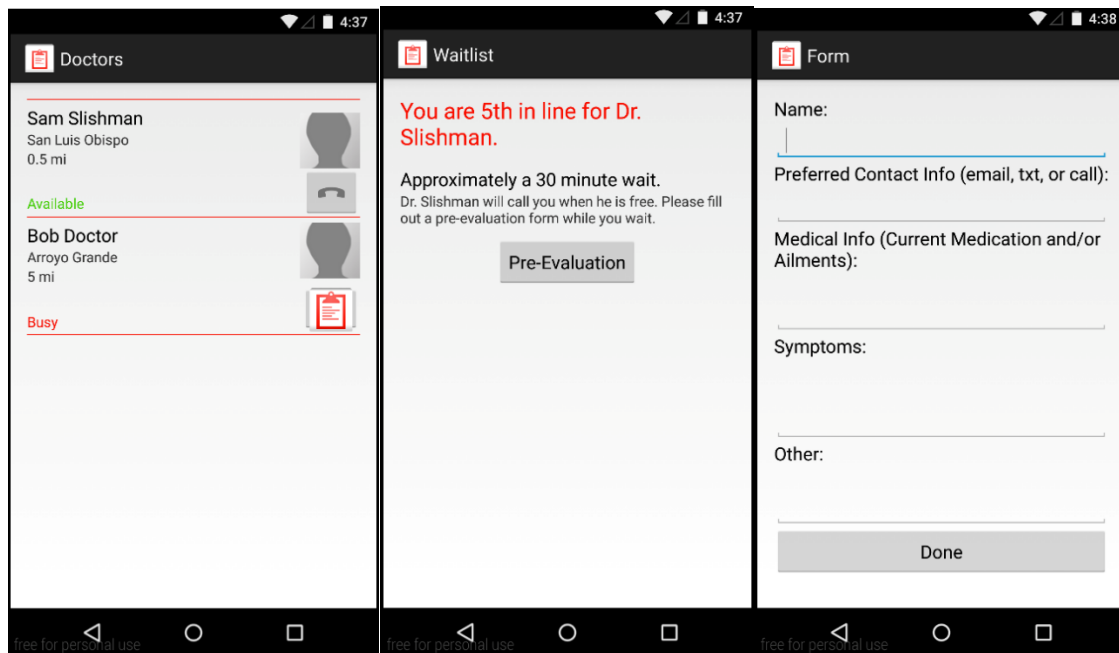

Figure 1: Logical flow of the application
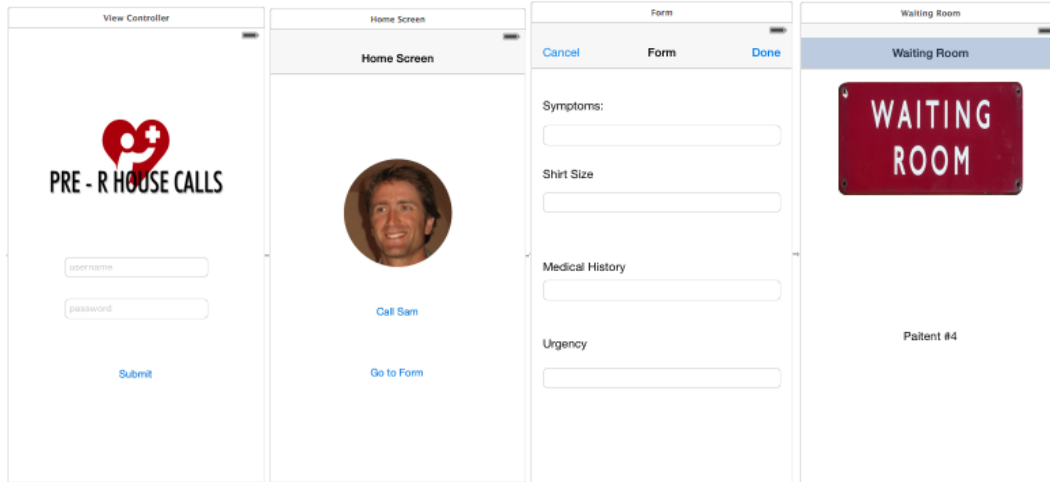
Figure 2: iOS implementation

Figure 3: Android implementation

Final Design

Our final design has stuck to the core of what we originally wanted, however there have been great changes in design and flow of the application. The final visual design of the application was created by our graphic design team, Kelby Hertanu and Cynthia Kim. These designs were able to be used on both the iOS and Android versions of the application, unifying the look of the project. The screenshots of each page currently available can be seen in the figures below.

Upon opening the application, the splash screen appears, as seen in Figure 4. If the user has not used the application prior, the tutorial page appears, showing the user how to read the doctor list and the various icons, as seen in Figure 5. In Figure 6, it shows the default "home screen" which is the doctor list. The doctor list is sorted by distance for convenience. When a doctor's name is clicked, a brief biography

is shown, and there are options for reading the full doctor bio as well as sending a form to that doctor. If the user clicks the full bio option, the user is sent to the page containing a background of the doctor as well as the doctor's specialties (Figure 7). If the user clicks the form option, the user is sent to a blank form where he or she can describe what the problem is and the form is sent to that doctor (Figure 8). The application does not allow for multiple forms to be sent at the same time. If the user swipes down the list of doctors, the current list updates—changing distances, availability, additional doctors, etc. If the user swipes to the left, a separate menu appears (Figure 9). It is here that the user has options to view his or her profile, change settings, or sign up if he or she hasn't already done so. This menu also shows what number they are on the waitlist for a specific doctor. If the user chooses the sign up option, the sign up page appears, asking for the information shown in Figure 10. These are the fully functional pages on both iOS and Android.

Although the doctor application is still in development, it is quite similar to the patient app, but instead of a list of doctors available, the doctor's homepage would show the list of forms waiting to be attended to for that specific doctor. The doctor also has the ability to change their availability setting, this information is transferred to the patient app by showing the doctor's availability. The possibilities include House Calls (available for house calls), Telemedicine (available for phone or Skype call), Unavailable, and Off Duty (Figure 11).
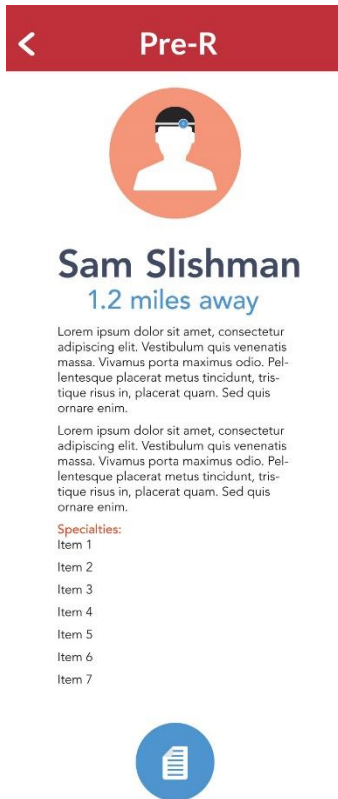

Figure 4: *Splash Screen*

Figure 5: *Tutorial*

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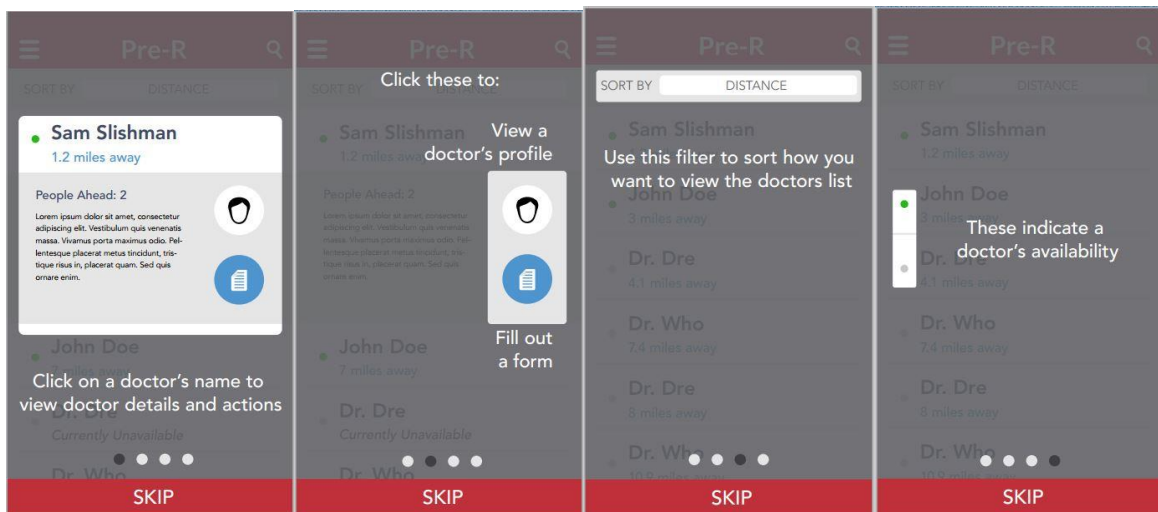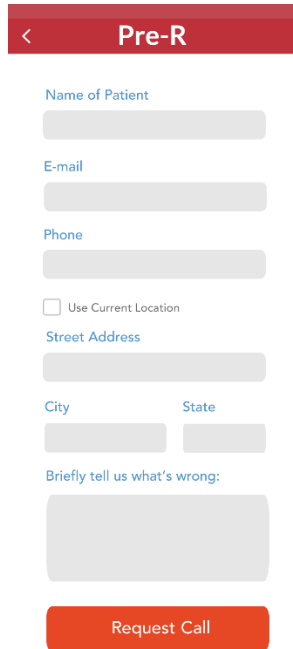
Figure 6: *Home Screen/Doctor List*

Figure 7: *Individual Doctor Biography*

Figure 8: *Pre-Evaluation Form*

Figure 9: *Home Menu*

Figure 10: *Sign up Form*

Figure 11: *Doctor App Home page*
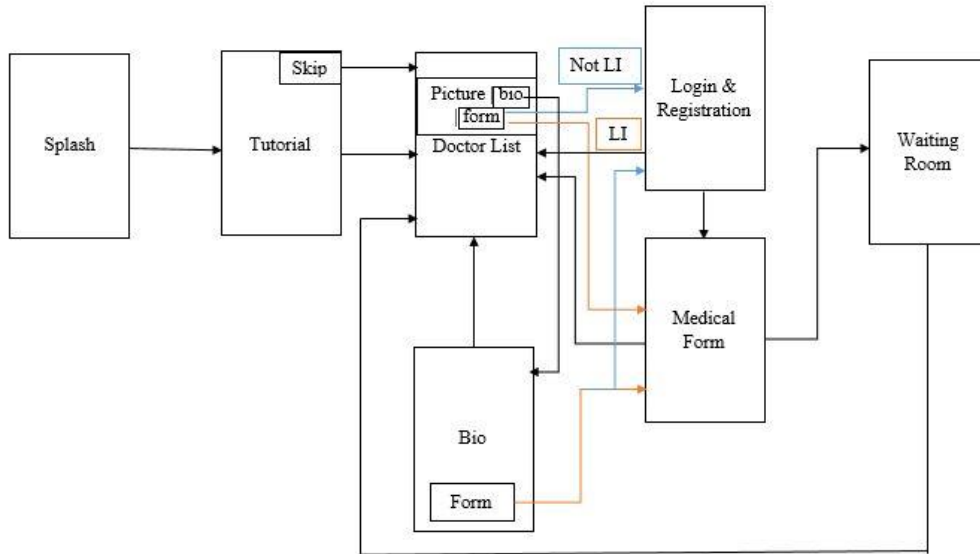
Figure 12: *Application Architecture*

Figure 13: *Database Architecture*

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We have our own database and server that stores all our scripts and information sent through the application. Whenever a user fills out a form or changes information, this information is sent to the database stored in different tables, depending on the information being sent. The database then sends back the correct saved information when requested by a specific page. The scripts do not allow for multiple accounts to be made by the same email or multiple forms to be saved on the database.

Because this project is also our senior project, we will be continuing to develop the user application, including developing the waiting room as well as allowing for setting changes. In addition to the continuation of the user application, we will create the doctor application through which the doctors can receive and review the forms as well as set availability. We will continue meeting with Lynne and Sam regularly to keep them updated on the progress we have made.

System Integration & Testing

When creating the FMEA, our biggest concerns were in the following categories: Create User Account, Waitlist, Form, Doctor Bio, Tutorial, and Doctor Availability Status. These were the biggest possibilities of failing because most of them have to extract or send information to the database and if the scripts are written incorrectly, the information will also be relayed incorrectly, making our application unreliable. The full FMEA can be found in the Appendix.

Two of the test procedures we created for the DVP+R were a login test and a sign up test. These connect with our FMEA because they involve retrieving and sending information into the database.

Item Number 1: Login Test
Determine: Whether the user can login with correct credentials/and validate that incorrect credentials are not accepted by the system.
Materials: Mobile device with House Calls application downloaded, iOS or Android; one user; For this test, a default user will be created in our database- username: "johnsmith", password: "iamjohnsmith"; access to a wireless internet connection
Safety: Be in a calm environment to allow for full attention and focus when using the application
Procedure:
With correct credentials-
1. Start up House Calls application using the mobile device
2. Wait for application to completely load
3. Read through the tutorial screens (or skip)
4. When on the doctor bio list view, click on the submit form button
5. This will prompt a login screen, enter correct username and password credentials
6. If the user is able to successfully login, the test passed.
With incorrect credentials-
1. Start up House Calls application using the mobile device
2. Wait for application to completely load
3. When on the doctor bio list view, click on the submit form button
4. This will prompt a login screen, enter incorrect username and correct password credentials
5. If the user is unable to successfully login, the test passed because of the incorrect username
6. Enter correct username and incorrect password credentials
7. If the user is unable to successfully login, the test passed because of the incorrect password
8. If both tests pass, the test passed.

<u>**Item Number 2: Sign up Test**</u>

Determine: Whether the user can sign up as a new user/and validate identical usernames cannot exist

Materials: Mobile device with House Calls application downloaded, iOS or Android; one user; access to a wireless internet connection; user will need an email address: "bobsaggot@fakemail.com", username: "bobsaggot", password: "iambobsaggot", phone number: "8885555555"

Safety: Be in a calm environment to allow for full attention and focus when using the application

Procedure:

Entering new users-

1. Start up House Calls application using the mobile device as a new user
2. Wait for application to completely load
3. Read through the tutorial screens (or skip)
4. When on the doctor bio list view, click on the submit form button
5. This will prompt a login screen, click register/sign up in order to create and account
6. Enter username, password, email, and phone number credentials
7. Submit the registration
8. If the user is able to successfully login, the test passed.

Entering existing users-

1. Start up House Calls application using the mobile device as a new user
2. Wait for application to completely load
3. Read through the tutorial screens (or skip)
4. When on the doctor bio list view, click on the submit form button
5. This will prompt a login screen, click register/sign up in order to create and account
6. Enter same username, password, email, and phone number credentials
7. Submit the registration
8. If the user is unable to successfully login, the test passed.

For the DVP+R, the different items we tested the following: login, sign-up, showing biography, splash screen, doctor list, sending forms, waitlist, server, and the different database tables. As stated previously, these were the main tests because it verified that information was being sent and retrieved, using the correct scripts. Our project, being strictly software, made testing our application easily verifiable. The full DVP+R can be found in the Appendix.

For this project we are using the Agile software development approach. The advantages of the Agile software development method are flexibility and frequent product delivery. The flexibility of Agile software development allows us to easily adapt to flow changes and incorporate new operating system features into our project. By using the Agile software development approach, it is possible to incorporate possible extra features into the project if time permits.

Overall, we tested and accomplished most of the requirements we had planned to by the end of this quarter. The main requirement that was not met was the creation of the waitlist. The only set back currently is that we have yet to figure out how to choose what place someone is placed into the waitlist. Beyond that, the creation of this mobile application was successful. Because this project is being extended for senior project, the waitlist will be fully functional as well as the creation of the doctor application.

Management Plan

Our team will be split into two sub-teams during the duration of this project. There will be an Android development team consisting of Brian, Winifred, and Ryan. There will also be an iOS development team consisting of Marek, Isabella, and Timothy. This arrangement allows us to reach more

customers while still retaining quality. We decided that six people working on a single app would be unnecessary, and it would be more beneficial to reach as many consumers as possible.

Since our team is inexperienced in app development, we will spread out the responsibility. Each group member will have some work in both the frontend and backend aspects of the app.

Design is very important to our app, so we will work with a team from the Graphic Design and Graphic Communications departments on campus to create logos, buttons, and help us develop a design scheme.

We will follow Cal Poly's 2 hours/unit/week philosophy for the amount of time we will put into this project, and consider the project a normal 4 unit class. This will equate to 8 hours/week for each team member that will be devoted to the project.

Team Mission and Objectives

Our mission is to create a house-call medical service that is available to users through a sleek and welcoming app and web interface. Our team is committed to creating the most intuitive and user-friendly service at the highest standards for quality results and experiences.

In order to achieve this we must have every group member participate and fully vocalize their ideas. Each group member shall be responsible for their own responsibilities and duties, but also be lenient with one anothers schedules. We must also sustain professional attitude when developing our product and keep a steady pace of progress throughout the next two quarters. Our team must constantly think like the user and develop with them in mind as well as work together to create a product we can collectively be proud of.

Team Membership and Roles

- Brian Truong - Android Developer / Backend / System Architect
- Timothy Acorda - iOS Developer / Security / Front End
- Isabella Sarmiento - Liaison / iOS Developer / Backend
- Ryan Foletta - System Architect / Android Developer / Backend
- Winifred Lee - Android Developer / System Interface
- Marek Zhang - Project Manager / iOS Developer / Front End
- Thomas Nguyen - Backend
- Kelby Hertanu - Graphic Designer
- Cynthia Kim - Graphic Communications

* Marek will be the primary person to interact with our client and customers.

Milestone	Due Date
Project Charter	October 16, 2014
App Flowchart	November 6, 2014
Requirements Document	November 13, 2014
Detailed Flowchart w/ design user will encounter in app (1 for Android, 1 for iOS)	November 20, 2014
Alpha Prototype (Skeleton version of the app.	December 4, 2013

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Most of design will be there, but functionality will not.	
Design Report and Design Review Presentation	December 9, 2014

Table 2: Gantt Chart

References

[1] *HealthTap*. Healthtap.Web. 14 Oct. 2014. <https://www.healthtap.com/>.

[2] *ITriage LLC*. ITriage. Web. 14 Oct. 2014. <https://about.itriagehealth.com/>.

[3] "Physician Visits at Home." *Cleveland Clinic*. Cleveland Clinic. Web. 14 Oct. 2014.

       <http://my.clevelandclinic.org/services/connected-care/services/physician-home-visits>.

[4] *Uber*. Uber. Web. 14 Oct. 2014. <https://www.uber.com/>.

Appendix

Persona Narrative

Enrique Haltertop

Enrique Haltertop is a seventy-five year old elderly man. He was born in Massachusetts and moved to Las Vegas at the tender age of eleven. His father was a coal miner and would always work late nights. His mother worked in a local factory and would be gone for most of the day. Due to this fact he was not always fed a proper meal and he became malnourished. Haltertop took after his father and became a coal mine at the age of thirteen. Over the years he worked sixteen hour days six days a week. The coal boss was vicious boss who did not like to play by the rules. As punishment for missing days of work he would whip his employees in the knees. Eventually the United States Department of Labor caught on to this and shut down the coal mine. Poor and homeless Enrique began to work odd jobs until he finally he ended up in San Luis Obispo.

Enrique has had a very hard and strenuous life. Through his travels and with his age, he has acquired a variety of diseases and physical ailments. He also has little to no savings. Enrique needs a reliable and cheap way to get medical attention. One of the grocers at the grocery store told him about a great local app that notified doctors or your medical problems and had them come to you. Enrique had the nice young man show him how to download the application. He had heard of applications like this before but they had always been too difficult to use. Lucky for Enrique this app was very intuitive and fluid in design. He was able to schedule a house call and have a doctor prescribe the proper medication.

Shawna Silverwood

Shawna Silverwood is a twenty-six year old woman who recently moved out of her parents home in San Luis Obispo, to work in New York City. It has been four years since she graduated from Cal Poly San Luis Obispo with a Bachelor's Degree in Business Administration. Her dream is to be the CEO of a well-known company. For the past four years, she has been working at local businesses, trying to find a job with which she can utilize her degree. She made a breakthrough shortly after her twenty-sixth birthday when she was offered a 9-to-5 job as a Marketing Specialist, making less than 45K a year.

Shawna has never been to New York and hasn't met many people yet. Back home, she would go out with her friends on the weekend to the beach and to the bars, but she has yet to find that close group of friends in her new home. She currently lives in her apartment alone with loud, rude neighbors that she

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feels uncomfortable talking to. She tries to spend most of her time running through or doing yoga in Central Park. Sometimes she even sits at different spots, painting the scenery. When she's not at work or in Central Park, she is at home watching Netflix and keeping up with her friends and family on Facebook or through FaceTime. She also enjoys online shopping and planning dream vacations.

Ms. Silverwood is a friendly, fun loving woman, who is also very hard working and will do whatever it takes to become the CEO of her company. She gets frustrated with people who are late and people who get in her way on her commute to work. Her main means of transportation is by foot or on the subway. Because of how active she is, how fast-paced her life is becoming, and how new she is to the area, she would love to have a way to receive medical services quickly, without having to search for a hospital. In addition to that, because she is now being aligned to the New York City lifestyle and is no longer on her parents' medical insurance, she would like the service to also be affordable. She heard about the application from her friends back home, where the application began. She is able to call a doctor and make a house call if necessary, by easily finding local doctors.

Marek Zhang

Marek Zhang is an 18-year old freshman at Cal Poly from New York. His parents pay for his education and provide him with healthcare. Marek doesn't care about his studies and spends most of his time skateboarding. During Week of Welcome, W.O.W, Marek was so excited about starting his new life in college. When he was leaving his dorm room to meet up with his W.O.W group to go to the beach he rode his skateboard into a tree head first. He started to feel dizzy, nauseous and had a massive headache. Unsure if he has a concussion or not, Marek decides to seek medical attention. He staggers over the health center only to find that they're closed! But he immediately remembers that at the beginning of W.O.W he downloaded an app that could provide him with medical assistance.

Marek's goal is to get convenient medical assistance and not have to wait for the health center to open. Even though his parents pay for his healthcare he doesn't want them to pay too much, he is afraid that his parents will stop supporting him financially if he brings home a ridiculous medical bill. Being a tech savvy young adult, Marek is able to use the app to schedule an appointment with a doctor for the next day. The price for the appointment was very reasonable and Marek's parents were happy to pay for the service.

Use Cases

Use Case 1:
- Actors - Patient
- Goal - Open application
- Description - The patient clicks the application and the splash screen appears. Immediately after, the patient is sent to the doctor list.
- Justification - This case is the initial step of beginning the service.

Use Case 2:
- Actors - Patient
- Goal - Sign up for service
- Description - The patient already opened the application for the first time and swipes left from the doctor list and clicks the "Sign-up" buton. The patient fills out the form or connects the application through Facebook login. The home screen becomes accessible.
- Justification - The patient must sign up or login through Facebook to begin using the service.

Use Case 3:
- Actors - Patient
- Goal - Locate closest doctor

- Description - The home screen is the "Doctor List." The list provides a list of doctors, their availabilities, and range from patient's current location and the patient chooses the one most applicable to situation.
- Justification - The patient must locate the nearest doctor in the event a house call is necessary.

Use Case 5:
- Actors – Patient, Doctor
- Goal – Call Doctor
- Description - The patient opened the application, signed in, and chose the nearest doctor. The doctor is currently on the phone with a different patient. The patient chooses the pre-evaluation form, fills it out and requests a call. The patient then waits for the doctor to call the patient.
- Justification - This use case is the second most common because they must fill a pre-evaluation form prior to speaking to the doctor.

Use Case 5:
- Actors - Patient
- Goal - Pay Doctor
- Description - Once phone call ends, patient directed to screen to pay. Patient chooses if they would like to pay or not, based on the medical care they received.
- Justification - The application, as well as the doctor, needs a revenue stream. Although, currently, the payment is completely optional.

Use Case 6:
- Actors - Patient
- Goal - Review Doctor
- Description - Like other mobile applications, there will be a chance to review not only the application, but also the doctor. Once the phone call ends, application directs patient to option to pay, followed by option to rate. Rating system based on 5-star, as well as short description for rating application as well as doctor.
- Justification: This use case is necessary for us to evolve the app based on customer satisfaction, as well as doctor is able to see what can be improved, if necessary.

Use Case 7:
- Actors - Doctor
- Goal - Set Availability
- Description - A doctor opens the Pre-R House Calls app and logs into account. Doctor then sets availability to unavailable, busy, or available. The doctor can then exit the app, which will run in the background. Notifications will appear whenever a patient wishes to contact as well as if a form is sent.
- Justification - The use case will show that the doctor has the freedom to make own schedule and will ensure that phone is not bombarded with calls when unavailable.

Use Case 8:
- Actors - Doctor
- Goal - Schedule Home Visit
- Description - After talking to a patient, a doctor can setup an appointment that is linked to an online calendar.

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● Justification - The use case covers setting up home visits.

Use Case 10:
● Actors - Doctor
● Goal - Make a Call
● Description - After getting a notification from the app, a doctor will open the app and go to the Available Section. In the section, there will be a list of numbers that are in line for the doctor to cal. The doctor chooses a number, which will call the patient and change his or her availability to busy. When the call ends, the doctor's availability to change back to available.
● Justification - The use case covers how a doctor will answer a call from a patient.

Decision Matrix

System Functions	Potential Solutions (From Convergent Thinking Exercise)	Best Benchmark from QFD	Performance	Security	Memory	Reliability	Costs	User Friendly	Weighted Sum +	Weighted Sum -	Weighted Sum S
Specification Weight			20	20	5	30	5	20			
Database	MySQL	S	S	S	S	S	S	+	20	0	80
	NoSQL		+	S	S	+	S	-	50	20	30
Waiting Room	Priority Queue	S	-	S	S	S	S	+	20	20	60
	Linked List		-	S	-	-	S	-	0	75	25
	Array List		-	S	-	-	S	-	0	75	25
	Hashtable		S	S	S	S	S	S	0	0	##
Server Hosting	AWS	S	S	S	S	S	S	S	0	0	##
	Google Cloud Platform		S	S	S	S	S	S	0	0	##
	GoDaddy		-	S	+	-	-	-	5	75	20
	Parse		S	S	S	S	-	+	20	5	75
Scheduling	Google Calendar	S	S	S	S	S	S	S	0	0	##
	MindBody		S	+	S	S	-	-	20	25	55
Payment	Paypal	S	S	S	S	S	S	S	0	0	##
	Venmo		-	-	-	-	-	-	0	##	0
	Apple Pay		S	S	S	S	S	-	0	20	80
	Google Wallet		S	S	S	S	S	-	0	20	80
Calling	In App Calling	S	S	S	S	S	S	S	0	0	##
	Skype		-	-	S	-	S	S	0	75	25
	Google Hangouts		-	-	S	-	S	S	0	70	30

Figure 13: Decision Matrix

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FAILURE MODE AND EFFECTS ANALYSIS

Item:	Pre-R House Calls Mobile App		Responsibility:	Izey Sarmiento			FMEA number:		123456			
Model:	Current		Prepared by:	Ryan Foletta			Page :		1 of 1			
Core Team:	R. Foletta, M. Zhang, I. Sarmiento, T. Acorda, B. Truong, W. Lee, T. Nguyen						FMEA Date (Orig):		1/21/2015	Rev:	1	

Process Function	Potential Failure Mode	Potential Effect(s) of Failure	Sev	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occur	Current Process Controls	Detec	RPN	Recommended Action(s)	Responsibility and Target Completion Date	Action Results				
												Actions Taken	Sev	Occ	Det	RPN
Create User Account	Create duplicate account	Users will be able to log into another user's account	10		Not checking the database for existing accounts before creating one	5	User	3	150	Query database for username before creating the account	Tim/Izey (1/27/15)					0
	Associate account with incorrect information	User's could see information from another user's account	10		Populating information in the incorrect row of the database	5	User	3	150	Ensure you are on the correct user in the database before entering information	Tim/Izey (1/27/15)					0
Waitlist	The queue gets overloaded	Crash the app/mess up the order of the line	7		Multiple users trying to join the same waitlist. Not limiting the number of people	3	Database	7	147	Put a limit on the length of the waitlist. Send a message to the user.	Ryan (1/27/15)					
Form	User entered data ends up in wrong spot of database	Doctor will see patient information incorrectly	7		PHP scripts are incorrectly querying the database	10	Database	10	700	Test the scripts for some examples before populating the database	Winifred (1/27/15)					0
Doctor Bio	Doesn't correctly pull data from the database	Patient will see doctor information incorrectl	8		PHP scripts are incorrectly querying the database	10	Database	10	800	Have multiple fake bios to test.	Izey					0
Tutorial	Tutorial plays every time you open the app, even if you have already seen it (and vice versa)	Users will see the tutorial every time they open the app	6		Login status is not updated properly	3	Frontend Application	10	180	Test opening the app with and without being logged in	Marek/Tim/Ryan					0
Doctor Availability Status	Doctor status could be listed incorrectly	Doctor may be sent forms when offline, or cannot recieve forms while online	10		Availability status not being updated	10	Frontend and Backend integration	8	800	Make sure database is constantly being updated as well as doctor status	Tim / Brian / Winifred / Marek					0

Figure 14: FMEA

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Report Date	2/5/2014	Sponsor	Lynne Slivovsky and Sam Slishman			Component/Assembly		REPORTING ENGINEER:	Isabella Sarmiento

		TEST PLAN								TEST REPORT			
Item No	Specification	Test Description	Acceptance Criteria	Test Responsibility	Test Stage	SAMPLES TESTED		TIMING		TEST RESULTS			NOTES
						Quantity	Type	Start date	Finish date	Test Result	Quantity Pass	Quantity Fail	
1	Login	Login to an existing user.	Username and password are looked up. If both are found, user is sent to next screen. If both are not found, user is asked to try again.	Brian, Izey	PV								
2	Sign up	Try multiple sign ups.	Username and password are correctly stored. Identical usernames do not exist in the database.	Winifred, Marek	PV								
3	Show Bio	Load bio from different doctors	The correct bio for each doctor loads. (ie: Doctor A's bio does not load when you click Doctor B)	Ryan, Marek	DVL, PV								
4	Splash Screen	Launch the app several times	Splash screen always comes up when the app launches. Splash screen should never pop up at any other time while using the app.	Tim, Winifred	DVL, PV								
5	List Doctors	Load the doctor page several times, each time with a different number of doctors	Doctors show up with correct information loaded from the database. Doctors that are not available to not show up.	Ryan, Izey	DVL, PV								
6	Send Form	Form is made and sent to the doctor.	User fills out form and it is added to the datacase.	Brian, Izey	PV								
7	Waitlist	The waitlist position is displayed to the user.	User is redirected to the waitlist screen after filling out a form. On the waitlist screen, the user's position in the database is sorted and displayed on the screen for the user.	Ryan, Tim	DVL, PV								
8	Tutorial	Launch the app as a new user and an existing user	The tutorial should only launch for a new user, or a user that is not logged in. Otherwise the app should skip the tutorial and move to the doctor list page	Tim, Winifred	DVL, PV								
9	Db User Table	Query all information before and after information is added	Confirm data is being stored correctly for User ID, First Name, Last Name, Email, Password, Phone Number, Username, and Profile Image	Tommy, Marek	PV								
10	Server	Create backups. Create new server instance and run backups on it.	Confirm that API functions correctly.	Brian, Tim, Izey	PV								
11	Db Doctor Table		Confirm data is being stored correctly for Username, First Name, Last Name, Availability, Distance, Description, and Profile Image	Tommy, Marek	PV								
12	Db Form Table	Query all information before and after information is added	Confirm data is being stored correctly for Index, Name, Number, MedInfo, Symptoms, Other	Tommy, Marek	PV								
15	Db Waitlist Table	Query all information before and after information is added	Confirm data is being stored correctly for Doctor Id, User Id, Queue Position, Primary Physician, Medical Concern, and Address	Tommy, Marek	PV								
16	Db Cities Table	Query all information before and after information is added	Confirm data is being stored correctly for id, City Name, City State, City Population, and Country	Tommy, Marek	PV								

Figure 15: DVP+R