RU Healthy?

PROJECT PROPOSAL

Class
ECE 567 – Software Engineering 1

Semester
Fall 2017

Group
Tahiya Chowdhury, Tina Drew,
George Koubbe, Aymen Al-Saadi,
Himabindu Paruchuri and Ramya Tadepalli

Website: RU Healthy?

TEAM PROFILE

Team Member Name	Description	Skills	Qualifications and Strengths
Aymen Al-Saadi	MS Student in Electrical and Computer Engineering	C, C++,C#, Java, Matlab	Data collection, software development, documentation, organization, presentation Previously worked on online bank accounts and stock market project.
Tahiya Chowdhury	MS Student in Electrical and Computer Engineering	C, C++, Java	Design, presentation, organization. Working on Mobile User Experience project, have experience with interaction design.
Tina Drew	Ph.D candidate in Electrical and Computer Engineering	LabVIEW, C++, Python	Documentation, organization, presentation, automated programming in LabVIEW. Have experience designing automated programs that interfaced with hardware and test equipment.
George Koubbe	MS Student in Electrical and Computer Engineering	C, Matlab, Python	Documentation, organization, presentation, software development. Experience working with robotic mobile platforms.
Himabindu Paruchuri	MS Student in Electrical and Computer Engineering	C++, Python and Java(basic)	Programming. Previously worked on software testing.
Ramya Tadepalli	MS Student in Electrical and Computer Engineering	C, C++	Programming, documentation. Previously worked on the bench and test case design and automation. Currently working on a 5G software architecture prototype.

PROBLEM

We live in a technology driven, quick paced, gluttonous society. It is easy to get caught up in online profiles, games or social statuses and neglect physical exercise. It is also extremely convenient to purchase fast food from a local McDonald's rather than making a healthy home-cooked meal. Unfortunately, these habits lead to obesity and multitude of health issues. According to the 2016 Health Study by the United States Department of Health and Center for Disease control, over 70% of Americans over the age of 20 are overweight.

As a way to reduce obesity, we propose using the "RU Healthy?" app to motivate people to exercise. Using the motion sensors and camera of the smartphone, the app will detect whether you are exercising according to your schedule. It will also perform your calorie count. The app will store these statistics to an online database that both physician and user can access.

PROPOSED PROJECT

Application Description

Suppose a person, Mike, is having a physical problem and is overweight. His physician has set up an exercise schedule for Mike, which is a part of the app we are proposing. This app will have a target weight, heartbeat rate, daily exercise hour, etc. prescribed by the physician.

As we mentioned before, we will count the calories burnt by Mike. In order to do this, we need the accelerometer sensor, available in most of today's smartphones. This sensor will provide us with three values (x, y, and z). The sensor will start calculating and saving the data to a database when the sensor event is true, we can use these data (x, y, and z) to calculate the distance. For example, if Mike is running at 5 MPH, he burns 0.064 calories per minute per pound of his body weight.

What will the user do with the app?

The user, Mike, can create an account for himself and log into the app. Mike will have to do an initial one-time configuration to enter his age, gender, height, and weight. He will also have the ability to check: when he started and stopped walking, and the total distance that he walked. Moreover, he will be able to see and keep track of the calories he burnt during the week and his activity history.

At the other end, the physician or the trainer will be able to see Mike's activities in a web UI. The data to this UI will be obtained from a database which regularly stores user activity (say, weekly). We can use Django or a similar platform to make the web UI for the doctor. Data from the Android phone can be sent to a server/database with the help of Java or Android libraries or this

can be synced to the cloud. We can further scale this up to ensure that the physician is able to see all of his patients records, if they have installed the app.

Every day, the person's data will be stored. The weekly update will be sent to his/her physician/trainer. This way, the physician/trainer will get to know whether Mike is following his schedule or not. The doctor will have a web page with login information. When the doctor logs in, they can see the information updates coming from all their patients. And whichever patient is failing to follow the schedule, it will be marked by red and the device will give the patient a "warning" or a notification. The physician will set up an appointment with those patients to talk about it.

Audience

The target audience are people that desire to be more physically active or have some sort of physical activity goal. This may include: people who are trying to lose weight, who may be training for a sport, or those that just want to remain healthy. The app could be recommended to overweight and obese patients by their physician/trainer in order to promote exercise. The app will also help the physician/trainer have a better idea of the patient's activities which will aid in a better diagnosis and treatment.

Functions

- Check heartbeats rate
- Monitor and record physical activity
- Perform calorie count
- Store user registration information.
- Store health data
- Send results to online database
- Sound alarm to promote people to exercise

What is different about this app and why is this app better than others?

Currently, there are a lot of apps which help users keep track of their activity and fitness levels. This can be done by calculating activity, setting targets and displaying the history of this activity. Our app hopes to further this functionality by building a unified platform for fitness and also share this information with a physician for better diagnosis and treatment.

"RU Healthy?" app will provide a user friendly GUI so that the user can interact with it in very easy way. Also, it will use built-in device features and sensors without the need for any external sensors or any other apps to depend on. The app will gather the data and will store it in an online database so it will not occupy any unusual device storage. Overall, the app hopes to provide a

convenient, user friendly experience in keeping people fit. This will make a complete mobile health monitoring system.

PLAN OF WORK

Basic Operation

Our target systems are Android devices. Our module will likely be a Galaxy S5. Since we are developing for the Android platform, we intend to use Android Studio (provided by google) based on Java language to update and build the software source code. First, we will try to gather and collect the data from the Android motion sensors. These sensors measure acceleration forces and rotational forces along three axes.

Tasks

Functional Tasks

- Research applications performing similar functions - **2 days**
- Create/include basic structure for phone application in Android Studio - **5 days**
  (We may use code structure from a previously developed application)
- Create the mobile application with the basic features - **10 days**
  (This includes registration, login, and entering user details such as height, weight, age etc.)
- Learn how to use phone sensors to collect the heart rate, distance walked, etc. - **4 days**
- Create database tables to store patient/user information and their records - **4 days**
- Plan and create structure for web application - **10 days**
  (add basic functionalities like login and patient profiles)
- Sync the mobile application with the web application - **5 days**
  (Try to find necessary libraries to send data to a server/database or sync with cloud and use the data)
- Add data view capability to the Web UI - **5 days**
  (Query database to obtain user information when corresponding function is chosen)

Quality Tasks

- Merge code components - **3 days**
  (Customer registration, data processing, data management, data transport, etc.)
- Use some gathered data to test the application - **4 days**
  (Since we will have only a limited time to collect actual user data, we could use some relevant random values as data for the remaining duration of time)
- Test the web application with multiple mobile app users - **3 days**
- Do beta testing on application - **2 days**
- Make adjustments to optimize application - **2 days**

- Retest application with adjustments - **2 days**

Product Ownership

Tasks	Aymen	George	Tahiya	Himabindu	Tina	Ramya
Customer Registration			X	X		
Data Capture and Storage	X	X				
Data Processing	X	X	X	X		
Web Development			X	X		X
Data management					X	X
Sending data to Android server					X	X
Non functional features	X	X				
Documentation	X	X	X	X	X	X