DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
THE UNIVERSITY OF TEXAS AT ARLINGTON

SYSTEM REQUIREMENTS SPECIFICATION
CSE 4316: SENIOR DESIGN I
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STATE FARM

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REVISION HISTORY

Revision	Date	Author(s)	Description
1.0	3.23.2020	CM, WS, DT, SB	official release
2.0	5.14.2020	WS	official release
2.1	5.15.2020	WS	official release

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LIST OF FIGURES

1 PRODUCT CONCEPT

This section describes the purpose, use and intended user audience for a wearable device along with a mobile application. The wearable device along with the mobile application is a system that will collect health data from the user. Users of the wearable device and the mobile application will be able to potentially receive discounts on their life insurance rates depending on how healthy of an individual they are, which will be determined from the data that is collected from the wearable device.

1.1 PURPOSE AND USE

Our product should be able to track health information from the user in order to calculate a corresponding fitness level of that user. The person's heart rate, sleep, exercise, driving habits, and location will be tracked by our product. The corresponding fitness level, calculated from the recorded data from the user, will relate to a possibly reduced quote.

1.2 INTENDED AUDIENCE

The intended audience of our product is the customers of State Farm. Specifically, the customers that are paying for life insurance at State Farm.
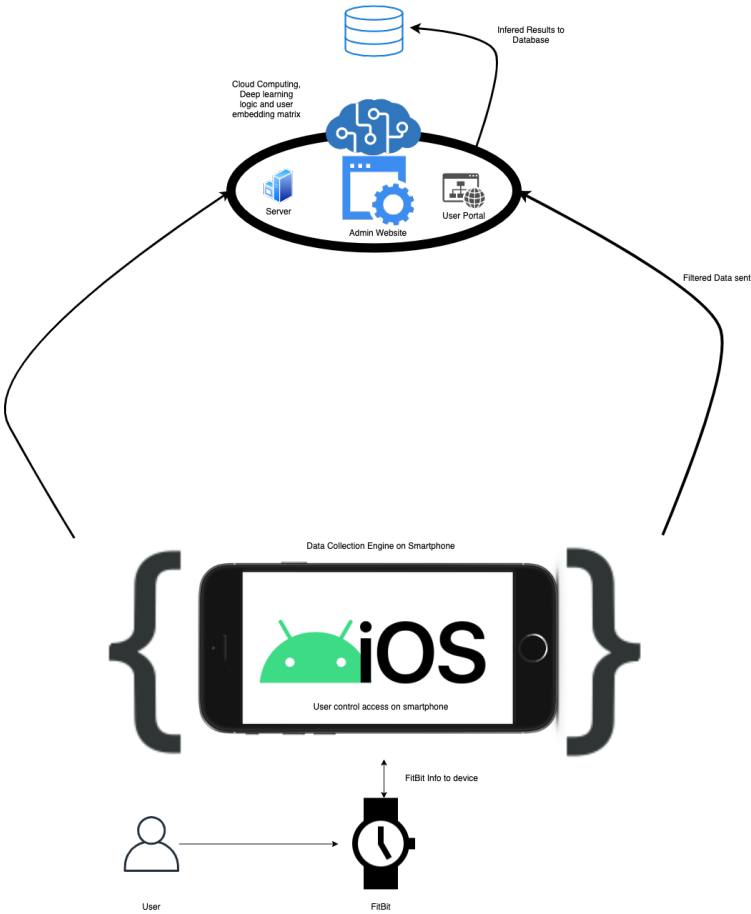
Figure 1: conceptual drawing

2 PRODUCT DESCRIPTION

This section provides the reader with an overview of the mobile application we will be creating for State Farm to extract health information from a wearable device in order to give users a possible reduced life insurance rate. The primary operational aspects of the product, from the perspective of end users, maintainers and administrators, are defined here. The key features and functions found in the product, as well as critical user interactions and user interfaces are described in detail.

2.1 FEATURES & FUNCTIONS

Our mobile application will similar to a fitness app and will track the user's health information. As in Figure 2, the user will first see a Get Started screen with "State Farm Fit" title at the top. Also shown in Figure 2 the user will be able to view their health information such as their heart rate, blood pressure, pulse, steps, calories burned, etc. Our application will also have GPS capabilities in order to track the user's location. The users will also be able to view their current fitness score which will be used to determine whether or not the user gets a discount.

2.2 EXTERNAL INPUTS & OUTPUTS

Name	Description	Use
Heart Rate	Wearable device should track the user's heart rate	The user's heart rate will be used in the mobile application as part of the "Fitness Level" calculation in order to give the user a possibly reduced rate.
Steps	Wearable device should track the number of steps the user takes in a day	The number of steps taken by the user will be used as part of the "Fitness Level" calculation in order to give the user a possibly reduced rate.
Sleep	Wearable device should track the hours of sleep the user gets each night	The amount of sleep the user gets will be used as part of the "Fitness Level" calculation in order to give the user a possibly reduced rate.
Exercise	Wearable device should track how much the user exercises	The amount that the user exercises will be used as part of the "Fitness Level" calculation in order to give the user a possibly reduced rate.
Location	Wearable device should track the user's location	The location of the user will be used as part of the "Fitness Level" calculation in order to give the user a possibly reduced rate. For example if they were consistently going to bars during the week that might count against them.
Driving	Wearable device should track the user's driving habits.	The user's driving habits will be used as part of the "Fitness Level" calculation in order to give the user a possibly reduced rate.
Username	Entered by the user when wanting to login	Used to authenticate user so that they can view their health information.
Password	Entered by the user when wanting to login	Used to authenticate user so that they can view their health information.

2.3 PRODUCT INTERFACES

Specify what all operational (visible) interfaces look like to your end-user, administrator, maintainer, etc. Show sample/mocked-up screen shots, graphics of buttons, panels, etc. Refer to the critical external inputs and outputs described in the paragraph above.
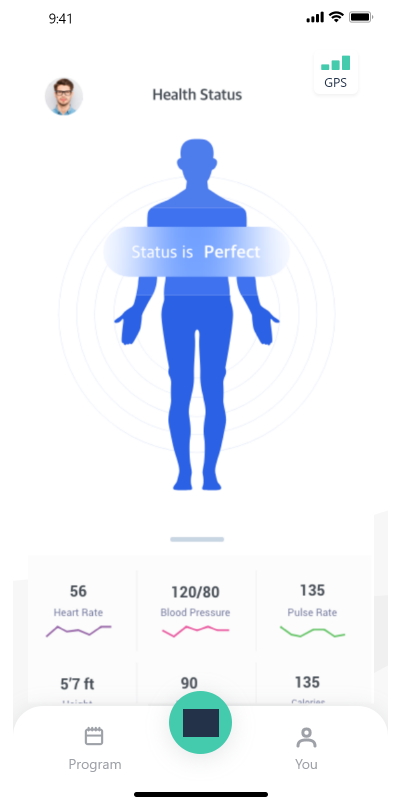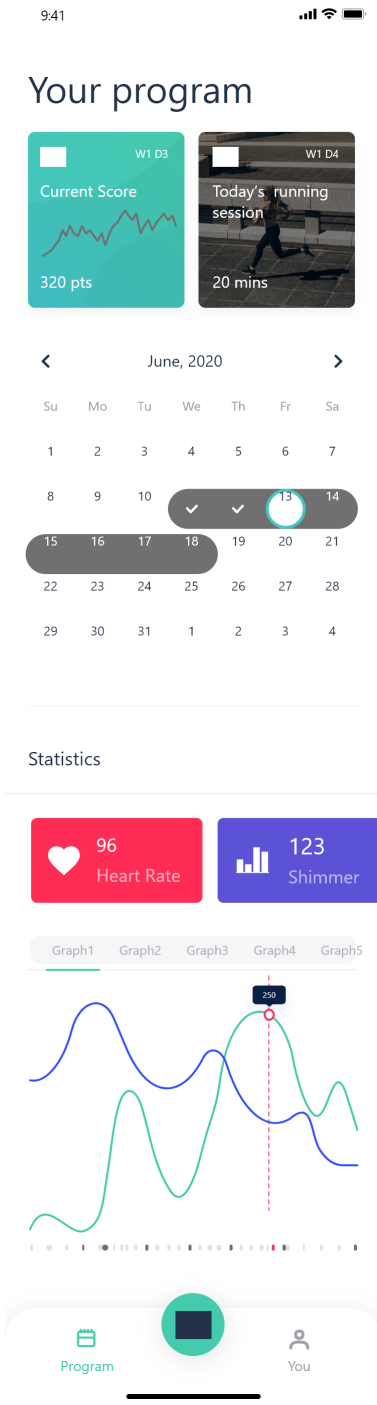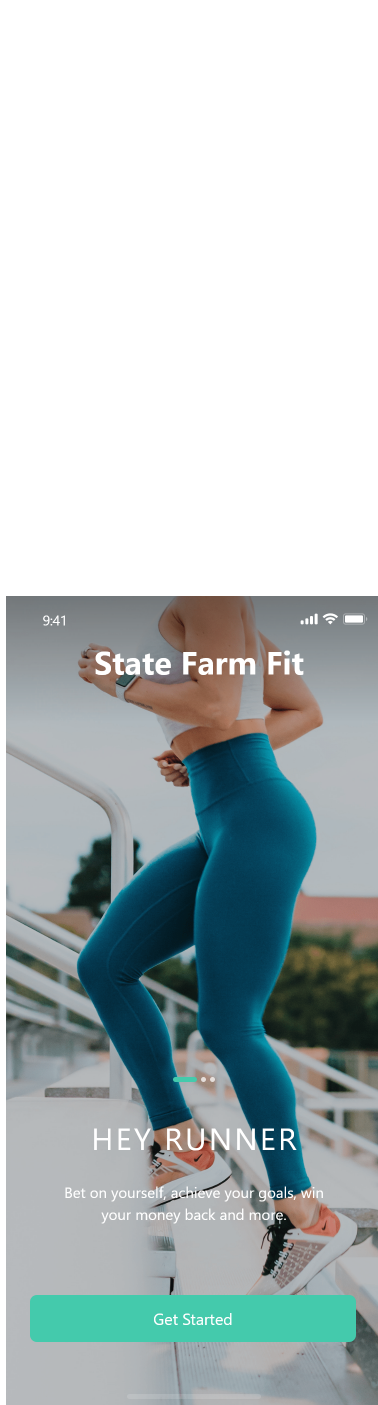
Figure 2: default

3 CUSTOMER REQUIREMENTS

Our project consists of a wearable device and a mobile application for the users of our product. The users can expect our product to collect health information from them, such as their heart rate, sleep, steps, workouts, location, and their driving habits. Depending on the collected data the user can then expect a corresponding "Fitness Level" to be calculated. Based on this "Fitness Level" the user can then expect our application to potentially give them a reduced rate for their life insurance with State Farm.

3.1 APPLICATION SHALL BE DEPLOYED ON WEARABLE DEVICE

3.1.1 DESCRIPTION

The system shall be deployed on a wearable device. As of right now our group is leaning towards a Fitbit. The wearable device will collect the user's health information to be used to calculate a Fitness Level for a possibly reduced life insurance rate.

3.1.2 SOURCE

The source of the requirement is our sponsor, State Farm.

3.1.3 CONSTRAINTS

Our only constraint for this requirement should be the budget and availability of a Fitbit.

3.1.4 STANDARDS

Since we will be collecting health data from the users of our product we will need to comply with HIPPA standards.

3.1.5 PRIORITY

Critical

3.2 APPLICATION SHALL BE DEPLOYED ON MOBILE DEVICE

3.2.1 DESCRIPTION

The system shall be able to be run on the user's mobile phone so that they can login to their account, access their health information, and see their reduced rate.

3.2.2 SOURCE

The source of this requirement is our customer, State Farm.

3.2.3 CONSTRAINTS

Our constraints will be needing to learn and research more about mobile application development as no one in our team has much experience with it. Also time will be a constraint, since we only have 2 semesters to work on our project we will likely only have enough time to create an IOS app or an Android app, but not both.

3.2.4 STANDARDS

Since our mobile application will be storing the health information that is collected from the wearable device we will also need to ensure that we comply with HIPPA rules and regulations for this requirement as well.

3.2.5 PRIORITY

Critical

3.3 WEARABLE DEVICE MUST BE CAPABLE OF CAPTURING HEALTH DATA

3.3.1 DESCRIPTION

The system shall be capable of capturing the user's health data. The wearable device that we choose must be capable of capturing the user's health data. It must be able to measure the person's heart rate, count their steps, track their sleep, their workouts, their location, and their driving habits.

3.3.2 SOURCE

The source of this requirement is our sponsor, State Farm.

3.3.3 CONSTRAINTS

The constraints for this requirement will be the availability of a device that tracks all of these things or at least the majority. Cost of a wearable device is also a potential constraint, our budget might not allow for a device with all of these features that we want.

3.3.4 STANDARDS

Since the wearable device will be tracking all of the user's health information we will need to ensure that it is HIPPA compliant.

3.3.5 PRIORITY

Critical

3.4 WEARABLE DEVICE AND MOBILE DEVICE MUST COMMUNICATE USER DATA

3.4.1 DESCRIPTION

The system shall be able to communicate user data between the wearable device and the mobile device synchronously or asynchronously. Our team has not decided on which one yet.

3.4.2 SOURCE

The source of this requirement is our sponsor, State Farm.

3.4.3 CONSTRAINTS

A constraint for this requirement would be that we will need to ensure that the wearable device and the mobile device that we choose are platform compatible.

3.4.4 STANDARDS

Our team will need to ensure that the communication of the user data between the wearable device and the mobile device complies with HIPPA.

3.4.5 PRIORITY

Critical

3.5 DECIDE FRAMEWORK TO BUILD APPLICATION ON

3.5.1 DESCRIPTION

The sponsor gave us flexibility to decide which framework (e.g. Swift, Java, C++...) to build the application. As of right now it is yet to be decided between Java and Swift.

3.5.2 SOURCE

Sponsor: State Farm

3.5.3 CONSTRAINTS

There will be a learning curve even if, we choose the framework we are familier with or not.

3.5.4 STANDARDS

N/A

3.5.5 PRIORITY

Moderate

3.6 MOBILE APPLICATION SHALL DISPLAY DATA CAPTURED BY WEARABLE DEVICE

3.6.1 DESCRIPTION

Mobile application and application on the watch should be able to synchronize to be able to see all the health data on the phone collected from the watch.

3.6.2 SOURCE

Sponsor: State Farm

3.6.3 CONSTRAINTS

The watch and phone should be platform compatible, in order for it to be able to synchronize.

3.6.4 STANDARDS

Our team will need to ensure that the communication of the user data between the wearable device and the mobile device complies with HIPPA.

3.6.5 PRIORITY

Critical

3.7 MOBILE APPLICATION SHALL HAVE A LOGIN/SECURITY INTERFACE

3.7.1 DESCRIPTION

Mobile application should have some kind of login interface either username/password or face id.

3.7.2 SOURCE

Sponsor: State Farm

3.7.3 CONSTRAINTS

The constraints for this requirement would be availability of a phone which is also compatible with watch and have latest security measures.

3.7.4 STANDARDS

N/A

3.7.5 PRIORITY

High

3.8 MOBILE APPLICATION SHALL CORRELATE GIVEN HEALTH DATA WITH A CORRESPONDING FITNESS LEVEL

3.8.1 DESCRIPTION

The mobile application should be able to provide fitness level based on the health data such as, heart rate, location, sleep, driving and workout, which will then relate to possibly reduced quote.

3.8.2 SOURCE

Sponsor: State Farm

3.8.3 CONSTRAINTS

Availability of a smart watch being able to track the health related data such as, heart rate, sleep, location, driving and workout.

3.8.4 STANDARDS

Our team will need to ensure that the transfer of data from mobile to AWS complies with HIPPA.

3.8.5 PRIORITY

Critical

3.9 MOBILE APPLICATION SHALL UTILIZE AWS AS A MEANS OF STORING AND PROCESSING USER DATA

3.9.1 DESCRIPTION

Amazon Web Services (AWS) would be used for storing the health related data collected by the wearable device and then process it.

3.9.2 SOURCE

Sponsor: State Farm

3.9.3 CONSTRAINTS

The only constraint we have to encounter is the budget to be able to use AWS.

3.9.4 STANDARDS

Our team will need to ensure that the transfer of data from mobile to AWS complies with HIPPA.

3.9.5 PRIORITY

High

3.10 APPLICATION SHALL DETECT FRAUDULENT ACTIVITY

3.10.1 DESCRIPTION

The application should detect if a person(customer) has switched the device to a healthier individual.

3.10.2 SOURCE

Sponsor: State Farm

3.10.3 CONSTRAINTS

To be able to constantly compare the health related data collected with the one's are stored already and check for the big difference to detect fraud.

3.10.4 STANDARDS

Our team will need to ensure that the transfer of data from mobile to AWS complies with HIPPA.

3.10.5 PRIORITY

High

3.11 Website that mirrors Mobile application which will allow users multiple points of entry to their data

3.11.1 Description

As a means to provide multiple access points, Costumers of the State Farm should be able to get website view their health data.

3.11.2 Source

Sponsor: State Farm

3.11.3 Constraints

N/A

3.11.4 Standards

Our team will need to ensure that the transfer of data from mobile to AWS complies with HIPPA.

3.11.5 Priority

Low

4   PACKAGING REQUIREMENTS

The package should include all documents and source code of the project.

4.1   DOCUMENTS

4.1.1   DESCRIPTION

The package shall include the final version of project charter, system requirements specification, design, and user manual.

4.1.2   SOURCE

Team

4.1.3   CONSTRAINTS

N/A

4.1.4   STANDARDS

N?A

4.1.5   PRIORITY

Priority:high

4.2   SOURCE CODE

4.2.1   DESCRIPTION

The package shall include the source code of the application for IOS and android platform, and back-end application.

4.2.2   SOURCE

Team

4.2.3   CONSTRAINTS

N/A

4.2.4   STANDARDS

N/A

4.2.5   PRIORITY

Priority:high

4.3   DOWNLOAD

4.3.1   DESCRIPTION

The package shall be able to be download at a google drive for the project.

4.3.2   SOURCE

Team

4.3.3   CONSTRAINTS

N/A

4.3.4   STANDARDS

N/A

4.3.5 PRIORITY

Priority:high

5 PERFORMANCE REQUIREMENTS

The performance of the software focus on two aspects. The application runs on user's smartphone should be robust for 24x7 tracking user's health data. When a customer request an evaluation, the software should yield a result to customer before they lose the patience.

5.1 APPLICATION SIZE

5.1.1 DESCRIPTION

The size of the application shall be at most 200MB.

5.1.2 SOURCE

Team

5.1.3 CONSTRAINTS

only apply for the software runs on the smartphone(front-end).

5.1.4 STANDARDS

N/A

5.1.5 PRIORITY

Priority:high

5.2 APPLICATION ROBUST

5.2.1 DESCRIPTION

The application shall run on a smartphone 24hours without failure.

5.2.2 SOURCE

Team

5.2.3 CONSTRAINTS

only apply for the software runs on the smartphone(front-end).

5.2.4 STANDARDS

N/A

5.2.5 PRIORITY

Priority:high

5.3 APPLICATION RESPONSE TIME

5.3.1 DESCRIPTION

The application shall be able to yield a result to customer in 10 seconds.

5.3.2 SOURCE

Team

5.3.3 CONSTRAINTS

only apply for the software runs on the smartphone(front-end).

5.3.4 STANDARDS

N/A

5.3.5 PRIORITY

Priority:high

6 Safety Requirements

Since our project is a pure software development project, we do not have a specific safety requirement. However, we will follow the default safety requirements if it is qualified.

6.1 Laboratory equipment lockout/tagout (LOTO) procedures

6.1.1 Description

Any fabrication equipment provided used in the development of the project shall be used in accordance with OSHA standard LOTO procedures. Locks and tags are installed on all equipment items that present use hazards, and ONLY the course instructor or designated teaching assistants may remove a lock. All locks will be immediately replaced once the equipment is no longer in use.

6.1.2 Source

CSE Senior Design laboratory policy

6.1.3 Constraints

Equipment usage, due to lock removal policies, will be limited to availability of the course instructor and designed teaching assistants.

6.1.4 Standards

Occupational Safety and Health Standards 1910.147 - The control of hazardous energy (lockout/tagout).

6.1.5 Priority

Critical

6.2 National Electric Code (NEC) wiring compliance

6.2.1 Description

Any electrical wiring must be completed in compliance with all requirements specified in the National Electric Code. This includes wire runs, insulation, grounding, enclosures, over-current protection, and all other specifications.

6.2.2 Source

CSE Senior Design laboratory policy

6.2.3 Constraints

High voltage power sources, as defined in NFPA 70, will be avoided as much as possible in order to minimize potential hazards.

6.2.4 Standards

NFPA 70

6.2.5 Priority

Critical

6.3 RIA robotic manipulator safety standards

6.3.1 Description

Robotic manipulators, if used, will either housed in a compliant lockout cell with all required safety interlocks, or certified as a "collaborative" unit from the manufacturer.

6.3.2 SOURCE

CSE Senior Design laboratory policy

6.3.3 CONSTRAINTS

Collaborative robotic manipulators will be preferred over non-collaborative units in order to minimize potential hazards. Sourcing and use of any required safety interlock mechanisms will be the responsibility of the engineering team.

6.3.4 STANDARDS

ANSI/RIA R15.06-2012 American National Standard for Industrial Robots and Robot Systems, RIA TR15.606-2016 Collaborative Robots

6.3.5 PRIORITY

Critical

7 MAINTENANCE & SUPPORT REQUIREMENTS

The software and all the code base will be delivered to the customer in a thumb drive along with a git repository. Each of our section of integration will include a Docker file and Doxygen based documentation that will allow user to recreate the development environment. The deliverable will also include compile apks for phone and script to run server and deploy deep learning model. The deliverable will also include a usage manual that will detail how to operate and view use documentation, while giving the customer a high level view of the entire system.

7.1 DOCUMENTATION

7.1.1 DESCRIPTION

Doxygen will be used document our code base and also for the overall system operation. It will give new programmer a understanding of each module. The detailed documentation of the system will include description of all the components involved.

7.1.2 SOURCE

Sponsor

7.1.3 CONSTRAINTS

For Deep Learning end of the application not all logic will be documented

7.1.4 STANDARDS

Doxygen will be used for documentation C-Style comment block will be used for documentation

7.1.5 PRIORITY

High

7.2 DOCKER

7.2.1 DESCRIPTION

The code base will be delivered to the customer along with its Docker environment which will enable our customer to recreate the environment and start developing immediately.

7.2.2 SOURCE

Sponsor

7.2.3 CONSTRAINTS

Will require customer that have same operating system with match system processing architecture.

7.2.4 STANDARDS

Docker with docker file and shell script to execute all the pipelines

7.2.5 PRIORITY

High

7.3 BUILD PIPELINE

7.3.1 DESCRIPTION

Build Pipeline is to ensure code integrity and spun docker instances with customer interference. This involves running different safety checks, unit test and deploying an environment to run the code base.

7.3.2 SOURCE

Sponsor

7.3.3 CONSTRAINTS

TBD

7.3.4 STANDARDS

TBD

7.3.5 PRIORITY

Future

8 OTHER REQUIREMENTS

This section focuses on capturing requirements related to customer setup, modularity and portability of the source to various platform.

8.1 MODULARITY

8.1.1 DESCRIPTION

The programming should be modular in nature as to make it more understandable, maintainable, to make it easier to find errors and to improve manageability.

8.1.2 SOURCE

Team

8.1.3 CONSTRAINTS

Team coordination is the thing we need to focus on while coding as all the team member would not have the same coding style.

8.1.4 STANDARDS

N/A

8.1.5 PRIORITY

High

8.2 PLATFORM MATCH

8.2.1 DESCRIPTION

The platform in which the docker image was created should match the platform customer to be able to run the program.

8.2.2 SOURCE

Team

8.2.3 CONSTRAINTS

None

8.2.4 STANDARDS

N/A

8.2.5 PRIORITY

Moderate

9 FUTURE ITEMS

9.1 BUILD PIPELINE

9.1.1 DESCRIPTION

Build Pipeline is to ensure code integrity and spun docker instances with customer interference. This involves running different safety checks, unit test and deploying an environment to run the code base.

9.1.2 SOURCE

Sponsor

9.1.3 CONSTRAINTS

TBD

9.1.4 STANDARDS

TBD

9.1.5 PRIORITY

Future

REFERENCES