Department of Computer Science & Engineering
The University of Texas at Arlington

Project Charter
CSE 4316: Senior Design I
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Team SpaceTabs
LifeFit

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Revision History

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1 Product Concept

This section describes the purpose, use and intended user audience for the State Farm Fit application. The State Farm Fit application is a mobile application that collects and analyzes the health data of State Farmâs customers through a Fitbit device. State Farm can then use the health data to create personalized health insurance rates for each individual customer.

1.1 Purpose and Use

The purpose of the State Farm Fit application is to provide users with personalized health insurance rates. The userâs health data such as their heart rate, number of steps walked, and number of hours slept, among others will be tracked through a Fitbit device. This data is available in Fitbitâs cloud services that will be collected into our AWS server. The application will then make AWS API calls to pull the data. This data can be seen by the user through graphs on the web or mobile application. The application will calculate the userâs fitness level based on their health data through a machine learning algorithm. The userâs fitness level will be used to determine their health insurance quote.

1.2 Intended Audience

The intended audience for the State Farm Fit application are general public that are looking for an insurance quote from State Farm. The product is designed for the general use for customers to keep track of their health quantitatively while observing their coverage rates.

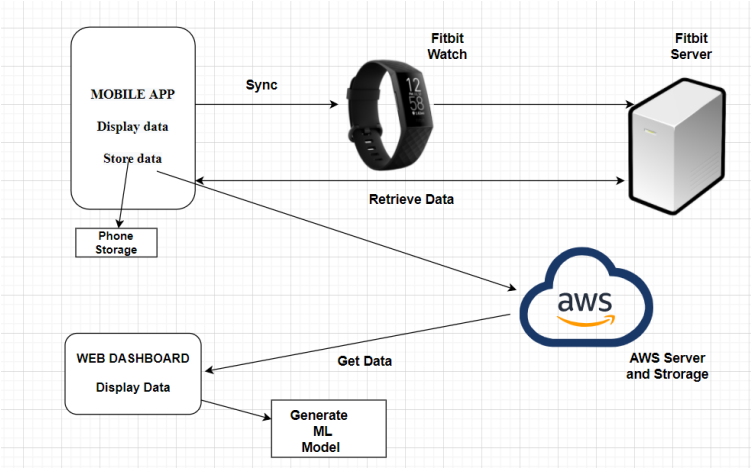

Figure 1: StateFarm Fit app conceptual drawing

2 Product Description

This section provides the reader with an overview of the State Farm Fit application. 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

Using the mobile application, the user will first land on a log in screen, which will require them to enter or create their login credentials. The user can then see their current status which include their health information such as their height, weight, heart rate, blood pressure, etc. The app will show statistics of the health data over a period of time via graphs. This screen will also show the fitness level of the user. The fitness level is what will be used to determine their health insurance quote using machine learning models.

2.2 External Inputs & Outputs

Name	Description	Use
Username	An input that is a unique identifier for a user.	Used to identify user and allow access to their account.
Password	An input that is an expression associated with a username.	Used to authenticate user and allow access to their account.
Height	An input that represents the userâs current height.	Used to determine fitness level.
Weight	An input that represents the userâs current weight.	Used to determine fitness level.
Heart Rate	An input that represents the userâs heart rate.	Used to determine fitness level.
Exercise	An input that represents the time spent by the user on exercises.	Used to determine fitness level.
Sleep	An input that represents the time spent by the user on sleeping in hours.	Used to determine fitness level.
Steps	An input that represents the number of steps taken by the user in a day.	Used to determine fitness level.
Location	An input that tracks the userâs locations.	Used to determine fitness level.
Fitness Level	An output assigned to each user depending on their health metrics.	Used to adjust insurance rate coverage.

Table 2: External inputs and outputs.

2.3 Product Interfaces

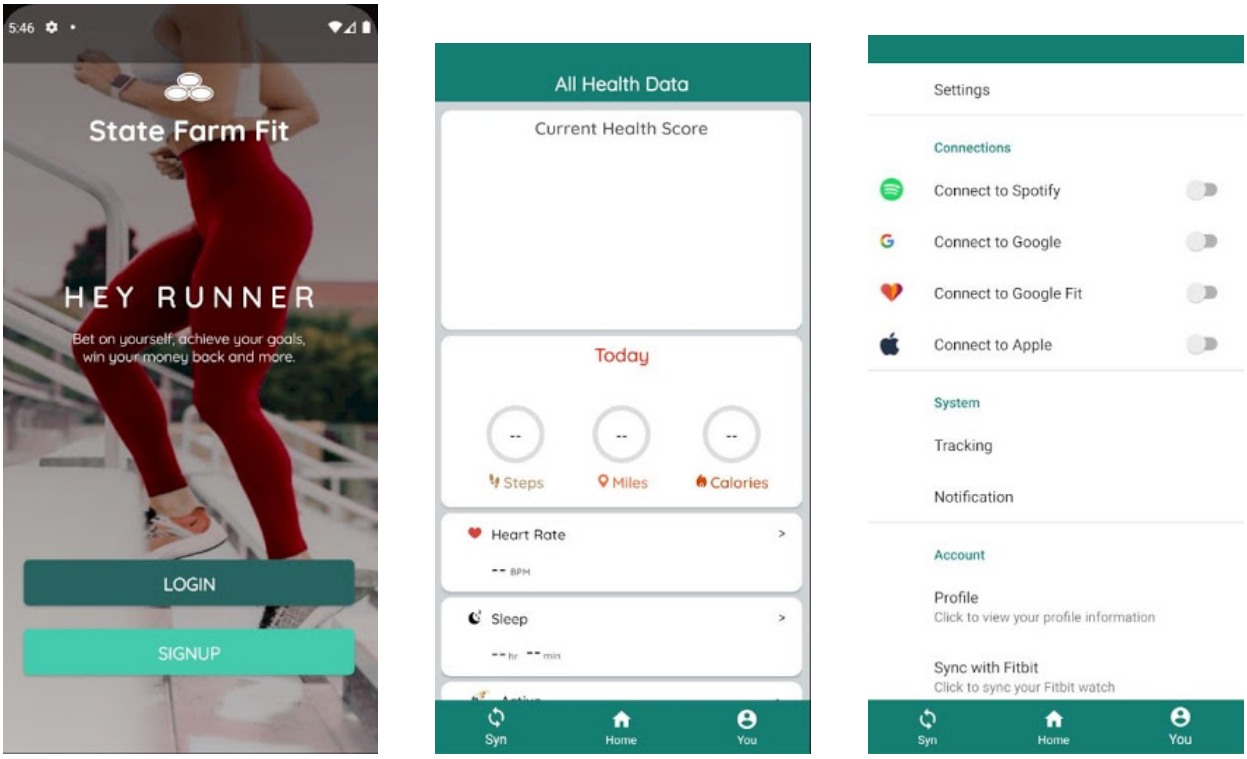

Figure 2: StateFarm Fit app Interfaces of Startup Screen, Dashboard, and Settings

3 Customer Requirements

The State Farm Fit application will interact with a wearable device such as a Fitbit. A user of the application can expect the wearable device to measure and collect data on their health such as the userâs heart rate, the number of steps the user has taken, and the number of hours the user has slept. This app will access this data and interact with it in various ways such as displaying it to the user and using it to calculate a fitness level that will be assigned to the user.

3.1 THE APPLICATION SHALL CALCULATE A FITNESS LEVEL FOR A USER

3.1.1 Description

The system should be able to collect health data through a Fitbit. The application needs to compute the data using a machine learning algorithm to calculate the fitness level. A mathematical model needs to be created to represent this fitness level.

3.1.2 Source

Sponsor: State Farm

3.1.3 Constraints

Users must have a Fitbit model for their data to be collected.

3.1.4 Standards

- HIPAA
- ISO/IEEE 11073

3.1.5 PRIORITY

Critical

3.2 THE SYSTEM SHALL HAVE IMPROVED ARCHITECTURE TO ALLOW API CALLS TO ONLY THE AWS SERVER

3.2.1 DESCRIPTION

The system shall collect data from the FitBit cloud and store it into a AWS server. The health data from Fitbit cloud should be pushed onto a AWS server. Only the AWS server should be used to interact with the application to display the userâs health metrics.

3.2.2 SOURCE

Sponsor: State Farm

3.2.3 CONSTRAINTS

OAuth tokens are needed for a user to sync the Fitbit data into AWS server. Currently, the token expires in about 8 hours, so a new authentication token needs to be generated to continue access to data from Fitbit cloud

3.2.4 STANDARDS

- HIPAA
- ISO/IEEE 11073

3.2.5 PRIORITY

Critical

3.3 THE APPLICATION SHALL HAVE DYNAMIC GRAPHS TO DISPLAY DATA

3.3.1 DESCRIPTION

The application shall display data with graphs. The application should be able to populate data that has been retrieved from Fitbit onto a graph. The user should be able to view different graphs for different data sets. If a user wants to see a subsection of their data, then the visual graphic should only display that subsection.

3.3.2 SOURCE

Sponsor: State Farm

3.3.3 CONSTRAINTS

Currently, new data can only be synced once per day.

3.3.4 STANDARDS

- HIPAA
- ISO/IEEE 11073

3.3.5 PRIORITY

Critical

3.4 SYSTEM SHALL PERFORM FRAUD DETECTION TO CHECK FOR MANIPULATION OF USE

3.4.1 DESCRIPTION

In a theoretical scenario, a user could try to gain a reduction on their health insurance quote by trying to raise their fitness level inorganically. For example, they could put their Fitbit on someone with a higher fitness level to collect their data. We will research the feasibility of being able to detect if data is being manipulated to give the user a better rate. The system should be able to check to see if the data is being manipulated.

3.4.2 SOURCE

Sponsor: State Farm

3.4.3 CONSTRAINTS

N/A

3.4.4 STANDARDS

N/A

3.4.5 PRIORITY

Low

3.5 THE APPLICATION SHALL HAVE A REGISTRATION UI TO ALLOW NEW USERS TO REGISTER

3.5.1 DESCRIPTION

The application should have the ability register a new user. Currently, all users are registered using the web UI and postman post call. The application should provide a registration form for users to enter their credentials.

3.5.2 SOURCE

Last Team: Team Aero

3.5.3 CONSTRAINTS

N/A

3.5.4 STANDARDS

- HIPAA
- ISO/IEEE 11073

3.5.5 PRIORITY

Moderate

3.6 THE APPLICATION SHALL HAVE IMPROVED UI EXPERIENCE TO SHOW MORE VIEWS

3.6.1 DESCRIPTION

The system should have the ability to view data in multiple views. The system should have more detailed statistical views for user data.

3.6.2 SOURCE

Sponsor: State Farm

3.6.3 Constraints

N/A

3.6.4 Standards

- HIPAA
- ISO/IEEE 11073

3.6.5 Priority

High

3.7 THE SYSTEM SHALL HAVE IMPROVED END TO END FLOW TO LET USERS INTERACT WITH DATA

3.7.1 Description

The user shall be able to collect data onto a FitBit which gets pushed onto FitBit serversâ. The application collects data from FitBit servers into AWS. Both Web and mobile applications pull data from AWS to display data. The user shall be able to interact with data using dynamic graphs as mentioned earlier. The database shall be updated with new information provided by a user or wearable device. When a userâs information is changed, then that change should be accommodated for in the database.

3.7.2 Source

Sponsor: State Farm

3.7.3 Constraints

N/A

3.7.4 Standards

- HIPAA
- ISO/IEEE 11073

3.7.5 Priority

High

4 Packaging Requirements

The State Farm Fit application is primarily software, so it is not physical. The deliverable should be in the form of a repository that can be delivered virtually. The repository should include the source code as well as documents that will support the source code in regards to maintenance.

4.1 THE PRODUCT SHALL BE DELIVERED THROUGH A GIT REPOSITORY

4.1.1 Description

The State Farm Fit application is primarily software, so the source code can be stored in Git repository. The Git repository should be available on GitHub.

4.1.2 Source

Team Members and Sponsor

4.1.3 Constraints

N/A

4.1.4 Standards

N/A

4.1.5 Priority

High

5 Performance Requirements

The State Farm Fit application is a mobile application, so it should be able to run on a smartphone efficiently.

5.1 THE APPLICATION SHALL BE AT MOST 200MB

5.1.1 Description

The State Farm Fit application should be able to fit in a smartphone storage.

5.1.2 Source

Last Team: Team Aero

5.1.3 Constraints

N/A

5.1.4 Standards

N/A

5.1.5 Priority

Moderate

5.2 THE APPLICATION SHALL BE ROBUST

5.2.1 Description

The State Farm Fit application should be able to run without failure.

5.2.2 Source

Last Team: Team Aero

5.2.3 Constraints

N/A

5.2.4 Standards

N/A

5.2.5 Priority

Moderate

5.3 THE APPLICATION SHALL HAVE A QUICK RESPONSE TIME

5.3.1 Description

When a user wants to see their data, the application should be able to yield a result quickly. An approximately appropriate response time would be 1-5 seconds.

5.3.2 Source

First Team: Team Ingenuity

5.3.3 Constraints

N/A

5.3.4 Standards

N/A

5.3.5 PRIORITY

Moderate

6 Safety Requirements

As this project is heavily software based, so it has minimal safety requirements. The below listed are the default safety requirements for CSE Senior Design projects.

6.1 Laboratory Equipment Lockout/Tagout (LOTO) Procedures

6.1.1 Description

Any fabrication equipment provided used in the development of the projects 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 (lock-out/tagout)

6.1.5 Priority

Critical

6.2 National Electric Code (NEC) Writing Compliance

6.2.1 Description

Any electrical writing 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 Manipulation Safety Standards

6.3.1 Description

Robotic manipulators, if used, will either be housed in a compliant lockout cell with all required safety interlocks, or certified as a âcollaborativeâ 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 State Farm Fit application is a software product, so there is need for maintenance after delivery to correct faults and improve performance.

7.1 The Source Code Shall Be Documented

7.1.1 Description

The code should be commented well so that there are clear explanations to what a file or a section of the code does. This is to provide clarity for people who look at the code in the future.

7.1.2 Source

Sponsor: State Farm

7.1.3 Constraints

As a continuing project, there is no proper comment of the code as of now. It will be hard to document everything later on.

7.1.4 Standards

- IEEE 1063

7.1.5 Priority

High

8 Other Requirements

8.1 The ML models should be able to provide results quickly

8.1.1 Description

The application should be able to send data to AWS S3. From which we can collect, clean and analyze data. Then the analysis should be able to directly send this info to the application on the device, phone or the web application.

8.1.2 Source

Collaboration of Last Team: Team Aero, and Current Team: Team SpaceTabs

8.1.3 Constraints

Knowledge and Understanding of AWS and Building ML Models

8.1.4 Standards

N/A

8.1.5 Priority

Above Average (7/10)

9 Future Items

9.1 Personalized AI Model which can make a workout schedule

9.1.1 Description

The application on the local device should be able to send data to a platform which will look at the workout data and build a weekly schedule which works around the userâs free time to achieve their personal fitness goals.

9.1.2 Source

Current Senior Design 1 Team. (Team SpaceTabs) and Sponsor

9.1.3 Constraints

N/A

9.1.4 Standards

N/A

9.1.5 Priority

Future (not feasible in this version of the product, but should be considered for a future release)

References