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

Sushant Gupta
Naveen Narayan Gnanapazham
Krishna Khadka
Puskar Dev
Shishir Pathak

Revision History

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1 Problem Statement

Determining a person's life insurance rate can be a difficult task and life insurance companies analyze various factors to create a personalized plan. For many plans, a doctor visit to analyze a customer's health is performed, but this only captures a snapshot of someone's health. An ongoing monitoring system would serve as a benefit to tracking general health information across a long period of time. State Farm is interested in creating a profile of a person's daily habits to get a better view of the person's overall health, and with that data, create a more accurate insurance rate.

2 Methodology

Systems have been created that collect a person's health data from a FitBit device and upload that data to cloud services. The information that is collected include heart rate, steps walked, and hours slept, among others. A user will wear a FitBit watch while connected to the Android app to collect and send such data to the cloud services. Using that technology, this team will continue to add, use and improve those systems to provide a more seamless and efficient process of collecting, transmitting, and analyzing health data to predict health score for the user.

3 Value Proposition

Using this system of data collection, an insurance companies will be able to have more confident in offering and making changes to their customer's health insurance plan with regard to that person's general health. A customer may adjust or fake their actual health habits when required to make a visit to a doctor for an evaluation, but with this regular monitoring for an extended period, it will be hard to fake and thus health evaluation will be more accurate to offer better coverage for such customers. Using a longer period of evaluation will show changes in the customer's general health that a single doctor visit may not find. In addition, using a system like this will also encourage individual to have better health changes by constantly tracking and informing them about their critical health trends, and thereby lowering occurrences of health incidents and medical bills, which the insurance companies would have to bear.

4 Development Milestones

Provided is the list of core project milestones along with their tentative completion dates.

- Project Charter first draft - March 2021
- System Requirements Specification - March 2021
- Architectural Design Specification - April 2021
- Detailed Design Specification - May 2021
- Demonstration of Android and Web App - June 2021
- Improvement of existing code/services structure - June 2021
- Improvement in existing Mobile/Web UI - June 2021
- Improvement and implementation of existing ML codes - July 2021
- Data visualization with graphing in Mobile/Web App - August 2021
- Final Project Demonstration - August 2021

5 Background

LifeFit is a State Farm sponsored project aiming to measure daily habits of a person such as activity level, heart rate, hours of sleep, and other health conditions. It is different from a traditional visit to a doctor that provides one snapshot of a personâs health condition. This project aims in monitoring a personâs health over a long period of time that will inform the insurance company about the health status of the person. Customers will also be able to view their own health status by graphs and charts and get encouraged to improve it. This will ultimately lead to a better health status of the customers that will lead to less health insurance and lower the overall medical cost.

Our customer, State Farm, is seeking to have a prototype built to show a proof of concept for use by their customers. Features will include the ability for health metrics to be collected, analyzed, and displayed for the user and administrators for each user. In addition to this, machine learning will be used to create predictions in health changes as well as alerting administrators when anomalous data is found.

6 Related Work

John Hancock Vitality program is one that is commercially available life insurance that uses a FitBit or Apple watch to track the regular health activities of its customers and offer rewards points [1]. Based on the reward points, on the yearly basis it gives certain status to the customer that will determine the yearly premiums of their life insurance. Customers can earn Bronze Status - 0 points, Silver Status -3,500 points, Gold Status - 7,000 Points and Platinum Status - 10,000 points. The status and premiums rate annually are Bronze - 1388, Silver - 1262, Gold - 1021 and Platinum - 964. You earn 10 points daily for 5000-9999 steps you take and maintaining Blood Pressure Ã Reading of<=120/80 will get you points too. As of now this plan is also not completely based on the data that is collected by using the FitBit or Apple watch, as it shows that the customer should get Glucose Check, Cholesterol Check, Dental Screening, etc. to earn points and increase status [2]. The other insurance firm, Humana have also purposed this project but is not commercially available yet [2]. The research made by the RGA on this topic shows that there are many ways that the wearable device can be made even more effective to collect the user's data to accurately maintain his/her fitness metrics. Some of the metrics are - steps, physical activity, inactivity, resting heart rate, sleep, pulse wave velocity and detecting illness [2]. Being a new concept in the life insurance, the John Hancock Vitality program is new and does not have enough data yet to consider this program successful or reliable [1]. Also, glancing at the plans looks like it may take years for the customer to reach at Platinum status and get the best possible premium rates as the rewards are calculated on yearly basis. Due to this, customer may end up paying high premium rate for years,in some cases more than the regular premium rates. With the advancement in the technology, the ability of the watch to collect data increases which increases the opportunities for the company in this field. [1] [2]

7 System Overview

Health data will be collected using a wearable device (FitBit Watch) which is connected to an Android app. The mobile app will use the wearable deviceâs API to collect all metrics that the device has sensors for and send that data, using a REST API, to a cloud service for storage and analysis. The back-end will be the host of the admin portal and machine learning system. For this project, a FitBit device will be used to collect the health metrics. The FitBit uploads its data to FitBit servers, so our app will use their REST API to download the information then upload it to our AWS system. Data collected from the AWS system will then be supplied to our ML model via Web Dashboard, to compute the score and render it back to the user.