

LifeScan, Inc.

Improving User Engagement using ML,  
IS Capstone Project, Fall 2018

# Scope Document

Version 2.0

10/16/18

## DOCUMENT IDENTIFICATION SHEET

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Prepared by :	Akeelah, Alice, Amit, and Sheena	Date :	10/16/2018
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## DOCUMENT REVISION HISTORY

Name	Date	Reason For Changes	Version
Amit Sharma	10/12/18	Initial document	1.0
Amit Sharma	10/16/18	Suggestions from Sponsor (Neelima)	2.0

## **Sponsor Overview:**

In the U.S. Lifescan, Inc. is the leading blood glucose monitoring company and its OneTouch® brand products are recommended by more endocrinologists and primary care physicians than any other brand. Globally, more than 10 million people depend on OneTouch® brand products for simple testing and accurate results to help them manage their diabetes.

Their flagship digital product is OneTouch® Reveal (OTR) —a mobile and web application that enables patients and healthcare providers (HCPs) to transfer blood glucose and/or insulin delivery data from their physical devices in order to gain important health insights and drive better diabetes care. For patients using LifeScan's latest Bluetooth-enabled blood glucose meters, OTR mobile app provides a wireless experience that enables patients to rapidly transfer, tag and share their data. They can then see useful patient-friendly trend and pattern data. In addition, patients can use OTR mobile app to log relevant lifestyle data regarding food and exercise.

## **Project Goals:**

Improve User engagement on the One Touch Reveal App to help patients manage their diabetes better through an easy call to action self-monitoring blood glucose feature on the app while simultaneously liaising with the business goals of increasing profits.

## **Business Case:**

### **➤ Problem Statement:**

- In OTR, patients aggregate large amounts of personal clinical and behavioral data over time. The issue is to devise algorithms that evaluate past data values to predict and suggest the right clinical actions to take. These recommendations would be fed back to the patient through the app, notifications, text messages etc. to try to encourage patients to take an action to test their blood glucose at appropriate times.

### **➤ Conceptual Solution:**

- An algorithm to predict patient's behavior and then suggest behaviors that drive compliance/testing frequency (e.g., we notice you've been testing at 5PM all week, it's 4:55PM—time to test)
- A prototype showing the various touchpoints of this algorithm with the app

**Sponsor:**

LifeScan, Inc.

Key members:

- Ann Cramer
- Rajasi Mills
- Michael Weinberger
- Neelima Raghuram Muvvala
- Manasa Challa

**Project Team:**

CMU Team

Members:

- Akeelah (Wei Ji)
- Alice (Chia Hua Lee)
- Amit Sharma
- Sheena Jain
- Sakir Yucel

**Deliverables:**

- Priority 0: Machine learning algorithm for timely notifications for the users
- Priority 1: Medium fidelity Prototype for notifications
- Priority 2: Gamification for better engagement

Our idea is to deliver an algorithm, and a medium fidelity prototype which can be used for user testing and usability tests. As an alternative way to improve engagement is gamifying the app which might be touched upon only if time permits.

**Constraints:**

- Majority of the users have logged BG very few times making it difficult to generate a statically significant output
- No baseline as there are no machine learning enabled notifications in place right now
- The algorithm would not be all encompassing as interactions with food and exercise are not quantifiable

**Assumptions:**

- Blood glucose readings should be taken 3-4 times/day for maintaining a healthy lifestyle
- The customers are losing interest (engagement) because they are not reminded about taking tests
- The sample data from Jan 2018 – Aug 2018 is representative of the complete population
- The patients should take another test within four hours of a previous high or low reading

**Risks:**

- Need to evaluate bias vs variance tradeoff of the models
- Noise in the data due to inherent human variations in behavior might not be effectively captured by the models
- Seasonality in the behavior over the years will not be effectively captured
- Notification engine not catering to individual user behavior if the data is insufficient to understand past behavior
- Notifications might irk the users from using the app

**Mitigations:**

- A decision on bias-variance tradeoff need to be taken at the time of modelling
- Techniques to remove noise would be used
- The model can be later improved by removing seasonality effects on the behavior
- Put threshold on the number of notifications
- Provide notifications based on the user's engagement