**Biometric Data Collection with Fitbit Technology**

A foundation of knowledge in the data sciences can prove advantageous for almost all scientists. Often, however, understanding the fundamentals of any new skill lacking proper instruction or recourses can be difficult. With ample guidance, all can develop a base knowledge of Data Science that can grow and provide new skills for improved research experiences.

The sets of instruction, examples, and tutorials in this walk-through are specifically designed for Merck Technology and can be distributed to Merck Scientists. The walk-through will be tailored to the needs of the pharmaceutical industry and will relate to work being done at Merck.

In this walkthrough, a complete, end-to-end, project will be outlined with instructional and applicational opportunities throughout.

1. Data Science Overview

Data Science is an interdisciplinary field aimed to extract insight from structured and unstructured data. An intersection between computing, statistics, mathematics, and domain application, data science reveals new meaning to the extreme amounts of data being collected and stored every day.

Some of the foundational skills that the data sciences require include basic computing and data analysis knowledge. A range of technologies are used daily by data scientists, including Python, R, Hadoop, Bash, and more. Statistical concepts like descriptive statistics, probability, Bayesian theory, and modeling are used in combination with the previously mentioned technologies to gain insight from data.

2. Introduction to Project

An end-to-end project will be outlined in the remainder of the text. Primary concepts included are data capture, data visualization, and client-server communication. The technologies covered will include Python, Bash, SQL, R, and React Native along with many useful packages and dependencies.

Throughout each section of the text, there will be an introduction to a new technology. Basic programming skills and logic explanation related to the technology will be covered within this section. Using the skills taught, the walkthrough section will follow, where instruction related to the overall project will be given.

The project being taught in this text is a data capture project that will evolve into a basic mobile application. Using Fitbit technology, users are collecting massive amounts of biometric data that, if captured properly, can be used to benefit pharmaceutical research. Patient activity, heart, sleep, and weight data can all be captured seamlessly. The medicinal benefits are great with a tool like this. It is through simple computing and foundational data science topics that a pipeline and tool can be engineered.

3. Merck Technology

4. Fitbit Technology

To begin the project, we will begin by discussing application programming interfaces (API). APIs are tools that allow developers to begin work easily. Often times, an API is a set of functions or methods that allow for replication of previously developed services. When released publicly, APIs allow for developers to gain access easily to features and data of large services.

The API that this walk-through works with is the Fitbit Web API. The API can be found at <https://dev.fitbit.com/build/reference/web-api/basics/> and the accompanying documentation can be found at <https://python-fitbit.readthedocs.io/en/latest/>.

The first step to using the Fitbit API is to create a Fitbit account. Creating a new account can be found at <https://accounts.fitbit.com/signup>. You will be presented with the screen in figure 1. Simply, enter an email and password of choice to create an account. You do not have to associate a Fitbit device to complete this tutorial. While no personal data will be collected due to lack of a device, the walk-through will still cover how properly use the API to access data. When data is necessary for later in the tutorial, dummy data will be provided.

A screenshot of a cell phone

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Figure 1

After registering your Fitbit account, proceed to <https://dev.fitbit.com/login> and login with the account credentials you just created. Click on ‘manage’ and ‘register an app’ in the navigation bar. You will then be presented with the screen show in figure 2. Fill out the necessary registration fields and click ‘register’ at the bottom of the page.

A screenshot of a cell phone

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Figure 2