Tracking fatigue after brain injury in real-time using a smart-phone app and sensors/wearables.

GDP Group 2
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Introduction

Our project focused on the further development of a previous app where we addressed design issues and integrated it with a wearable such as a FitBit. The main improvements constitutes an overall improved design and syncing data from a fitbit whilst retaining the activity questionnaire.

User Surveys

The user surveys are the backbone of our app's data collection. We designed them based on the structure given by our customer and aimed to implement a clean user interface/experience.

This was achieved by providing a dynamic system that wasn't just a series of buttons but provided sliders, a progress bar and a battery visualisation.

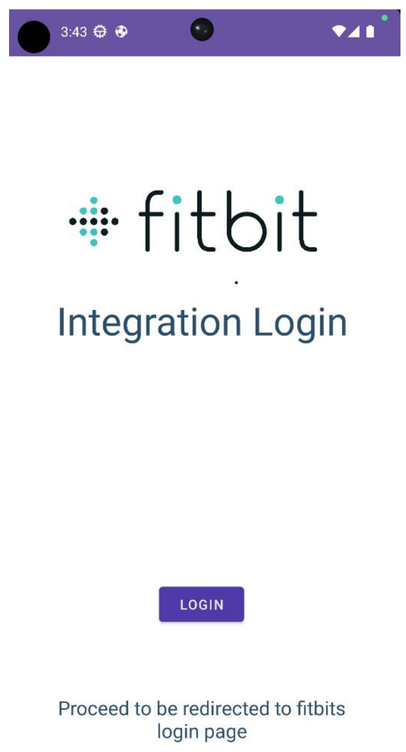
The survey results are collected by the app and stored within the app itself. This data is then passed over to the dashboard. Finishing the survey also sets up the next survey notification.

Above is an example user survey page.

Fitbit Integration

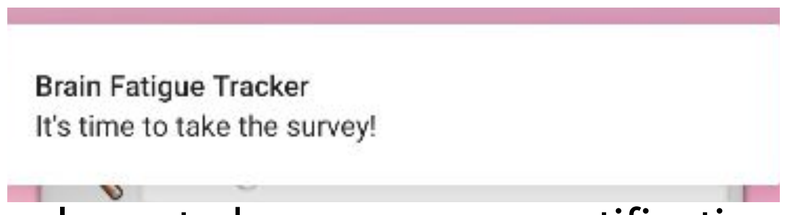
The users can integrate the app with their fitbit account which gives access to a lot of information unable to be gathered by a survey such as exercise and heart rate information both of which can impact fatigue.

By integrating with Fitbit's API instead of the device itself the app is compatible with all fitbit devices including those not yet released during the development of the app.



Notifications

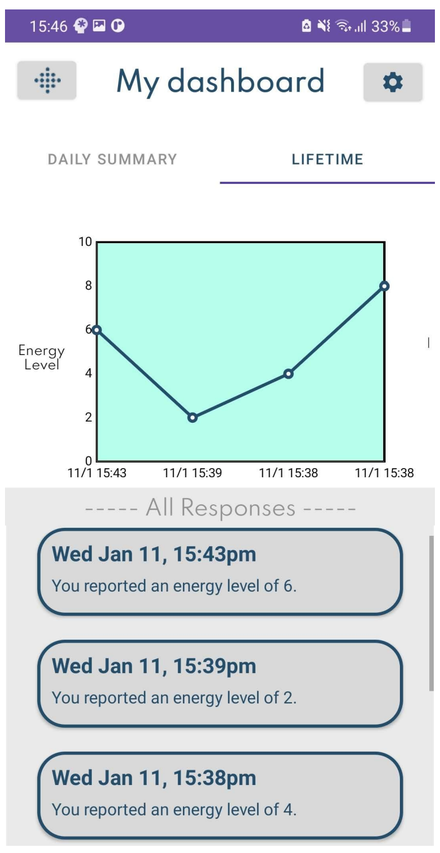
We use regular notifications to alert the user to complete their brain fatigue surveys. These surveys build trends over time but that only works if they are done frequently and throughout the day. We use high-priority notifications that users cannot simply dismiss to grab their attention.



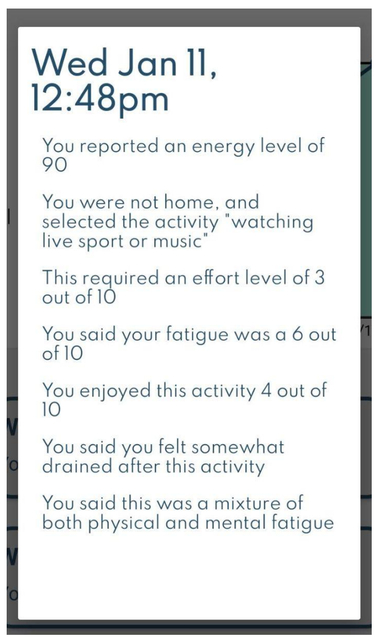
We also implemented an emergency notification system to detect intense volumes. We also implemented an emergency notification system to detect intense volumes. This was designed to get impromptu brain fatigue results at the most exhausting part of their days.

Dashboard

Users can review their previous responses to fatigue surveys in the data dashboard to begin to understand the causes of their fatigue.



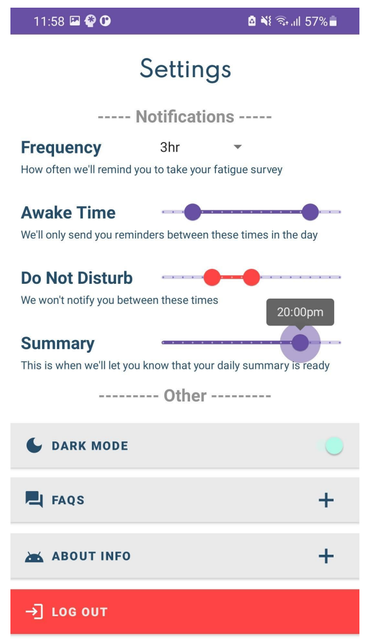
The dashboard contains graphs of the user's energy level over time, as well as a list of all past responses. The full information from each survey can be viewed in a pop-up.



Settings

Like most mobile applications, our app has a settings page where the user can set their preferences to control how they experience the app. Notably, the user can control the frequency of notifications and the times of the day between which they *would* and *would not* like to receive alerts.

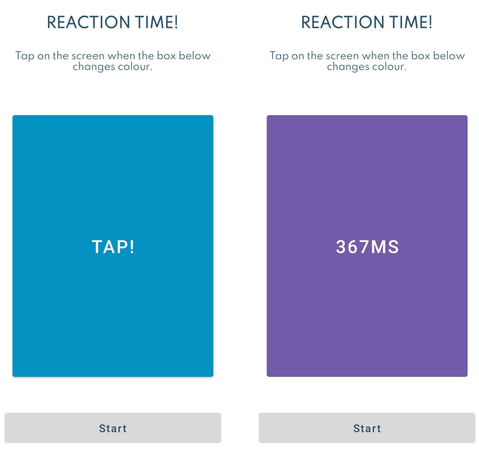
The settings page also contains the things that users would expect to find, such as an FAQs section and a logout button.



Reaction Time Tests

We developed a reaction time (RT) test as an objective method of measuring changes in RT in users. The 3-minute RT we designed measures the time it takes for the user to respond to a visual stimulus, in this case, we have chosen a colour change. Given its simplicity, the RT can be carried out in most settings and provide continuous monitoring of RT and fatigue throughout the day.

The average RT is displayed on the dashboard.



Feedback and Future Ideas

The app had met its initial goals of building an app that allows users to track and understand their fatigue levels. Altogether, the app offers many features but there are plenty of features that can be added on to enhance its functionality, such as:

- Surveys to provide accessibility support.
- Reaction time test customisation.
- Expandable graphs with additional details.
- Extending FitBit integration with other external devices.
- Additional emergency notification triggers.