Investigating Methods of Layering a Mobile Application to Increase its Accessibility to Elderly

Alice Wong[1], Brian On[2], Chandler Mendenhall[3], Moein Enayati[3], Marjorie Skubic Ph. D.[3]

[1]Wellesley College, [2]Princeton University, [3]University of Missouri - Columbia

Problem

How can we design mobile applications in a way that elderly people can reap the benefit of complex features?

Introduction

One solution is multi-layered interfaces, which is discussed in the paper, "Multi-layered Interfaces to Improve Older Adults' Initial learnability of Mobile Applications" by Rock Leung, Leah Findlater, Joanna McGrenere, Peter Graf, and Justine Yang. Multi-layered interfaces refer to a stepwise manner of introducing a user to an application.
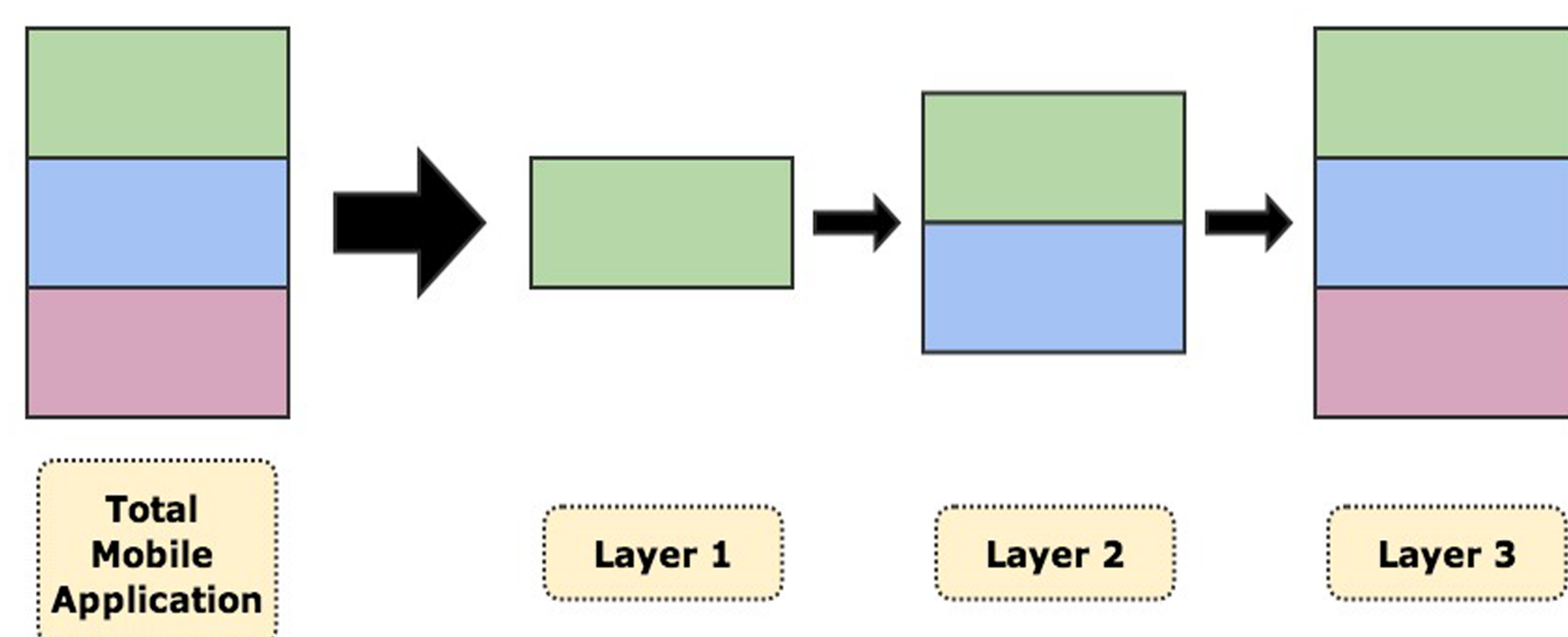
Figure 1. Multi-layered interfaces divide the features of a fully functional application into multiple layers. This allows users to learn to use a simiplified version of the application (Layer 1) before transitioning to layers of increasing complexity and functionality (Layers 2 and 3).

Methodology

Our experiment researches the methodology that determines the sorting of features into multiple layers. Is there a general strategy for dividing these features that results in a multi-layered interface that most helps the elderly master the skills necessary to operate a mobile application?

Experiment & Results

• Survey 14-24 residents from the ages of 70 to 100 at TigerPlace
• Random assignment of residents into two groups
  • 1st group - Given the application layered by complexity
  • 2nd group - Given the application layered by functionality
• Subjective and Objective measurements taken
  • Subjective: Survey asking participants to rate the difficulty of tasks
  • Objective: Measuring the time it takes to complete the tasks along with the number of steps taken
• We will analyze the data to determine which interface proves to be more salubrious

Mobile Application Overview
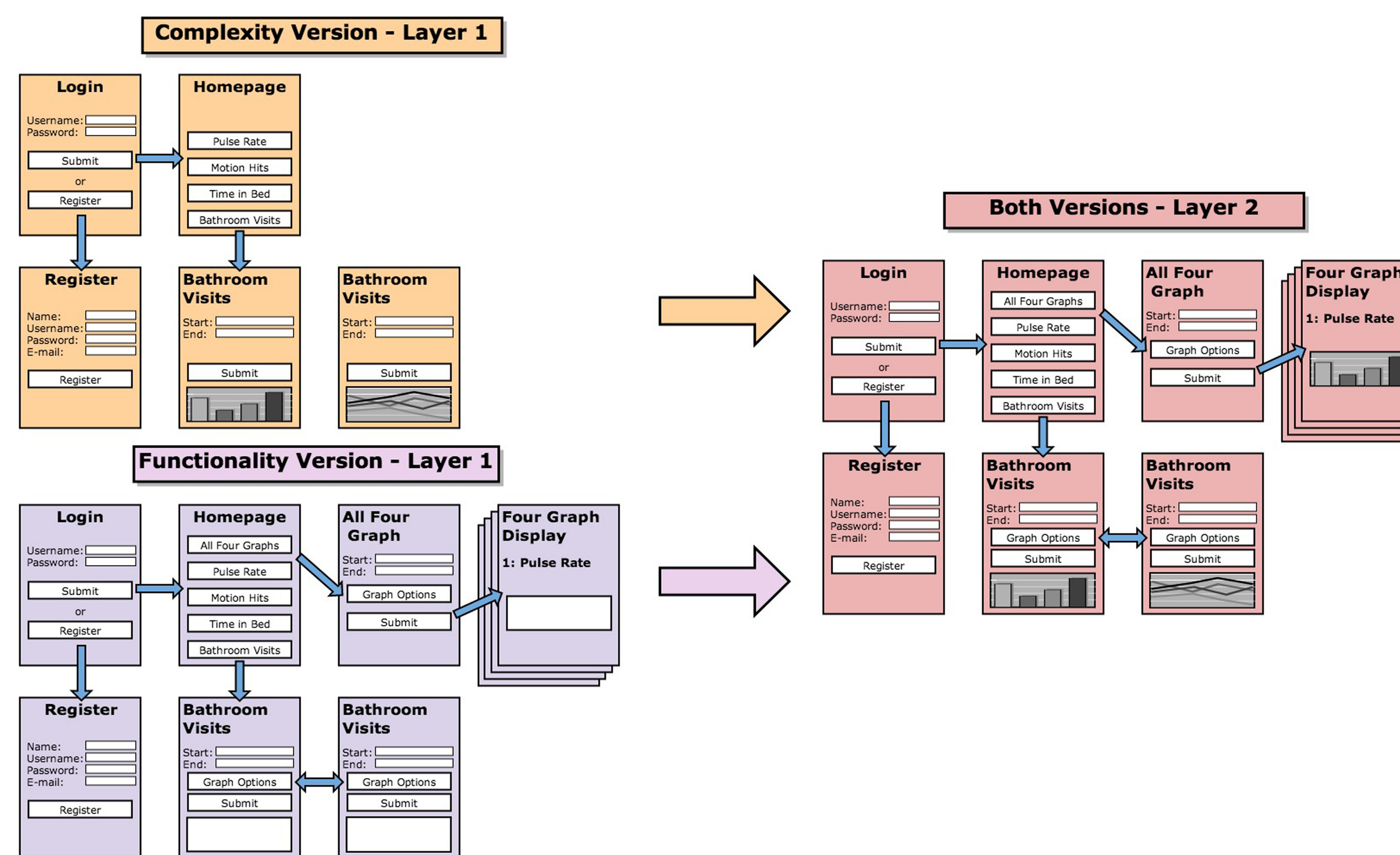
In our study, we investigate two general strategies to determine whether both are equally conducive to learning or whether one is more conducive than the other. The first strategy sorts the features of an application into layers based on complexity. The second strategy sorts the features of an application into layers based on their function.
The application we are using in our study is a mobile application that delivers personal health information in the form of charts that we developed.
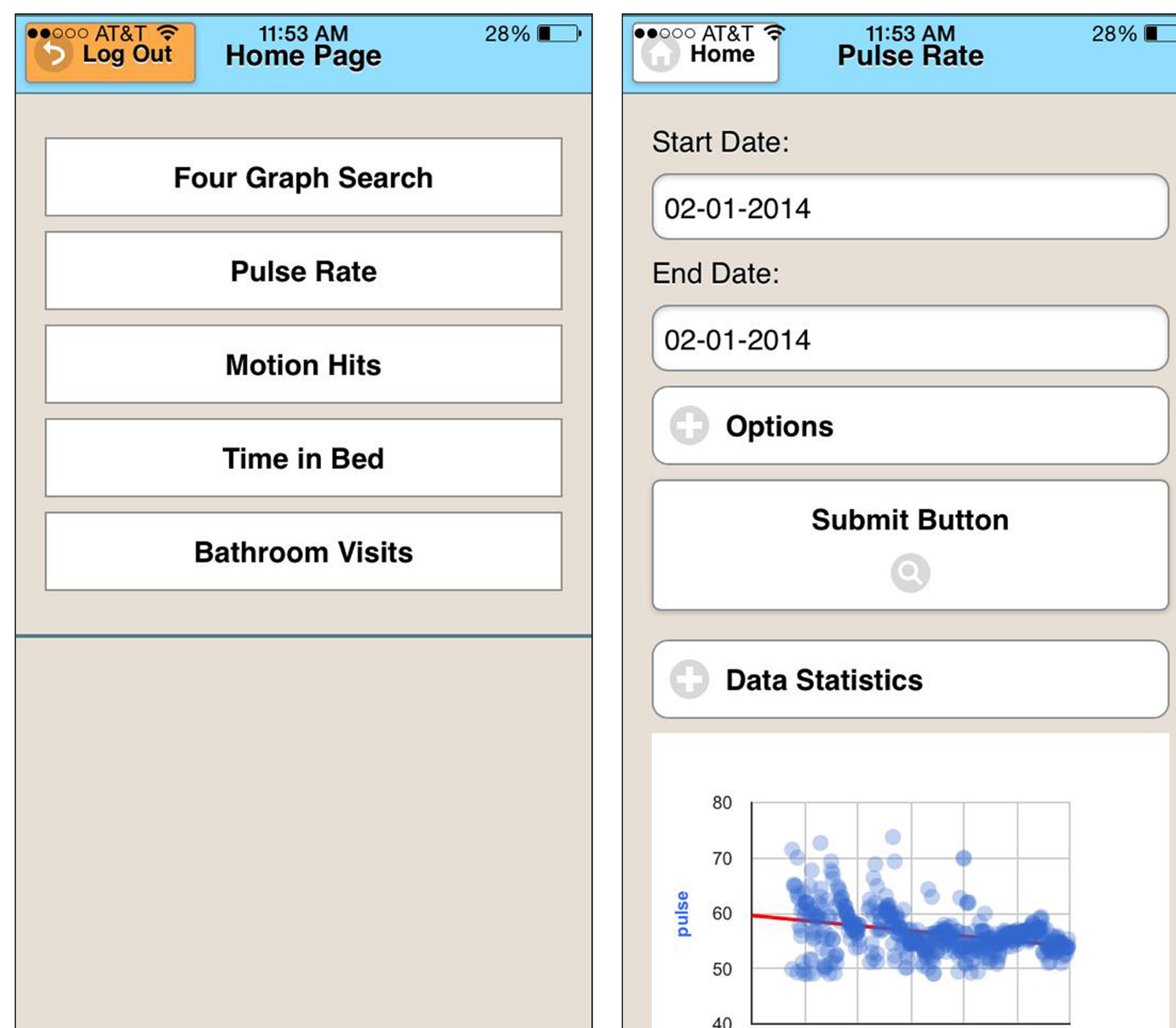
Figure 2. The home page and pulse rate page from the fully functional application

Future Work

In the future, we would like to complete more thorough testing by increasing the different versions we have. We will look into creating a three layer version of our application divided by functionality as well as a three layer version of out application divided by complexity. It is possible that a given strategy for division is only optimal for a certan number of layers. For instance, it is possible that dividing by functionality is only optimal for the two layer version of our application. Testing for a different number of layers accounts would allow us to determine if there is an optimal strategy for dividing the features of an application regardless of layer number.

References

• Kurniawan, Sri, Murni Mahmud, and Yanuar Nugroho. "A study of the use of mobile phones by older persons."CHI'06 extended abstracts on Human factors in computingsystems. ACM, 2006.
• Kang, Hyunmo, Catherine Plaisant, and Ben Shneiderman. "New approaches to help users get started with visual interfaces: multi-layered interfaces and integrated initial guidance." Proceedings of the 2003 annual national conference on Digital government research. Digital Government Society of North America, 2003.
• Leung, Rock, et al. "Multi-layered interfaces to improve older adults' initial learnability of mobile applications." ACM Transactions on Accessible Computing (TACCESS) 3.1 (2010): 1.