MemCare: Detecting Early Signs of Alzheimer's

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Introduction

Alzheimer's disease is the sixth leading cause of death in the United States. While a very serious ailment, there is no current cure available. Despite this, there is much innovation and research happening around the disease, and there exists some treatment and training methods which help improve cognitive functions of patients who show early signs of Alzheimer's Disease. One possible treatment is to engage such patients with brain games. MemCare, a free lightweight Android application, is designed to help detect early signs of Alzheimer's or Dementia in seemingly healthy seniors. MemCare allows caregivers or physicians to evaluate seniors' abilities to remember family members' names via images and abilities to memorize and name different categories of objects.

Methods

Phases:
1. User creates an account
2. User constructs image-based tests
3. User administers test
4. Test results are tracked over time
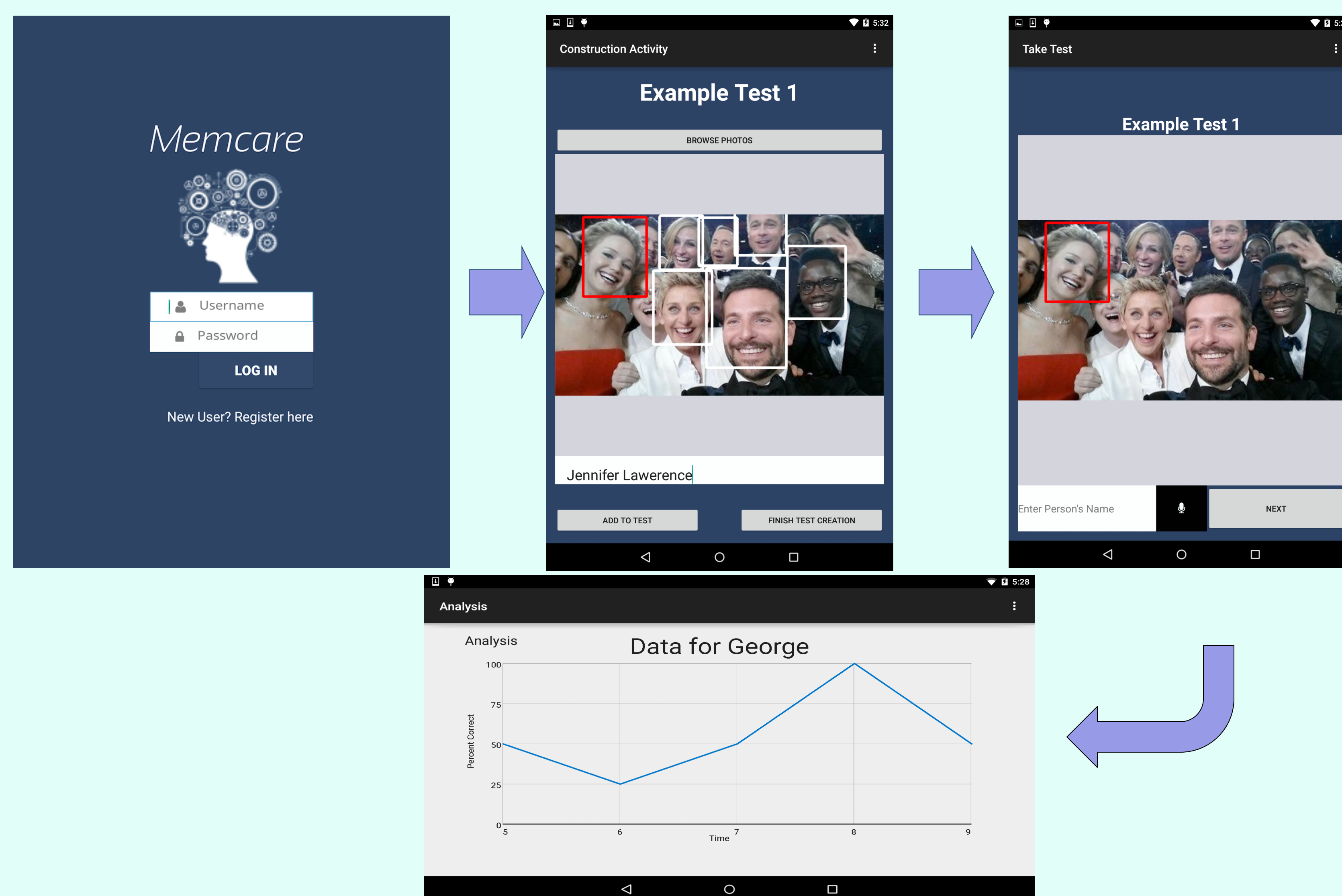
Conclusion and Next Steps

MemCare was originally designed to asses elderly's cognitive function by means of a facial recognition test. Apart from being useful for those who may be at risk of having Alzheimer's Disease, MemCare can also be used for other populations. For example, MemCare could assess the effects of sleep deprivation on a college student's short term memory. This application can be applied to other populations where memory tracking is a useful tool to determine the mental alertness of a user.

Design Features

Dropbox

The creation of tests require many photos, possibly high resolutions, which require large amounts of storage. For convenience, we utilize Dropbox where a user can easily upload their own images into his/her personalized account. Further, this allows for easy access across devices anywhere anytime as long as internet connectivity exists.


Voice Recognition

Typing for elderly can often be a difficult and tedious task in itself. MemCare provides a service that allows users to audibly say the answers to any question asked, using Google Voice.

Face Detection

To account for photos with multiple faces, during test construction, the user has the option to select the face of the target individual. Using a face detection algorithm, all faces present are highlighted white and once a face has been selected, it is converted red.
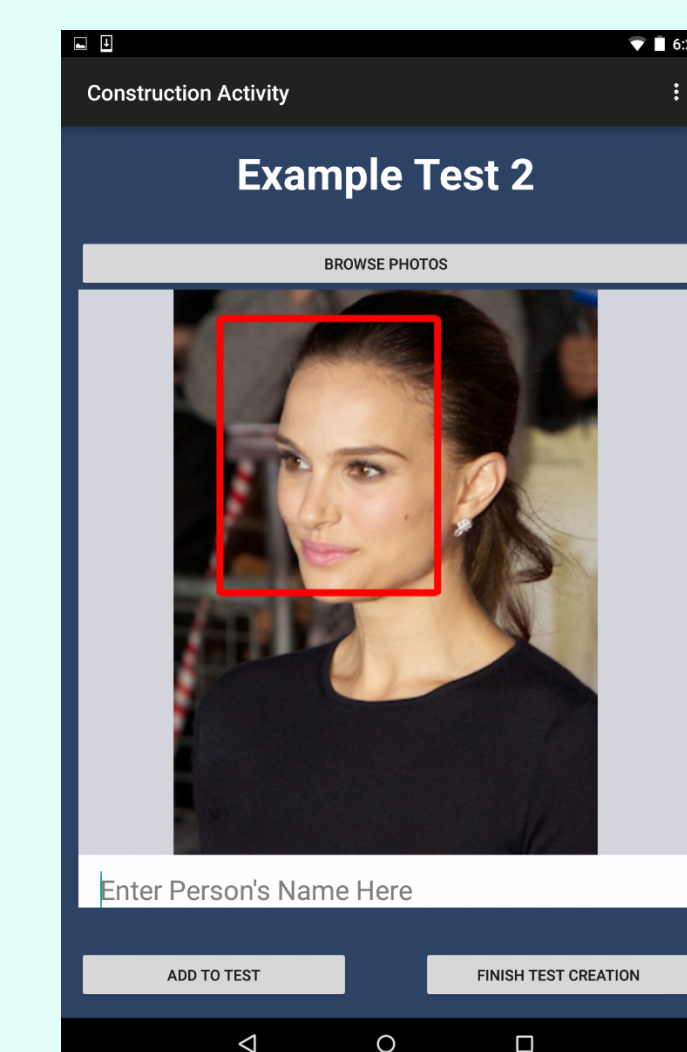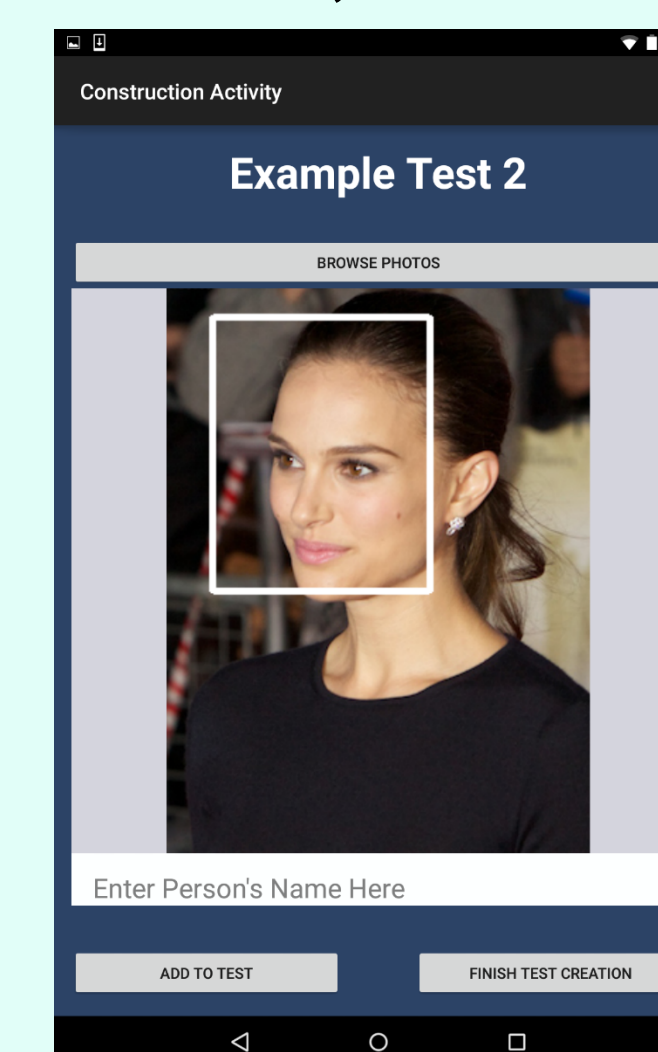
Data Analysis

Once sufficient data has been collected by completing multiple tests over time, the accuracy is plotted on a line graph, easily readable by layman. Such visual display easily shows the trends of a user's cognitive function, indicating the sustainability or possible deterioration of memory. A prolonged decline could indicate early signs of Alzheimer's, and further medical consulting is highly encouraged.

Next Steps:

- Improved voice recognition
- Track the average amount of time taken to answer a question
- Add additional memory game(s).

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