CSCI4163/6610- Project Proposal

SECTION 1. ADMINISTRATIVE INFORMATION

Project Title: **AI-Momentous - Alzheimer's helper app**

Date: **29-Sep-2019**

1.1 Team Name: Absolute Contagious

1.2 Team Members

Name	**Banner ID**	**Work Done (%)**
Miles Redgate	B00705540	25
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Total		**100%**

SECTION 2. PROJECT DESCRIPTION

1. INTRODUCTION

A quote from Jarod Kintz says, “Alzheimer’s is the cleverest thief because she not only steals from you, but she steals the very thing you need to remember what’s been stolen!” (Jarod Kintz)[3]. Alzheimer’s is a disease associated with memory loss and a person suffering from this disease will find it very difficult to remember and accomplish simple tasks of day to day life. Alzheimer's disease has become one of the major problems all over the world. Currently, 50 million people are affected by this disease and there are at least 10 million new cases every year. Unfortunately, the problems and causes related to Alzheimer's disorder are unknown to the common population and sometimes been mistaken for the normal pattern associated with ageing. It most commonly affects people over the age of 65. Nowadays as our understanding of the disease grows, we can see early signs of it in even younger people. It is important to identify the symptoms of Alzheimer’s disease at the right stage and proper treatment should be provided before it gets severe. Our application is meant to help people with early Alzheimer’s disease navigate their day to day life easier, as well as provide doctors and health professionals with more data on a patient's day-to-day activities to help understand both how the disease is affecting them as well as if the patient's status is deteriorating.

2.1. PURPOSE AND BACKGROUND

2.1.1 Purpose

The main objective of our study is to build simple and easy to use app that helps them remember events, stay connected and engaged with friends and family and recognize faces of friends using artificial intelligence-based face to face recognition technology. This app will help users solve simple issues of their lives. More details about the app will be discussed under the prototype description. Our team feels that this study is very important as it could pave the way for helping out the patients whose memory is worsening over time. As there is no cure for this disease, we hope to still improve their quality of life for as long as we can. Also, some research suggests that stimulating one’s memory and socializing especially by using a computer or a mobile app could slow down cognitive decline over time.

2.1.2 Background and Prototype Description

As discussed in the introduction, Alzheimer’s patients have a tough time remembering simple tasks on a daily basis. Alzheimer’s affects the patients on 7 different stages. Our app is intended for the patients who are affected up to stage 4(the beginning stages of Alzheimer's). The patients who fall under these stages have a problem performing the general task listed below:

- The patient may face problems doing simple arithmetic tasks

- The patients might have trouble remembering loved one's birthdays
- Might face problems in maintaining their finances and paying bills
- Might have a problem remembering the faces and names of their new friends
- Might have a problem finding the right word while speaking to someone
- The patients may forget what's the next event of the day
- We had listed some of the difficulties of these patients as it will be easier for the users to understand the motive behind our study.

Our prototype is designed such that it addresses the common issues faced by Alzheimer's patients (stage 1-4). The app does not need a password, it just needs a touch id or face id.

The home screen has the following features:

Photos: Have all the photos of their loved ones and friends. The photos will be tagged with the names of friends. The pictures are grouped by a person by using facial recognition. These photos could also be shared by friends and family with one tap as they join the app's circle

Events: This consists of the date, time and the upcoming events of the day. This helps the user remember various activities and appointments. The feature will be managed by the caregiver or the loved ones who could add events to the calendar.

Contacts: Helps patients who have difficulty remembering phone numbers. It would have a picture of the person and the relation to the patient beneath it.

Identify: Patients are often faced with the difficulty of recognizing people around them. This feature helps in taking pictures which in turn would recognize the person with the help of facial recognition technology.

Help Line: Help feature has a list of emergency contact lists like 91, counselling services, doctor's number etc.

The app will also utilize reminders and notifications to remind patients about taking pills, paying monthly bills etc.

Background research based on some of the articles like " Cultural Diversity and Alzheimer Disease: Introduction" [5] and "Alzheimer changes in nondemented patients younger than sixty-five: Possible early stages of Alzheimer's disease and senile dementia of Alzheimer type" [6] helped us identify the major difficulties faced by the patients and we considered this research as a base while building the foundation of low fidelity prototype.

Fig 1: Mockup of the app home screen

Limitations of the app:

1. The most obvious limitation is that the app could be used by patients from stage 1-4 only. Might not be helpful in more severe cases.
2. The event's feature requires to be managed by someone to be effective. Further research would need to be conducted to know if this feature could use allow the patient to manage it themselves.

2.2. Research Method

2.2.1 Research Question/Hypothesis

Hypothesis:

By providing constant reminders and tracking the user's day to day activities, as well as support for minor struggles they might encounter, an app can help reduce the negative effects of Alzheimer's.

Research question:

- Does using this kind of mobile app on a daily basis have a positive impact on people suffering from Alzheimer's?
- Will looking at pictures of the patient's acquaintances help them to remember their connection with them?
- Does playing games that control stress and anger levels have a positive influence on patient's mental health?

2.2.2. Study details:

The study will be conducted with our classmates. To start, participants will be explained the context of the study, what is being examined, the general guidelines that the participants have to follow while taking up the interview and the mode in which the interview will be conducted is also explained to them. After they have agreed to these terms we will proceed with the study. We will first collect basic data about them, pertaining to demographic information to help reveal more data from the data we will collect later. The users will then be asked to complete a series of tasks with our prototype while we observe their interactions with it for either confusion or when they have done something right or wrong. The participants will then be asked a set of both open and closed ended questions pertaining to the application's prototype designs and features. Their feedback recorded for future iterations of the app. The overall time that a participant is expected to spend around 10-15 minutes for the entire study. We intend this study to be a within subject study, as given the expected small sample size, we would like to get the most information out of our participants as possible. As our app deals with people suffering from memory loss, there's the potential for each interaction to be a "new" interaction for each user. Therefore, the order effect can have a harmful effect on our study as a user is likely to remember details of our app from performing previous tasks, e.g. remembering menu items from the last task, therefore already having an idea of what to do for the current task. To deal with this we can give each participant the tasks in a different order, so that we can better evaluate the first impressions of as many different parts of our app as possible

2.2.3. Participants

We hope to have around 5-10 participants for this study. Ideally, we would have people suffering from Alzheimer's participate in the study. However due to the confines of this course, as well as the problems that naturally arise by studying people with memory loss problems, especially with such a low fidelity prototype that we would have.

2.2.4. Data Details

We plan to gather our data by first gathering general data about the user, (age, gender, place of origin) then having our user perform assigned tasks while we monitor their performance for quantitative objective data such as how quickly they complete a task, how many right or wrong "clicks" they make on our prototype. As well as qualitative objective data such as any moments of frustration when using the prototype, notable moments of hesitation (such as when a popup occurs or when the user first opens a menu). Appendix A is a list of questions we would ask during the interview. These interview questions are subject to change as our prototype gets developed further and we have more specific things we want to know, e.g. how they find the layout of menu items, is this a good font, etc.

2.2.5 Data analysis method you will employ

After the study we will aggregate the data from both the observation of the user using our prototype as well as the results from the interview. Using this data, we can both understand if our app idea is even a helpful app in the first place and to help us improve the app with user's suggestions and observations.

2.3. References

1.Order Effects: Definition, Examples and Solutions - Statistics How To. *Statistics How To*, 2019. https://www.statisticshowto.datasciencecentral.com/order-effects/.

2.Studies, H. How to Determine the Right Number of Participants for Usability Studies :UX matters. *Uxmatters.com*, 2019. https://www.uxmatters.com/mt/archives/2016/01/how-to-determine-the-right-number-of-participants-for-usability-studies.php.

3.Hart, C. and Hart, C. Quote: Alzheimer's Is A Thief. *Alzheimers.net*, 2019. https://www.alzheimers.net/quote-alzheimers-is-a-thief/.

4.Timeless - A Mobile App for Alzheimer's Patients. *Indiegogo*, 2019. https://www.indiegogo.com/projects/timeless-a-mobile-app-for-alzheimer-s-patients#/.

5.Radebaugh, T. and Ward-Robinson, J. Cultural Diversity and Alzheimer Disease: Introduction. *Alzheimer Disease & Associated Disorders 16*, (2002), S41-S42.

6.Ulrich, J. Alzheimer changes in nondemented patients younger than sixty-five: Possible early stages of Alzheimer's disease and senile dementia of Alzheimer type. *Annals of Neurology 17*, 3 (1985), 273-277.

7.What Are the 7 Stages of Alzheimer's Disease? *Alzheimers.net*, 2019. https://www.alzheimers.net/stages-of-alzheimers-disease/.

2.4. Attachments

Appendix 1- Interview Script

Questions:

1) On a scale of 1-5 (1 being very difficult and 5 being very easy), how difficult was it to accomplish the tasks given in this study?
2) Where there any tasks that stood out as more difficult than the rest? Easier?
3) Is there anything about this app that you would change design wise?

4) What about features that would benefit the app or current features that hinder it?
5) On a scale of 1-5 (1 being not at all useful and 5 being very useful), how useful do you think our app would be for helping those with Alzheimer's?
6) Other thoughts?

Appendix 2 – TCP 2: Core Certificates

TCP2.zip