ENSHRINE: Application for Alzheimer's Patients

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Abstract – **Alzheimer's disease is one of the leading diseases that contribute to dementia cases. The Alzheimer's patient suffers from memory loss and losing judgment due to its effect on the human brain. Alzheimer's patients need to be monitored and assisted in their daily life especially for medication. Proper medication may reduce the effect of Alzheimer's disease on the patient. The Android-based mobile application is one of technologies that can be used to assist family members to monitor Alzheimer's patient. The application helps setting the reminders for the patients by family members.**

Keywords: Alzheimer's disease, Family member, Patient, Caregiver.

I. INTRODUCTION

Alzheimer's disease is one of the dementia syndromes. Dementia is a syndrome due to the illness in of the brain that disturbs human memory, thinking, orientation, comprehension, calculation, learning, language and judgment. Alzheimer's disease contributes 60% to 70% of the dementia cases. India houses more than 4 million people suffering from some form of dementia. Alzheimer's being the most common condition out of all of them affects around 1.6 million. Alarmingly, this number is set to triple by 2050. To help prevent the disease that is constantly on the rise and to help patients suffering from Alzheimer's lead better lives, we are trying to arrive at a solution.

The patients of the Alzheimer's disease face loss of memory which makes them forget some essential day to day chores. The patient forgets where his house is located and might get lost with no clue of contacting anyone of his family members. The patient also feels very sad and depressed when he fails to recognize his family members which in turn cause risks. There are some existing systems which have login problems, Bluetooth overhead, connectivity problem and outputs are showed in different languages.

We remember our family's birthdays and anniversaries but there are individuals that don't even remember when to take food or when to carry out their day to day activities. These are the people who suffer from Alzheimer's disease. The patients of the Alzheimer's disease initially face loss of memory. The loss of memory happens at a moderate rate, initially at Early-Onset of disease and researches have proven that with constant remembrance of memory the Late-Onset can be delayed. The application Enshrine would put this to practice. At Late-Onset the patient would not be able to recall his name or any faces. Memory loss would be delayed with constant reminders displayed from Enshrine application. The Enshrine application would be available for both the patient and the family members. The patient would be able to see the reminders set by him/her or by his/her family members. The location of the patient would be traceable by the family members. The Enshrine application would also notify the patient if any family member would approach him/her.

II. LITERATURE SURVEY

Alzheimer's disease is one of the most common and feared diseases afflicting the elderly community. Alzheimer's disease causes problems with memory, thinking and behavior. There are two stages of Alzheimer's disease, one is Early-Onset and other is Late-Onset. Problems faced in Late-Onset by the patients are language problem, disorientation, mood swings and loss of motivation. Recent research has proven that constant mental stimulation can delay the loss of memory when Alzheimer's disease is at early stage. Currently one of every eight people of age bar sixty-five plus face the Alzheimer's disease. There are more than ten million cases of Alzheimer's disease every year in India, out of which majority are in the bracket of 40-65 years of age. The disease's cure has not been discovered yet. During Late-Onset the patient are at worst of their condition of memory and might not even remember their own name. Late-Onset period is severe and should be looked that a person does not reach it. The other period being the Early-Onset, here the patient can remember their name, different people and different things. According to a research constant remembrance can delay the Late-Onset period. The Enshrine application targets Early-Onset patients of Alzheimer's disease.

III. PROPOSED METHODOLOGY

People suffering with Alzheimer's need a companion to help them carry out their day to day activities. Most of the times patients family members leave their job and live with the patient to help them out. Alzheimer's patient often wander and can't find their way back home. There is an at most need for tracking of their current location in order to keep an eye on them. Considering all the above mentioned problems the application Mind-Palce is developed to provide the functionalities stated below:

- Setting of Reminders for people suffering with Alzheimer's disease by themselves and their caregivers.
- To track the current location of Alzheimer's patient by their caregivers.
- Nearme feature to let an Alzheimer's patient know that a family member is nearby.

3.1 System Specification
System specifications help to define the operational and performance guidelines for a system. It may outline how the system is expected to perform, and what the system might include. Key specifications may include interface definitions, Software and Hardware requirements, document design rules and functional areas.

3.1.1 Software Requirements
- Operating System : Windows
- Platform Development Environment : Intelxdk
- API's : Pubnub, Google maps API

3.2 System Design
The goal is to provide the reader a specification of the design. A brief description of the project's algorithm is made and discussed, along with the API's used in implementing the project. The application Enshrine uses basic Model View Controller (MVC) architecture. System design discusses the components of the system and their role in the systems execution.

3.2.1 System Model
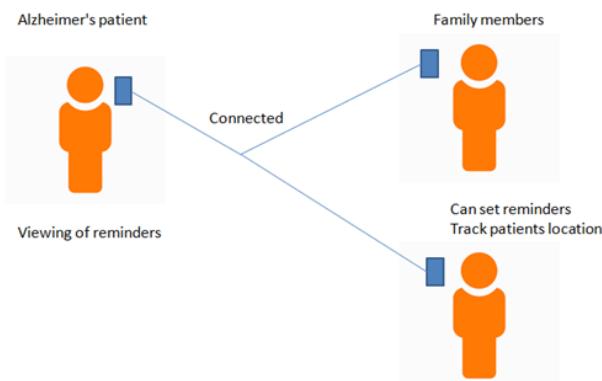A system model is the conceptual model which describes and represents a system.

Figure 3.1: System Model

In the application Enshrine the device which belongs to the Alzheimer's patient and the devices that belong to their family members are interconnected. Family members of the patient can set reminders for patient and track patient's current location provided they have Internet connection. An Alzheimer's patient can view the reminders and will be reminded to do certain tasks which will be set by their family members.
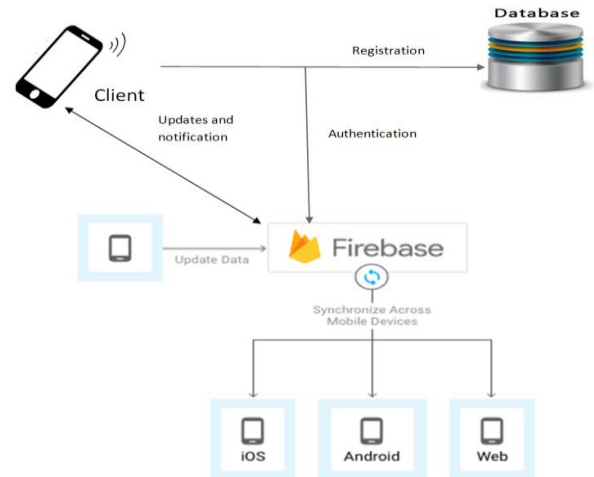
3.2.2 Architectural Diagram

Fig.3.2. Architectural diagram of android application

The architectural primary concern is to illustrate a specific set tradeoff inherent in the structure and design of a system or ecosystem. Here the client (user) the registration details are stored in local database. Then the users are authenticated through Google's Firebase. Firebase is a fully managed platform for building iOS, Android, and web apps that provides automatic data synchronization, authentication services, messaging, file storage, analytics, and more. Starting with Firebase is an efficient way to build or prototype mobile backend services. This is where we make use of real time database for any changes or updates to be made by the developer.

3.2.3 Dataflow Diagram
The DFD represents how the data will flow in the system when it is build. In this modeling, the major functions in the software are identified.
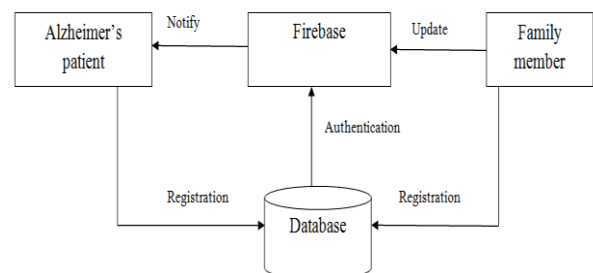

Fig 3.3 Dataflow diagram

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Diagram shows how data will flow through different processes or functions. From the context level diagram we examine high-level functional requirements of the system so main modules can be represented in level one of DFD using DFD notations. Thus, DFD is a hierarchical graphical model of the system that shows different processing activities of each processing module that the system performs and data is interchanged among these functions. This is represented in the figure above.

3.3 Development and Implementation

The client (user) the registration details are stored in local database. Then the users are authenticated through Google's Firebase. Firebase is a fully managed platform for building iOS, Android, and web apps that provides automatic data synchronization, authentication services, messaging, file storage, analytics, and more. Starting with Firebase is an efficient way to build or prototype mobile backend services. This is where we make use of real time database for any changes or updates to be made by the developer.

3.4 Testing

Any project before exposed to user must be tested to ensure that it behaves as expected. In this project, the application is tested by giving various types of input to check whether they are being validated or not and whether the application is behaving as expected or not.

3.5 Maintenance

Once the application is tested and deployed, it must be maintained to satisfy the various constraints such as availability, reliability, etc. The newer versions of the applications can be developed depending on the success or feedback of the users.

IV. EXPERIMENTS AND RESULTS

Module 1: Reminder setting by Alzheimer's patient
- Request: Viewing and setting of reminders by Alzheimer's patient by clicking on the reminder button.
- Response: A list of the reminders set for the day including the one which is set.

Module 2: Reminder setting by Family Member
- Request: : Viewing and setting of reminders by family members of the Alzheimer's patient by clicking on the button reminder.
- Response: A list of the reminders set for the day including the one which is set.

Module 3: Tracking of Alzheimer's patient
- Request: Tracking of the Alzheimer's patient by family members by clicking on tracking button.
- Response: Displays Google maps with the location of the person.

Module 4: Nearme feature

- Request: Clicking on Nearme to let an Alzheimer's patient know that a family member is nearby.
- Response: A pop-up notification will appear on the Alzheimer's mobile telling him that a family member is approaching him/her.
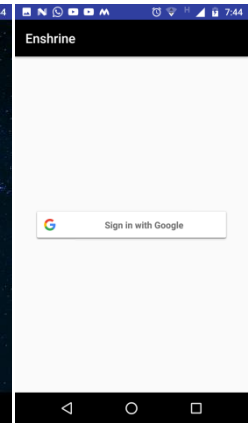

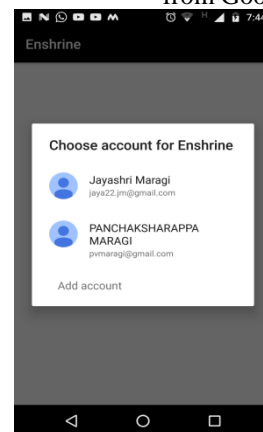Fig 4.1 Login Page   Fig 4.2 Authentication from Google accounts
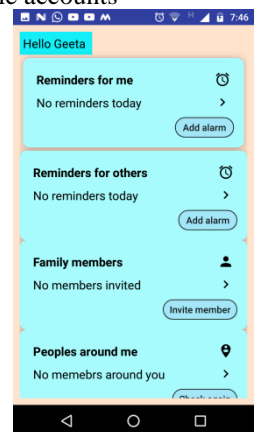

Fig. 4.3 Preferences of   Fig 4.4 Home Page
Google accounts

V. CONCLUSION AND FUTURE SCOPE

Alzheimer's patients who suffer from dementia often tend to wander. With the application Enshrine they can be easily tracked by their family members from any corner of the world. Both family members and a patient with Early-Onset Alzheimer's disease can set day to day reminders. The constant reminders will simulate the patient's memory improving their mental health. Thus the application Enshrine helps in assisting both Alzheimer's patient and their family members.

REFERENCES

[1] Grandmaison, Eric, and Martine Simard. "A critical review of memory stimulation programs in Alzheimer's disease." The Journal of neuropsychiatry and clinical neurosciences 15.2 (2003): 130-144.
[2] Zanetti, Orazio, et al. "Procedural memory stimulation in Alzheimer's disease: impact of a training programme." Acta Neurologica Scandinavica95.3 (1997): 152-157.

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[3] Boggio, Paulo Sergio, et al. "Prolonged visual memory enhancement after direct current stimulation in Alzheimer's disease." Brain stimulation 5.3 (2012): 223-230.

[4] http://www.webmd.com/alzheimers/guide/understanding-alzheimers-disease-basics

[5] https://firebase.google.com

[3] Boggio, Paulo Sergio, et al. "Prolonged visual memory enhancement after direct current stimulation in Alzheimer's disease." Brain stimulation 5.3 (2012): 223-230.