Alzheimer's Assist

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Abstract— Alzheimer's disease is an illness characterised by a gradual deterioration of symptoms over time. It impairs everyday work performance and leads to memory loss. Memory loss creates numerous difficulties in a person's day to day life. Memory loss makes it difficult to recall people's names, faces, places, or other facts. Specially in post covid era, many people are suffering from declining memory. This paper provides an assistive application that focuses on helping Alzheimer's patients by reminding them of their forgotten memories in ways like photo galleries, daily diaries, and also assisting the patients in their daily life with the help of reminders and emergency contacts. The current applications are mainly health-based as they focus on location tracking through GPS, medicine reminders,s or heart rate monitoring. This system will focus on helping the patients by reminding them of their daily tasks and helping them in their day-to-day life.

Keywords — Alzheimer, Android Application, Flutter, Mental Health.

I. INTRODUCTION

Alzheimer's disease is a neurodegenerative degenerative illness that causes brain cells to die and the brain to atrophy. Alzheimer's disease is the most prevalent form of dementia, which is defined as a progressive deterioration in cognitive, behavioural, and social abilities that impairs a person's capacity to operate independently. They may even lose their sense of time and space, thus making it easy for them to get lost outside of the home. Furthermore, they may forget recent events or the names of those close to them.

Within today's society, the number of old and older people (aged 60 and above) is increasing. In 2007 the World Health Organization (WHO) reported a total number of 650 million older people living worldwide. By 2050 this number is expected to reach 2 billion and outnumber that of the younger generation (aged 14 and below). Alongside the increase in the number of older people the average life expectancy worldwide has also increased from 46 years old in 1950 to over 65 years old in 2000 [5]. With the increase in the number of older people the risk of chronic disease is also rising

With the progress of technology, it is clear that technology plays an important role as caretakers for individuals who are unable to care for themselves. The great potential of smart mobile devices has drawn academics and medical practitioners to create and supply Alzheimer's m-health solutions.

In this paper, an Android-based application called Alzheimer's Assist is proposed. This system will focus on helping the patients by reminding them of their daily tasks and helping them in their day-to-day life.

II. PROBLEM STATEMENT

The aim of this project is to solve the issue of inconvenience faced by Alzheimer's patients by developing the app from the mental health perspective like providing information and photos of family members, having a list of tasks to be done, and maintaining a diary to help them store their thoughts and memories.

III. LITERATURE REVIEW

Nahla Aljojo[1] developed a mobile application that utilizes facial recognition technology and location detection using Google maps. It features location detection to keep Alzheimer's patients safe and prevent them from being lost by tracking their whereabouts. The main features of the proposed system included a daily overview including dates, reminders for daily tasks, and prompts with the next events in the day; Saving a photo of each person in a dedicated folder; Recognizing people by steering the camera on them so as to identify them; Two interfaces for the patient and caregiver; Bracelet which provides real-time location. However, it is only available for people living in Saudi Arabia and hence there are limitations on language.

An assistive tool was proposed by Kazi Shahrukh Omar[2] for Alzheimer's patients and their caregivers to

provide support like health monitoring, assistance to find lost items, provide reminders to take medicine, and assistance to monitor a patient's location. A light-weighted evaluation study with 15 participants revealed that the proposed system was effective and usable for patients and their caregivers. However, the system was built as a prototype. It was developed in an academic environment; thus, no evaluation study with real users was obtained against it.

Zaid A. Habash[3] used android-based mobile technology to assist doctors to manage and monitor their Alzheimer's patients. The application also serves as a support tool for Alzheimer's patients by reminding them about the medication. The response from the doctors shows that the proposed application is a suitable tool to support and assist doctors to monitor and communicate with their Alzheimer's patients. Further assessment still needs to be conducted to evaluate its usability among Alzheimer's patients and their caretakers.

Gaurav Gupta[4] implemented a system that includes reminding them of their families through memories and family photos and information, the dates of their medications, the amount of medicine, and hospital appointments. The results obtained showed that a high percentage of the students approved that the proposed system is usable, and useful and achieved the main project target. The feature to track the locations of patients and a section for emergency contacts can be added.

Shooq Alharbi[5] focused on creating an application for Alzheimer's patients. The design of the proposed system presented in this study includes reminding them of their families through memories and family photos and information, the dates of their medications, the amount of medicine, and hospital appointments. Twenty students evaluated the system prototype and answered the survey questionnaire. The aim of the proposed survey was to measure user satisfaction with the proposed system and prove its usability. The results obtained show a high percentage of the students approve that the proposed system is usable, useful, and achieved the main project target.

Yuqi Guo[6] wrote an article on existing mobile phone apps for self-care management of people with Alzheimer's disease and related dementias. The availability, content, features, and quality of mobile phone applications to facilitate self-care among AD/RD patients were reviewed using a systematic manner. An initial search of 245 applications yielded a total of 14 apps. The top 3 features were alert (9/14, 64%), self-care tips (6/14, 42%), and social networking capacity (5/14, 35%). The applications' average readability was a tenth-grade reading level (SD 3.06). The overall quality was 3.71 out of 5. It was concluded that currently available apps for AD/RD patients may not meet complex needs and may be challenging to use, given the possible impaired communication ability associated with AD/RD. As a result, high-quality applications must be built and extensively tested for practicality and efficacy.

N. Armstrong[7] wrote a paper evaluating a number of smartphone-based applications in order to help assist persons with AD on a daily basis. These applications included activity of daily living reminder, a picture dialing telephone and short messaging service (SMS), and a geo-fencing and one-hour reminder application. The paper provided initial details of the pre-study results, following the evaluation of the applications on a cohort of healthy adult users. In addition, details of how each of the application's user interfaces has been redeveloped are presented.

Nicola Armstrong[8] investigated a more clinically valid approach to smartphone technology for Alzheimer's patients. It was concluded that although there have been numerous research initiatives and projects in the area of assistive technologies for persons with AD, the key unmet needs still remain. The main features should be to help patients remember, maintain social contact, perform daily life activities, and enhance their feelings of safety. But, there was no single system or service that adequately meets all AD patient needs and requirements.

Latifah Alraddadi[9] proposed a case study to use the smartwatch with the mobile phone along with messaging push technologies for alerting the patient and the caregiver and redirecting the patient in case of wandering outside the prescribed region.

IV. EXISTING SYSTEM

Most of the existing apps are health-based as they focus on location tracking through GPS, medicine reminders, or heart rate monitoring. There are a very limited number of applications that assist the patients in their day-to-day life. Therefore people suffering from Alzheimer's find it tedious to go on with their daily life.

Our scope is to focus on helping the patients by reminding them of their forgotten memories in ways like photo gallery, daily diary and also assisting the patients in their daily life with the help of reminders and emergency contacts.

V. METHODOLOGY/EXPERIMENTAL
A. Components/Block Diagram
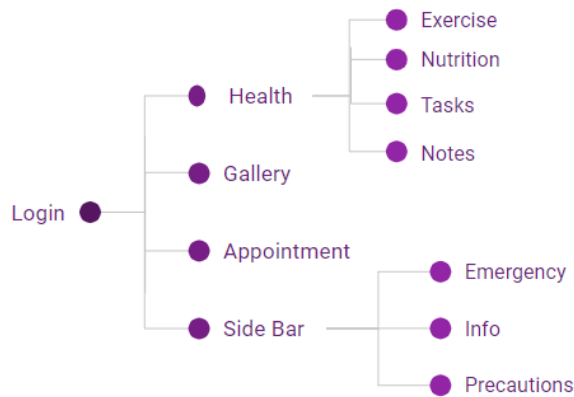
B. Technology

Languages used:

1. Dart

Dart is a programming language intended for client development, such as web and mobile applications. It was created by Google and may be used to create server and desktop apps. Flutter is an object-oriented, class-based, garbage-collected language with C-style syntax.

Framework used:

1. Flutter

Google's Flutter SDK allows you to create attractive, fast user experiences for mobile, web, and desktop from a single codebase. Flutter is free and open-source, works with existing code, and is used by developers and enterprises all across the world.

Softwares used:
1. VS Code

Visual Studio Code, usually known as VS Code, is a source-code editor developed by Microsoft for Windows, Linux, and macOS. Some of the features of VS Code include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, integrated Git, etc. Visual Studio Code is a simplified code editor that supports development tasks such as debugging, task execution, and version control. It strives to give only the tools required by a developer for a rapid code-build-debug cycle.

2. Android Studio

Android Studio is Google's official integrated development environment for the Android operating system. It is based on JetBrains' IntelliJ IDEA software and is intended exclusively for Android programming. Android Studio is a unified development environment for developing apps for Android phones, tablets, Android Wear, Android TV, and Android Auto.

C. Firebase and Authentication

We created a firebase project for our app and linked our login and registration with the firebase database. Using firebase authentication we chose email and password verification. Whenever a new user is registered its information is saved on cloud database.

Fig. 1 Firebase console Authentication

D. Cloud storage

We are able to add Notes to our diary which is being stored on cloud firebase storage. For every user, the notes are stored separately.

On clicking on 'Notes' in our app, the user is redirected to a new page which will display the diary menu where the user can add new notes, user has to add a title and description using the keyboard and after clicking save the note will be saved on the cloud storage.
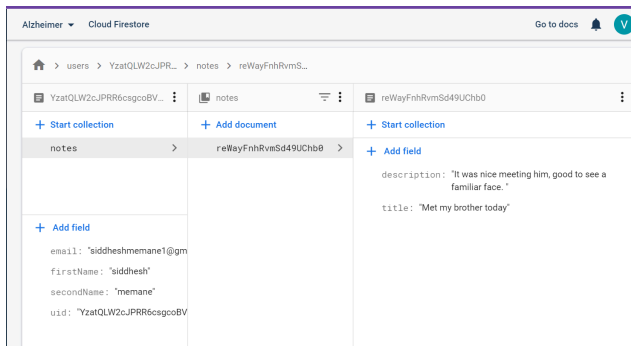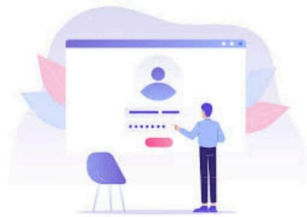
Fig. 2 Firebase storage

Fig.3 Login page

VI. RESULTS AND ANALYSIS

We are providing the users with basic functionalities which will help Alzheimer's patients with their daily tasks. We have included facilities like a to-do list, a diary, an interface to book appointments with the doctor and ask queries, etc.
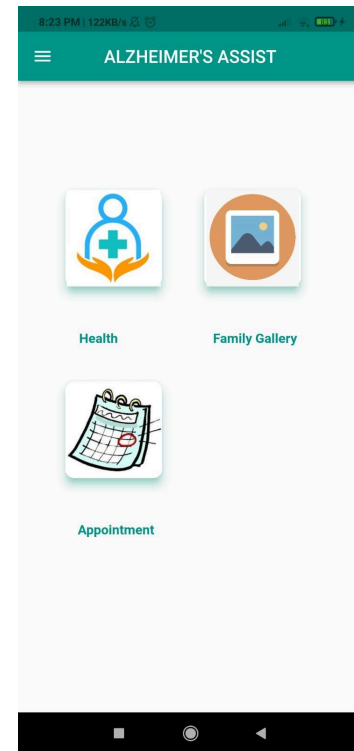

Fig.4 Home page

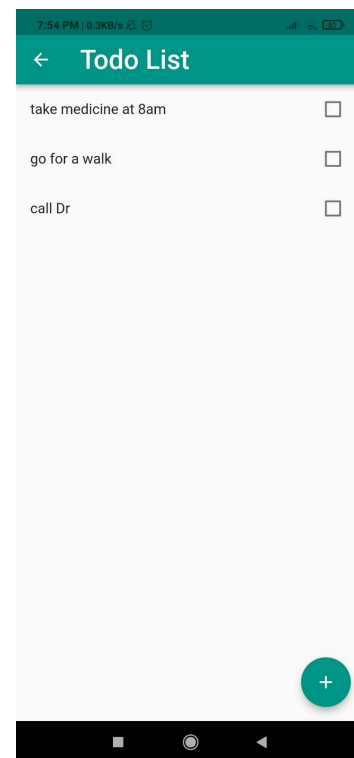The home page of our app gives an overview of all the functionalities.

Fig.5 To-do list

The patient can checkmark all the tasks that are already completed and add new tasks in the to-do section.

Fig. 6 Notes/diary

The patient can record his/her personal memories in the diary and revisit them whenever required.
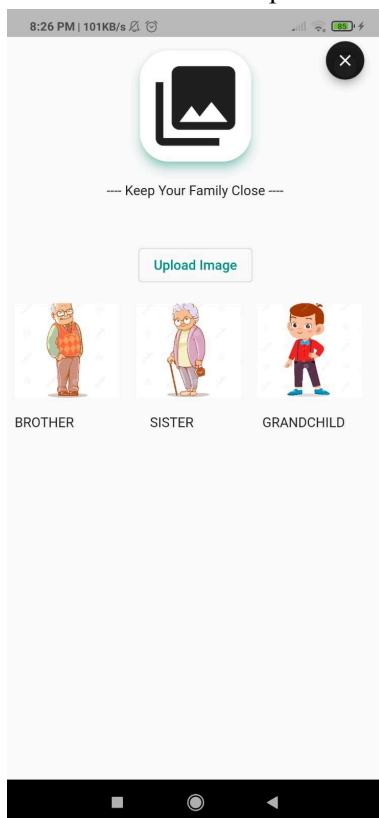

Fig.7 Photo gallery

The patient can add pictures of his family and also add descriptions for the pictures.
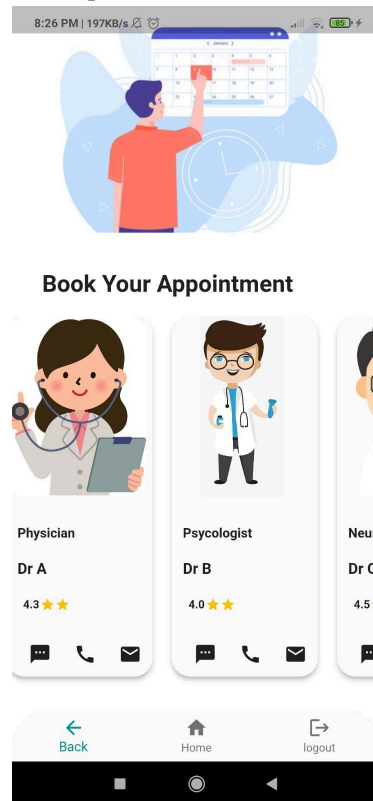

Fig. 8

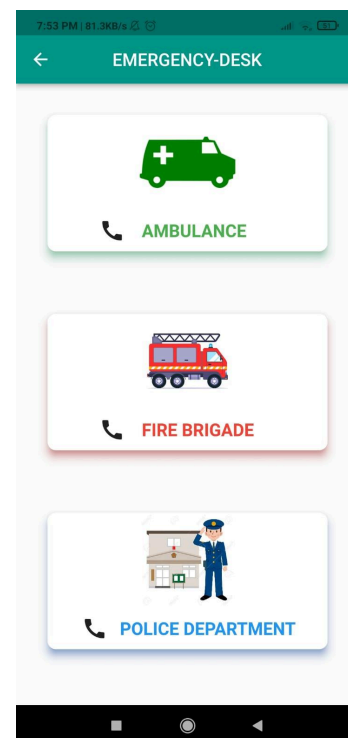The patient can book an appointment with any doctor as per his/her convenience.

Fig. 9 Emergency contacts

The patient can directly call the emergency contacts through our app.

VII. FUTURE SCOPE

The system can be extended for caregivers as well. The system can allow the user to unlock the application through fingerprint authentication.

VIII. ACKNOWLEDGEMENT

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