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Vellore Institute of Technology

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School of Computer Science and Engineering

CSE4015 : Human Computer Interaction

(J-Component)

REVIEW 3

Project Title : **AlzhiCare**

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ABSTRACT

Alzheimer's disease is the most common type of dementia, without a cure till date. Millions of people in the world are living with this disease.According to the Alzheimer's association more than 5 million people are living with it and it is projected to increase even more in the coming years.

Alzheimer disease patients need user friendly and easy reminder systems, cognitive improvement games, emergency buttons, easy way to make phone calls. Due to the issues they have with their memory, people with Alzheimer need to be reminded repeatedly about daily tasks and activities. Elders and people with Alzheimer disease often forget all the steps that are necessary for the completion of a task. Safety issues can be faced with the use of the SOS smart button system, families can be informed about the exact place of the patient in a digital map and communicate with the patient.

This project is to help these people,make their lives easier and make it better for them to live with this disease. By including features such as pill and hydration reminders,help features,chatting with the community and notes to write down the things they always want to remember.We feel that our project can help the people who are suffering from this incurable disease and who feel that they are helpless and give them an easier way to live to their lives and not be dependent on others.

This app is a complete health care application catered to the health and wellbeing of Alzheimer Patients.The App has several features that include indoor navigation using AR,Several Customised Memory Puzzles, Take your pills and stay hydrated remainders and streaks. A complete Alzheimer's community Feature, 3 things am grateful for feature, Daily Affirmations & White Noise Feature

INTRODUCTION

The main aim of our project is to build an application completely catering to Alzheimer's patients. It will focus on all the factors with regard to looking after them by including tasks in their daily routine like recognition using puzzles, hydration reminder, take your pills feature, AlzhiHelp feature, the date and most importantly the navigation feature

In this way they are enabled to feel a little more liberated than controlled because of their condition and controlled environment. With AlzhiCare we might not be able to cure dementia but might help the millions of people in the world who are living with this disease.

RELATED WORK

Some of the features that we have in our project have been done before for example the Pill reminder, but we are combining all these features into one project and tweaking and modifying them to create an all in a single application catering to Alzheimer patients in particular. This app is a complete health care application catered to the health and wellbeing of Alzheimer Patients.

REAL LIFE APPLICABILITY

Alzheimer's disease is the most common type of dementia and till date there is no cure for it. People around the world are living with this disease. More than 5 million people are living with it and it is projected to increase even more in the coming years.

This project is to help these people in making their lives easier and make it better for them to live with this disease. By including features such as pill and hydration reminders, help features, chatting with the community and notes to write down the things they always want to remember. We feel that our project can help the people who are suffering from this incurable disease and who feel that they are helpless and give them an easier way to live to their lives and not be dependent on others. The patient tends to be irritated and depressed in the disease. Features like '3 things I am grateful' for help improve the mental health of the patient.

HARDWARE & SOFTWARE REQUIREMENTS

Hardware requirements:

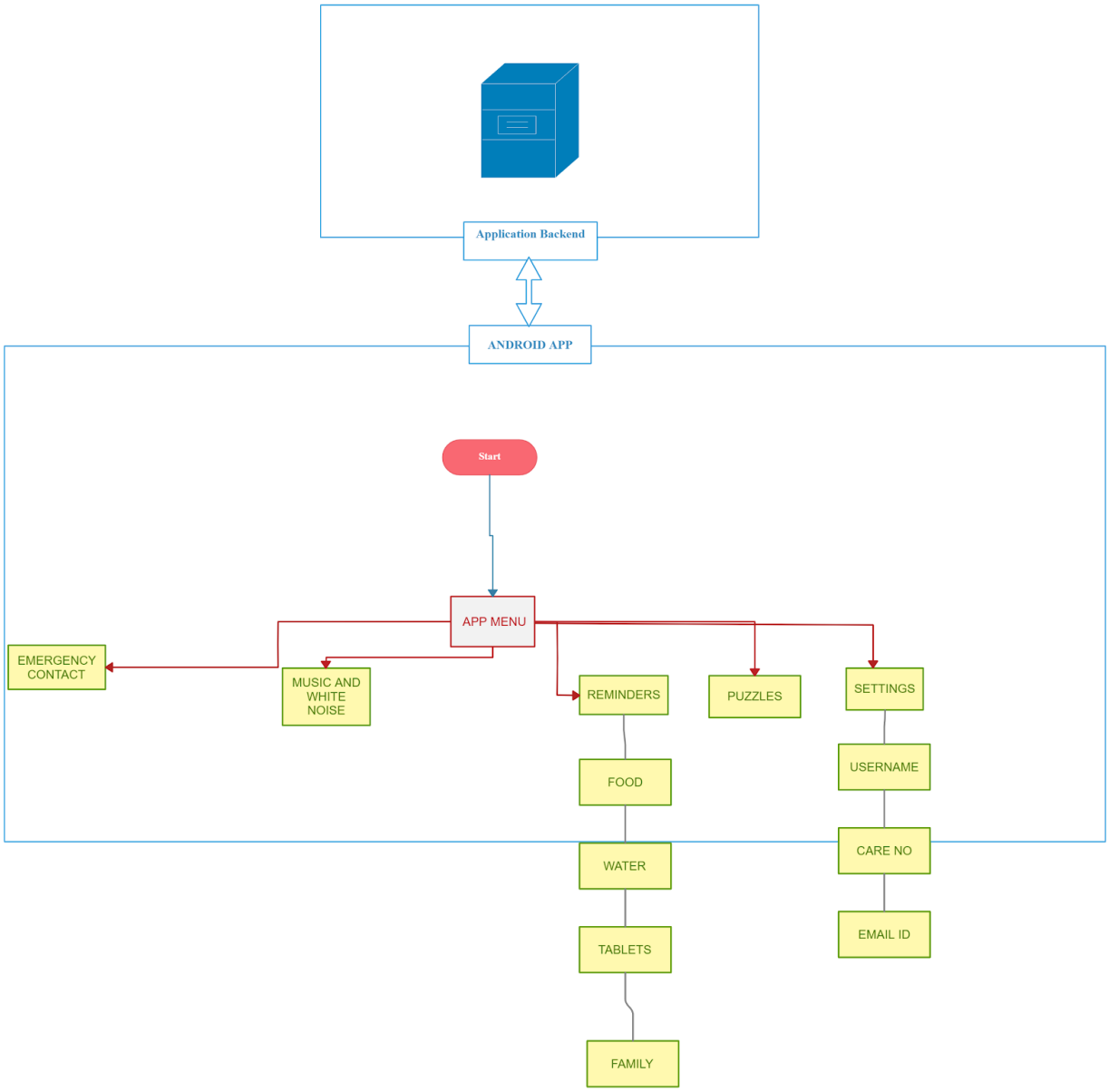
- Smartphone with a screen resolution of 320x480 pixels or higher
- Free disk space in the phone

Software requirements:

- Android operating system versions (4.1-8.0)

TOOLS USED: ANDROID STUDIO
PROGRAMMING LANGUAGE: JAVA

PROPOSED SYSTEM (PICTORIAL REPRESENTATION)



WORKING METHODOLOGY

The mobile application has been created using android studio. The code is written in java. The below are the details of how the features of the mobile application are created:

Daily Affirmations feature : A custom word adapter and arraylist is used to store the information. the array adapter creates a view by calling Object#toString() on each data object in the collection you provide, and places the result in a TextView. Pre recorded audio is used so that the patients can easily repeat the Affirmations as they are being said. For customising the type of view used for the data object,method getView(int, android.view.View, android.view.ViewGroup) is overridden and inflates a view resource.

White Noise Feature : Pre-recorded white noises used that help with better sleep. It is played and paused when the feature is clicked.

AlzhiHelp feature : Directly takes the user to the dial pad where he or she can contact their caregiver with the touch of a button.

Memory Puzzles : This feature takes the user to a website with various brain games made especially for Alzhimers patients to improve their memory.

Settings: The main feature of this app. That makes the app the most diverse and versatile. Shared Preferences used here allows the user to set the values, for emergency AlzhiHelp number, email id and username. So that the app is customisable to their liking. In order to use shared preferences,a method getSharedPreferences() is called which returns a SharedPreference instance that points to the file containing the values of preferences.

IMPLICIT AND EXPLICIT INTENTS

In order to reduce redundancy and make our app fast and efficient, we made use of explicit and implicit intents for all our features. This helps with the UX and helps the user familiarize themselves with the app more. Making it easier for them to make it a part of their daily life.

- **Explicit intents** are used to start a component in the app, as the class name of the activity or service is known which you want to start.
- **Implicit intents** doesn't name a specific component, instead declares a general action to perform, which allows a component from another app to handle it.

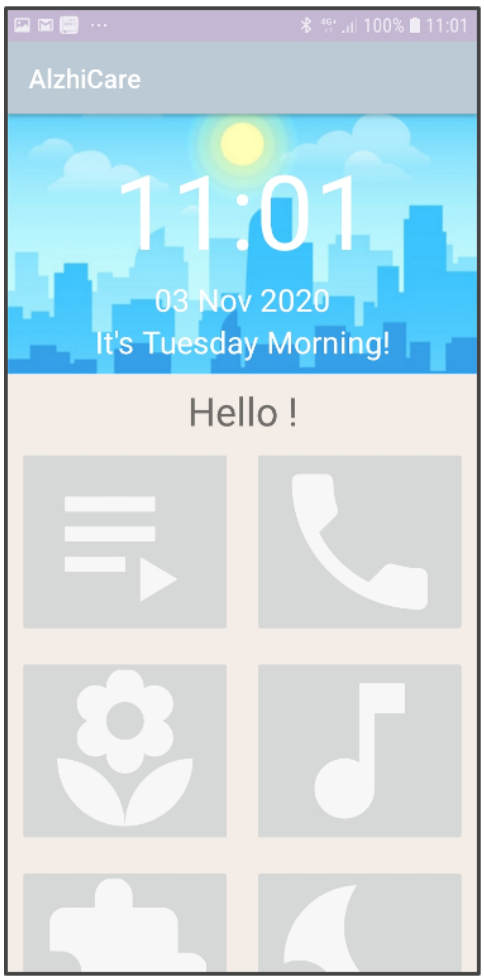
Below are the features we used intents for

- AlzhiCall / AlzhiHelp feature - implicit intent
- Affirmations feature - explicit intent
- Reminders feature - implicit and explicit intent
- Things to be grateful for feature - implicit and explicit intent
- Music feature - implicit intent
- Memories feature - implicit intent
- Settings - explicit intent

(Note : the AlzhiCare giver is expected to configure the settings before the User is to rely on the app.)

IMPLEMENTATION RESULTS AND USER INTERFACE

ALZHICARE is an application completely catering to Alzheimer's patients. It focuses on all the factors with regard to looking after them by including tasks in their daily routine like recognition using puzzles, hydration reminder, take your pills feature, AlzhiHelp feature, the date and many other such features. Our project can help the people who are suffering from this incurable disease and who feel that they are helpless and give them an easier way to live to their lives and not be dependent and feel a little more liberated than controlled because of their condition and controlled environment

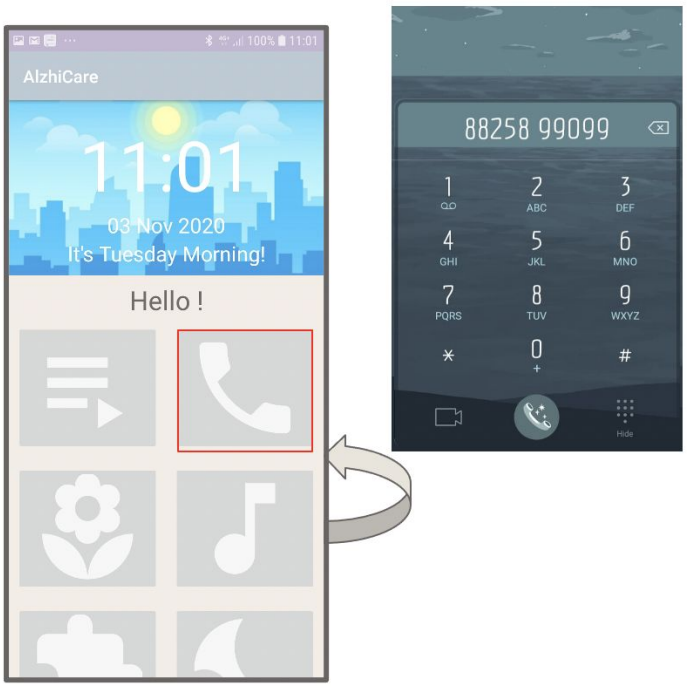


The Alzhicare Application

The app displays the Date, Day and Time on the homescreen and the picture changes according to the time (morning, afternoon, evening & night).

The color scheme is very neutral, calm and soothing colors as these help patients feel more comfortable.

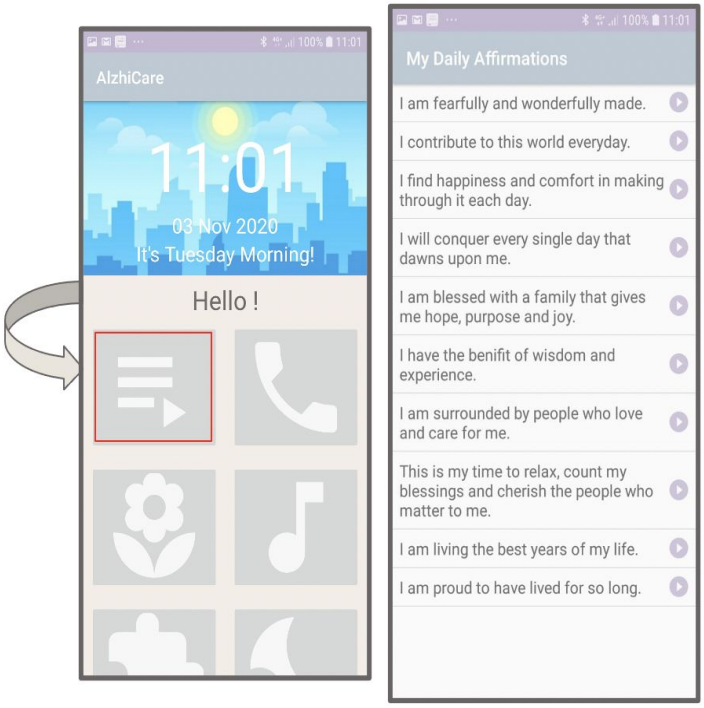
We have made all the icons comparatively large in size and pictures instead of text as it has seen that patients understand pictures better than text.



AlzhiHelp feature

Since Alzheimer's is degenerative, we have included this option so that caregivers can prioritise their patients accordingly. With the click of a button, they can have a caregiver attend to them.

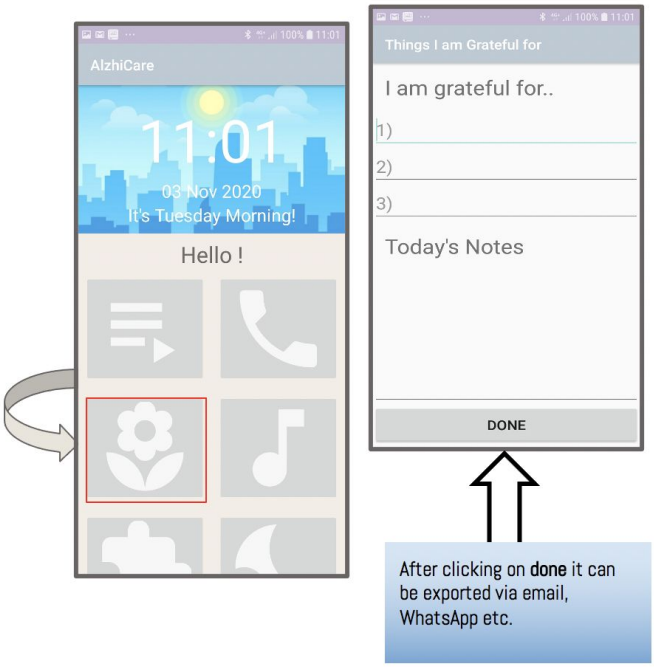
The number of the caregiver just has to be added in the settings and with one click it is directed to the dial pad



Daily Affirmations feature

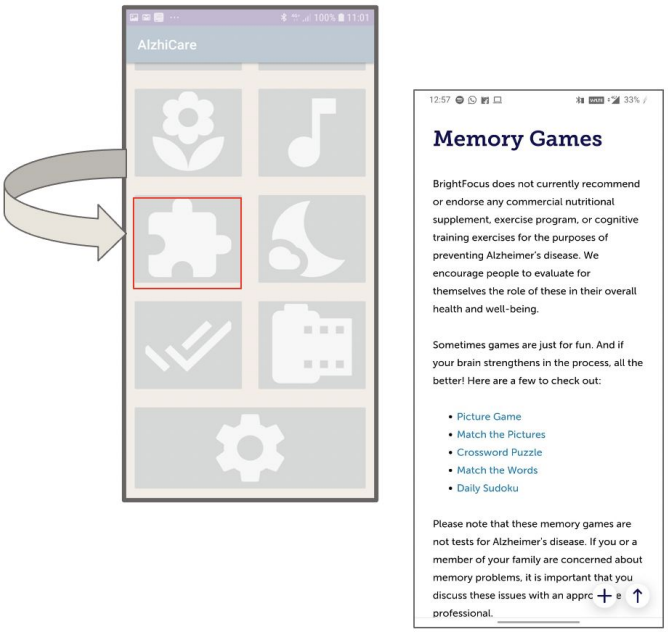
Positive affirmations create positive connections between nerves in your brain. When you think positive thoughts, your brain releases chemicals related to those positive emotions. The same happens when you think negative thoughts. We thus feel it's necessary to include this feature so that the patient may have a positive outlook on life and can prevent depression due to their condition. By clicking on the play

button next to the affirmation it will be read out to the patient.



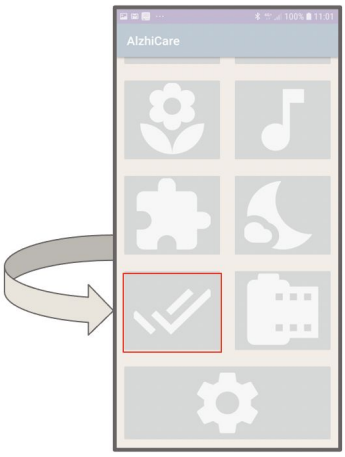
3 Things I am grateful for

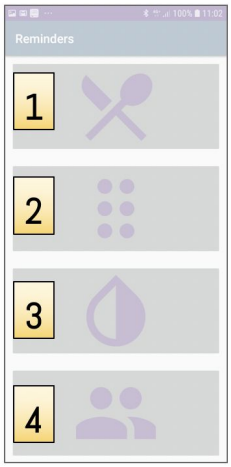
There is a growing body of research which shows there are many psychological benefits to being grateful, including feeling happier and lowering stress, depression and anxiety. Not only that expressing genuine gratitude on a daily basis can improve physical health, cardiovascular health and immune function. Remembering 3 significant things and connecting that to an emotion can also help with a better memory despite the patient's degrading condition.



Customised Memory Puzzles

Alzheimer patients tend to forget a lot of important information, even the names of their family and friends. So with our customised Memory Puzzles, they can always attempt to remember those close to them and try improving their memory gradually.
On tapping the icon,patient will be directed to a bunch of memory games for him/her to play





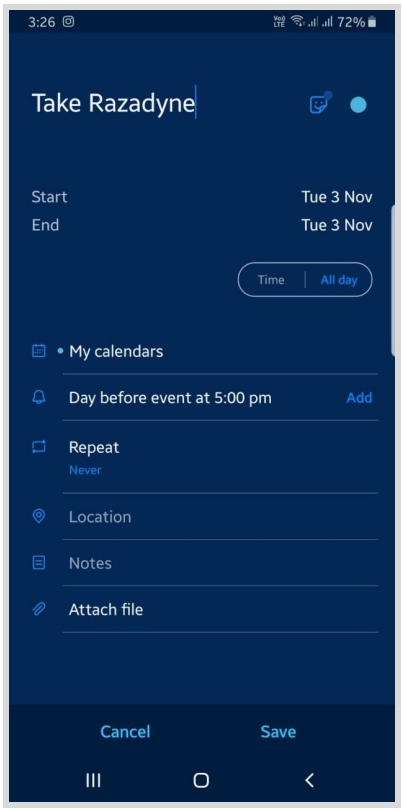
Reminder Feature

Remembering to take the medication prescribed and to stay hydrated will improve their brain activity. So, we have added these features so that they are reminded and can share their streak with their Alzheimer's Community.

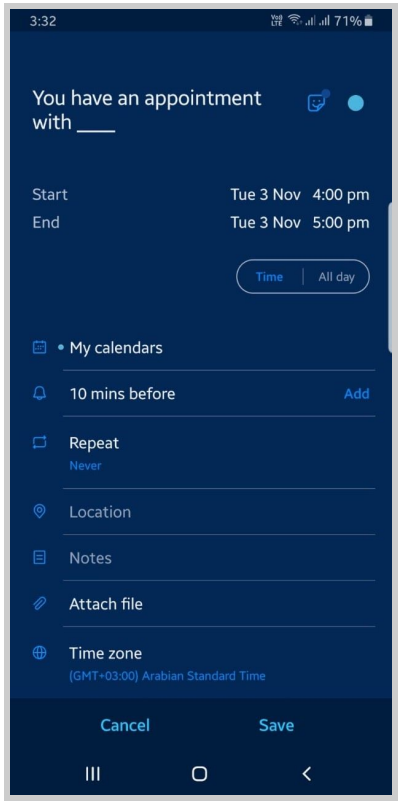
1 - Food reminder
2 - Pill Reminder
3 - Hydration reminder
4 - Appointment reminder

The interface of reminders depends from mobile to mobile. This feature directly leads to the reminders of the mobile. This must be configured by the caretaker beforehand.

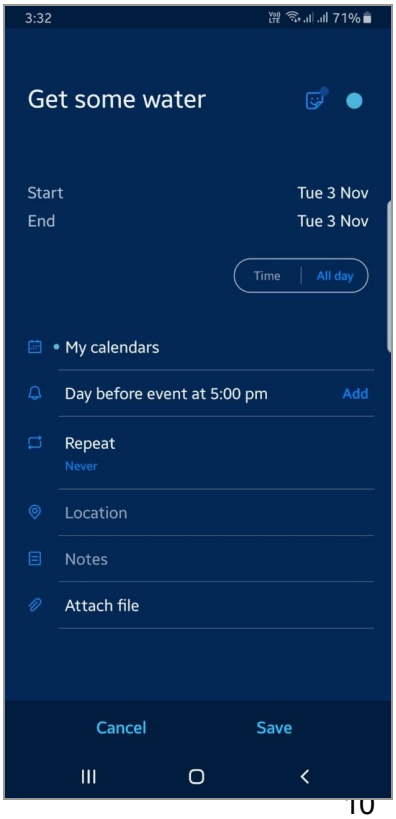
Pill reminder

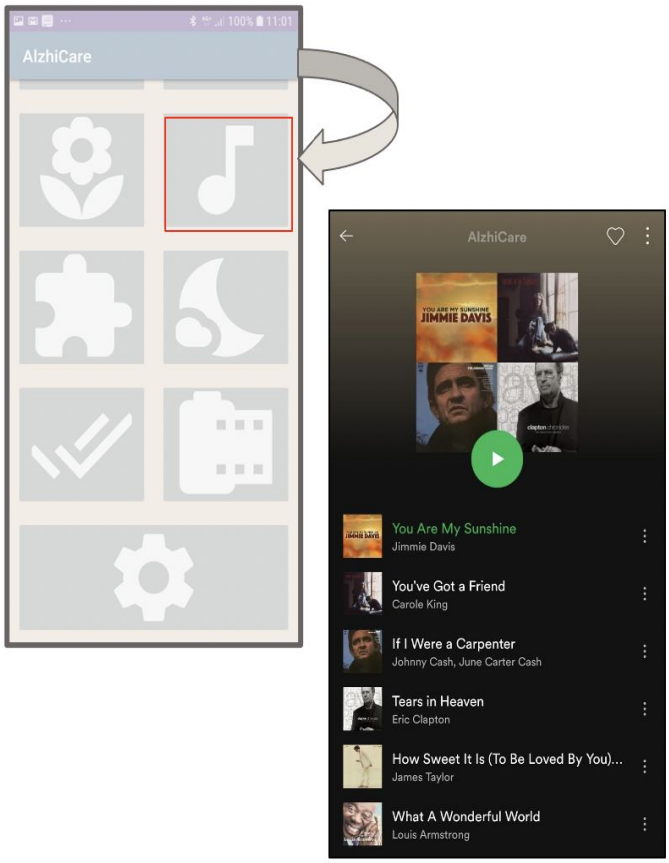


Appointment



Water

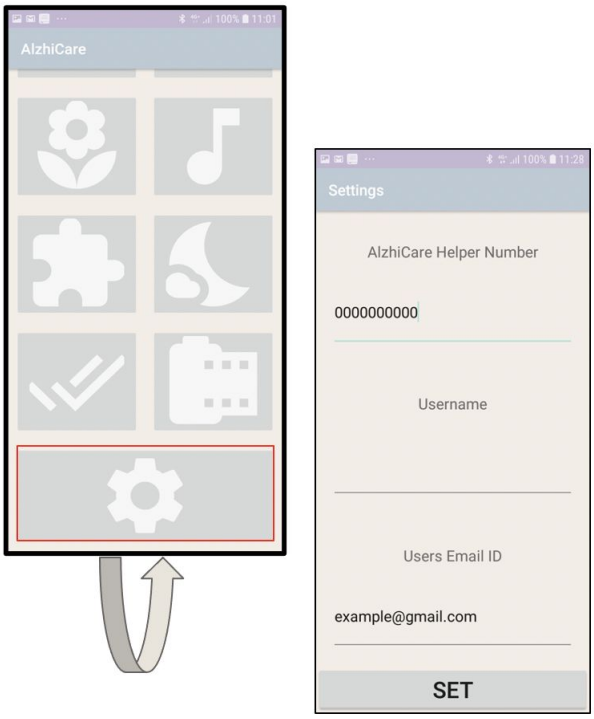




Music Feature

Research suggests that listening to or singing songs can provide emotional and behavioral benefits for people with Alzheimer's disease and other types of dementia. Musical memories are often preserved in Alzheimer's disease because key brain areas linked to musical memory are relatively undamaged by the disease.

For example, music can-Relieve stress,Reduce anxiety and depression,Reduce agitation. Music can also benefit caregivers by reducing anxiety and distress, lightening the mood, and providing a way to connect with loved ones who have Alzheimer's disease - especially those who have difficulty communicating.

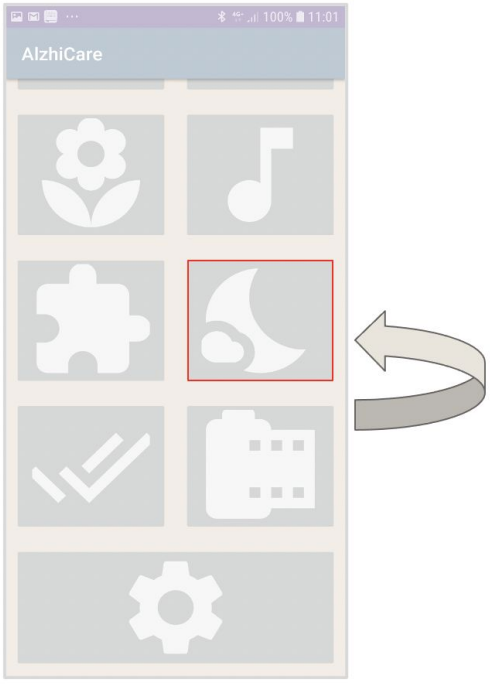


Settings

Settings is used to for adding & updating details-

- The Caregiver's Number
- Username
- Patient's Email ID

The Caregiver's Number is used in the Alzhihelp feature to contact him/her in need of assistance.



White Noise Feature

As most patients have trouble telling what time of the day it is and sleeping, due to the disease's effect on their body clock, we introduce the white noise feature that will enable them to fall asleep easier and put them in a better mood.

Just by tapping on the icon, the white noise will be played and turned off when tapped again.

INTERFACES VALIDATION WITH NIELSEN'S 10 HEURISTICS

- *Visibility of system status*: Each action being performed is displayed on the screen to let the user know of the system status.

- *Match between the system and the real world*: The features in the application like a reminder clock, notes features, puzzles are all similar to what the user has seen in the real world.

- *User control and freedom:* Back and cancel buttons are available to go back or undo actions easily. As elderly can have vision issues, there is a feature to change the colour patterns and increase or decrease font size at will.

- *Consistency and standard:* The features and icons are consistent in nature as best practices and common patterns are used.

- *Error prevention:* The chances of users making an error are very less and suitable error messages are provided on server or client errors to prevent the server from crashing.

- *Recognition rather than recall:* All the commands or features of the application is displayed along with an icon that describes it so users need not remember about features. Eg: a water and clock symbol for hydration reminder.

- *Flexibility and efficiency of use:* The application would work on every android platform. It is very handy and easy to use.

- *Aesthetic and minimalist design:* Since this website is likely to be accessed by aged people the following things are done: larger font sizes, colour contrast is more in the app so that it caters to older adults, Text and button sizes kept large. Progressive disclosure is used to lower chances of overwhelming older adults.

- *Help users recognise, diagnose and recover from errors:* It displays what kind of an error might have occurred and asks the user to do some action to fix it.

- *Help and documentation:* There is a 'help' feature in the application. This feature helps users to contact their friends or relatives in times of emergency. The documentation of the app is also available which helps users to know each and every feature available on the app and how to use it.

COMPARATIVE ANALYSIS

Our project focuses on integrating various features like pill reminder, affirmations, puzzles, etc into one application. The projects done till now include only one or two of these features. Our pill reminder is different from others as it directly connects to the time and clock system of the mobile and puts a reminder.

CONCLUSION AND FUTURE SCOPE

The AlzheiCare mobile application is successfully deployed and run. All the features are visibly working and really helpful for the Alzheimer patients.
In the future, we can add more puzzles and affirmations to the application. Currently this application works on android only as it is built on android studio, we can build similar for iOS.

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APPENDIX

Demonstration video:
https://drive.google.com/drive/folders/1fjXfI2Hd_OR2a_rVUUCHOdOx_9WrKM7V?usp=sharing

Link to access source files:
https://github.com/jerelyn-premjit/AlzhiCare
(Just run the above source code using android studio.)