

Technical Design Document for MemorEZ Application: Combined Version

Version 2.0

Consolidation by James Eble (Project Manager)

UMGC SWEN670 – Spring 2022 (FlutteringMind, RememberAll, DevSecOps)

Professor: Dr. Mir Assadullah

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Section 1 – Executive Summary

Project Manager: James Eble

1. Executive Summary

1.1 Purpose

This document is a consolidation of the technical design documents (TDDs) created for the SWEN670 Spring 2022 Semester. The class consists of three teams: team FlutteringMind, team RememberAll and the DevSecOps team. These teams are collaborating to design and build the MemorEZ mobile application. The application is intended for use by short term memory loss (STML) patients. The app consists of a 'patient mode' and 'caregiver mode'.

1.2 Patient Mode

The patient mode, detailed in section two of this document, is here designed to assist STML patients to track daily tasks and provide daily reminders. This TDD document provides a design for the architecture, data, component, and human interface features of the application.

- **Decomposition Description:** Details architecture in regard to the modes and features within the application.
- **Data Design:** Details the outgoing data, data formats for various aspects of the application
- **Component Design:** Briefly details twelve components in the application.
- **Human Interface Design:** Provides an overview of the UI and details the individual screens of the app.

1.3 Caregiver Mode

The caregiver mode is detailed in section three of this document. This mode of the MemorEZ app is designed for use by a caregiver of the person with STML. The caregiver section of this TDD document also provides design models for the architecture, data, component, and human interface aspects of the app.

- **Decomposition Description:** Briefly describes thirteen components of the application.
- **Data Design:** Details data flow and storage for the application.
- **Component Design:** Details basic requirements for thirteen components of the application.
- **Human Interface Design:** Details screen images of the MemorEZ application.

Revision History for the Combined TDD

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Version	Date	Reason	Approval
1.0	2/5/2022	Initial Documentation	James Eble
1.1	2/7/2022	Executive Summary	James Eble
2.0	3/23/2022	Revision	James Eble

Section 2 – Patient Mode TDD

Team FlutteringMind

Revision History

Revision Number	Date	Description	Authors	Reviewed & Approved By
1.0	02/05/2022	Initial Release	Selina Zaman Vanessa Stringer Joshua Fischer Joseph Jewell Daryle Urrea Sean LaMonica Anusha Ramanan	Selina Zaman Vanessa Stringer Joshua Fischer Joseph Jewell Daryle Urrea Sean LaMonica Anusha Ramanan
1.1	03/19/2022	Updated TDD	Selina Zaman Anusha Ramanan	Selina Zaman Anusha Ramanan

1. Introduction

1.1 Purpose

The purpose of this Technical Design Document (TDD) is to provide a comprehensive look at the design and architecture of the **MemorEZ** application or app is to assist individuals who are suffering from Short-Term Memory Loss (STML). This TDD will work as a technical guide for the development team to help with the implementation of the application. The following sections and subsections in this document will explain the MemorEZ application's architectural design, user interface design, data design, component design, and overall UI/UX or interface layout design. The intended audience to read this document includes project managers, stakeholders, business analysts, software developers, testers, future developers, testers from next semester, and any other future members who could add value to improve the application.

1.2 Overview

The purpose of the MemorEZ application is to assist both people with STML, as well as their caregivers. According to Cherry (2021), Short Term Memory is “the capacity to store a small amount of information in the mind and keep it readily available for a short period of time.” In turn, STML has an inability to store small amounts of information in active memory. This application is intended to aid and assist patients, as well as their caregivers in this matter. This application is meant to modify/build on previous features based on stakeholder feedback to upgrade the application “Memory Magic”.

Team FlutteringMind is tasked with the patient portion of the application. This portion of the application will assist patients with STML with daily note-taking using speech-to-text, reminding them of specific events, giving them certain tasks to complete in which they can save, review, or archive that event once completed, give them a mood survey, as well as have a patient profile with important information stored. Team RememberAll is tasked with developing and implementing the provider/caregiver portion of the application. This portion of the application will assist caregivers/providers by allowing them to input specific events for the user, input important tasks for the user to complete, obtain information from the patient in regards to the mood survey, toggle what features are available to the patient, and input the user's information into the patient profile.

MemorEZ is designed to be a useful tool for users who suffer from STML, as well as their caregivers/providers. This tool will stimulate STML patients and remind them of tasks that they may have to do. It will also allow their caregiver/provider access to their tasks, how they are doing, and send them updates on how they are doing. Features like speech-to-text, text to speech, and notification reminders will be there to aid the patient while using the application. Team FlutteringMind, as well as team RememberAll will collaborate in the design of the application MemorEZ.

1.3 Scope

The scope of this document is to provide to the intended audience a detailed description of the architecture, as well as the technical design of the application MemorEZ, specifically for the patient portion. This document is broken down into different sections, and subsections that will cover each aspect of the application in detail. The areas that this document will address will be the following:

1.3.1 In Scope

- **Architecture Design:** This section will show the application design, and structural properties found within the system.
- **Data Design:** This section will provide the storage and data design of the application.
- **Component Design:** This section will provide the components that can be found inside the application.
- **Human Interface Design:** This section will provide a model of the human interface within the MemorEZ application.

1.4 Definitions, Acronyms, and Abbreviations

Table 1 - Acronyms, Abbreviations, and Definitions

Acronyms/Abbreviations	Definitions
APP	Application
API	Application Programming Interface
UI	User Interface
UX	User Experience
GUI	Graphical User Interface
TDD	Technical Design Document
STML	Short-Term Memory Loss
HIPAA	Health Insurance Portability and Accountability Act
PHI	Protected Health Information
NLU	Natural Language Understanding
NLP	Natural Language Processing
FAQ	Frequently Asked Questions
SMS	Short message service(text message)
JSON	JavaScript Object Notation

1.5 References

Avery, D., Balbi, T., Bell, K., Crumb, K., Cruz Jimenez, C., Muwan, P., & Salim, S. (2021, October 10). Technical Design Document Memory Magic App. University of Maryland Global Campus

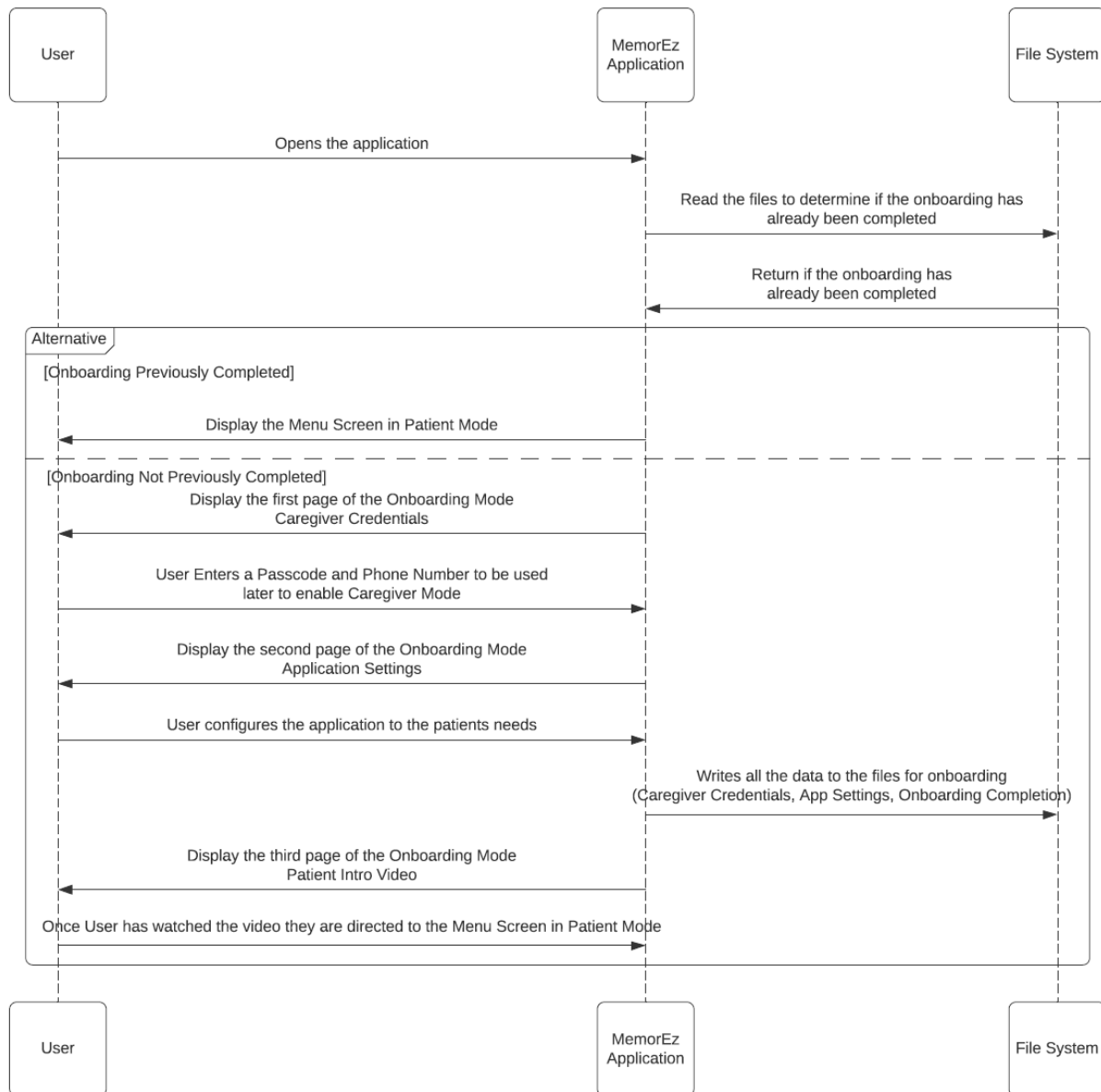
Cherry, K. (2021, April 25). What is short-term memory?. In *Verywell Mind*. Retrieved from <https://www.verywellmind.com/what-is-short-term-memory-2795348>

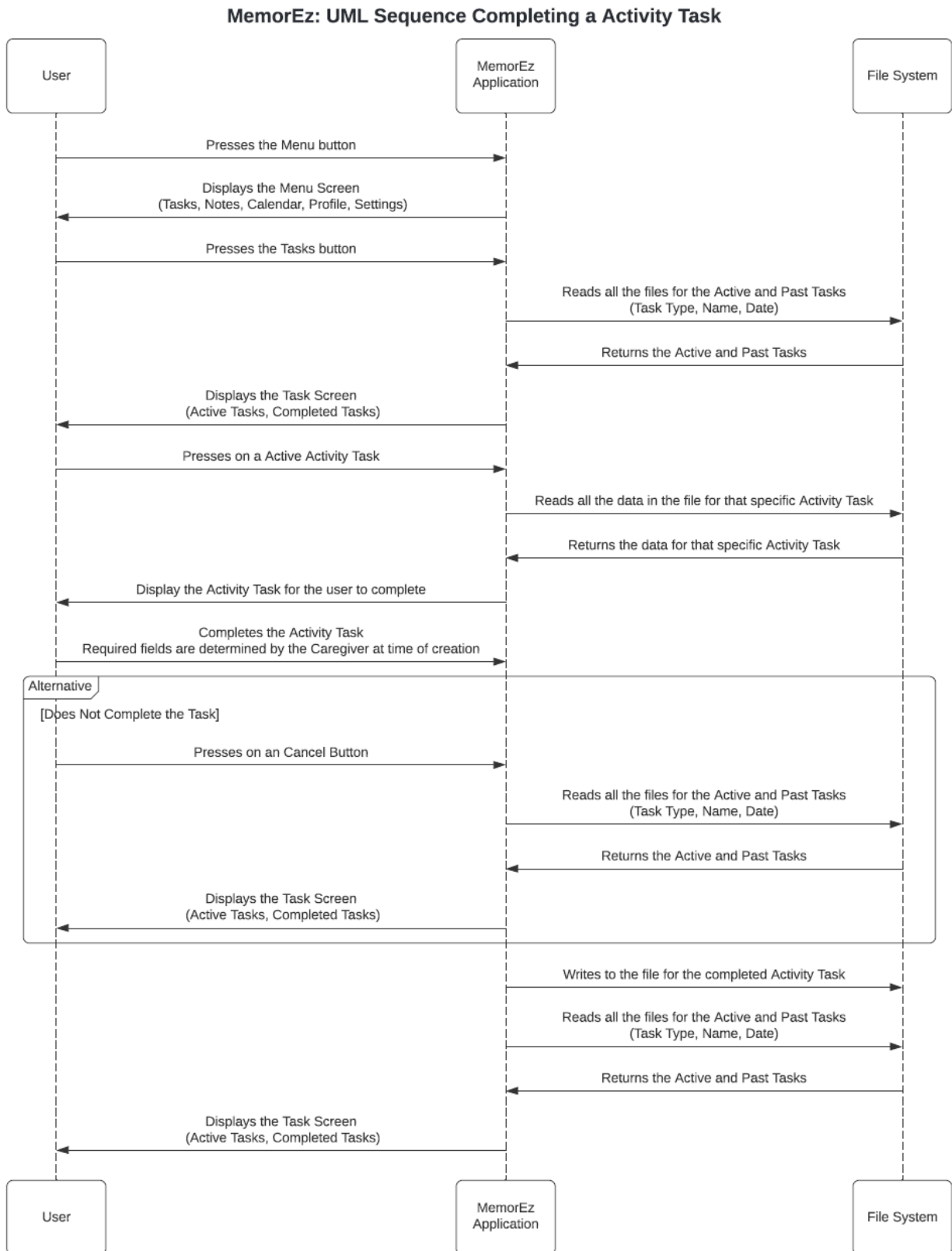
Flutter Favorites, Flutter packages, <https://pub.dev/>

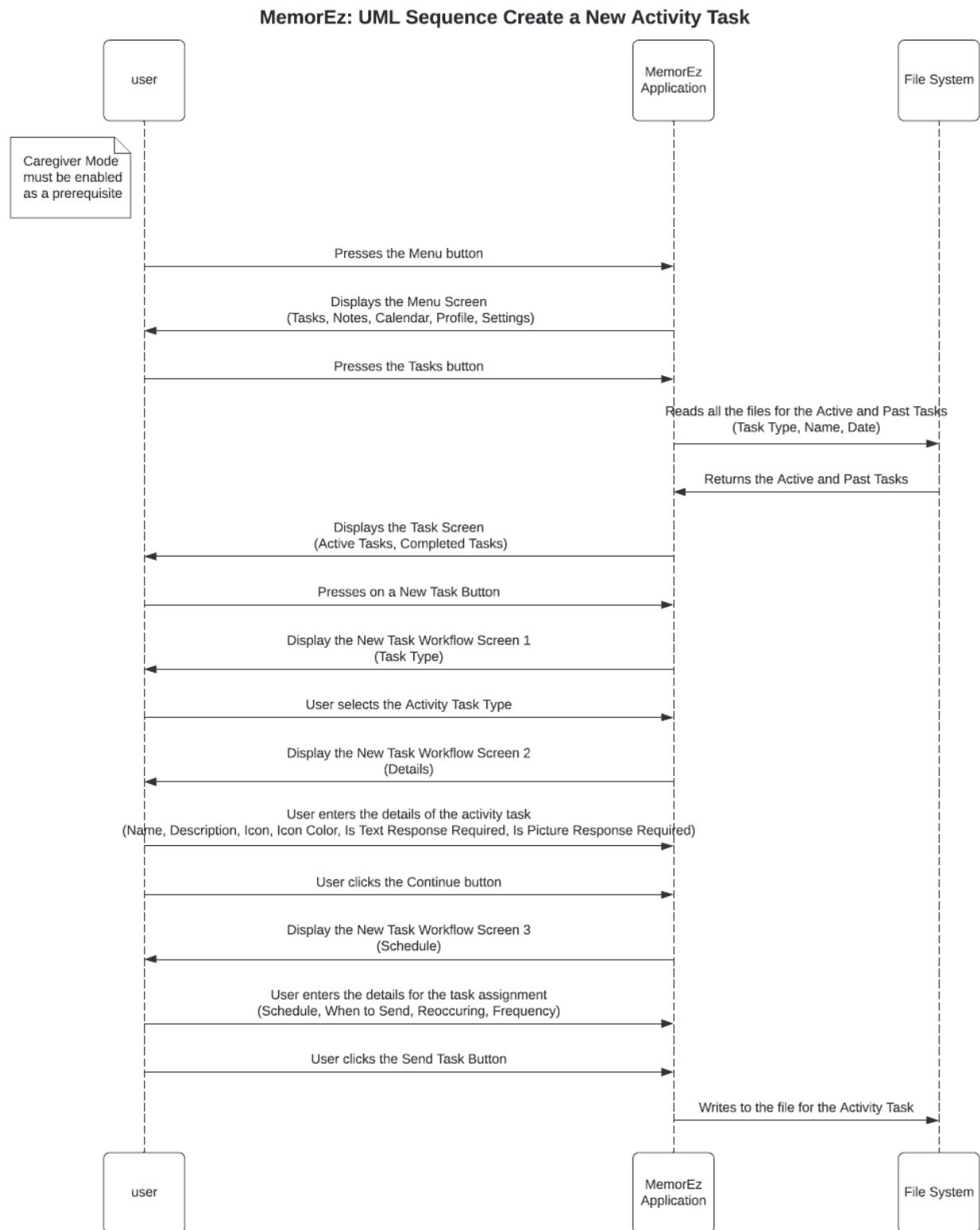
2. System Overview

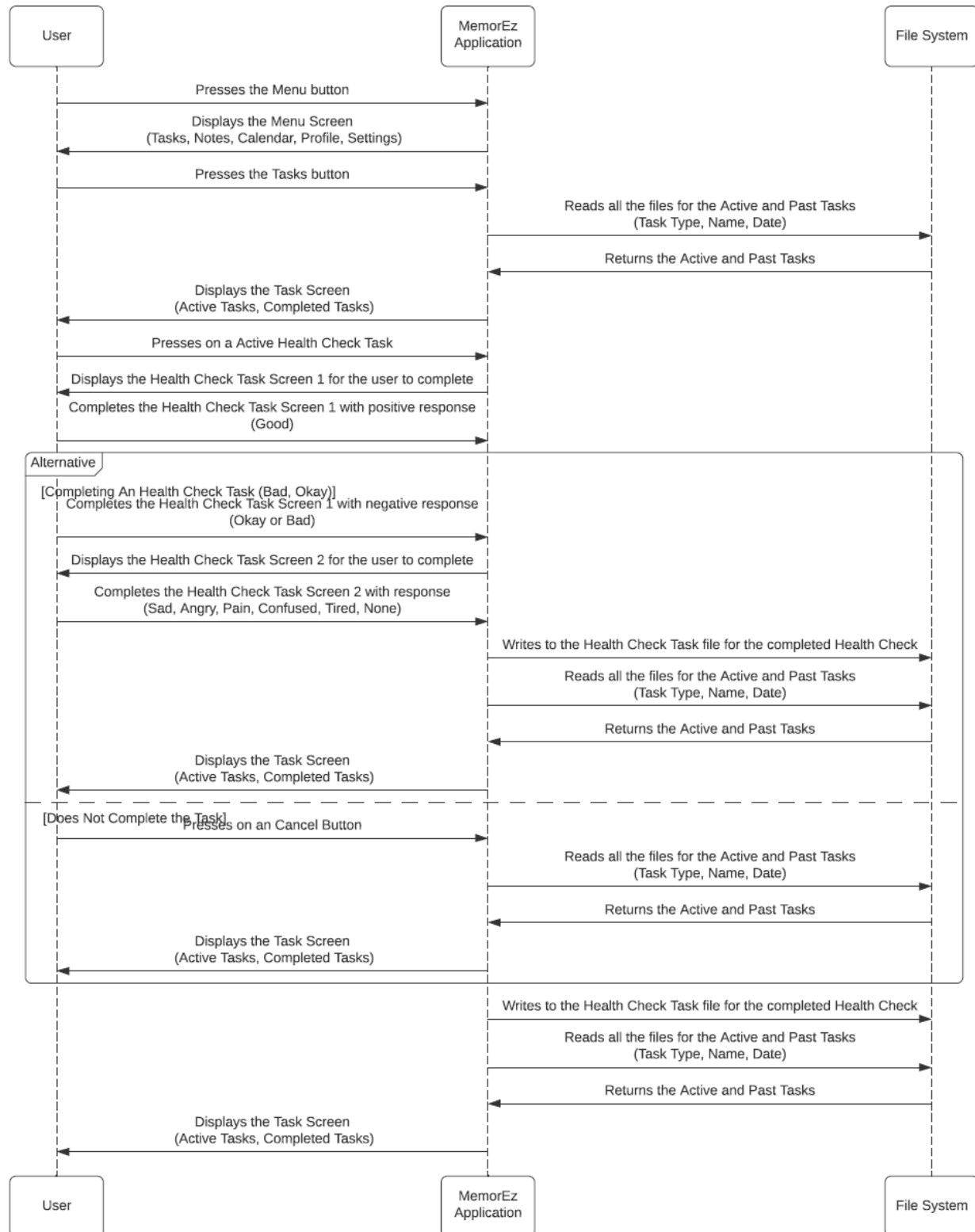
The MemorEZ Application shall serve as an assistant for individuals with short-term memory loss (STML) and their caregivers/providers. The application provides two modes (patient and caregiver) that feature note-taking capabilities, customizable tasks, a calendar, and a task and list, as well as a personal profile to store information about the user for reference. The MemorEZ Application will include natural language processing technology, notifications, and support for language internationalization. The application will support a listening mode that will enable the device to listen and act (add, modify, and delete) on designated trigger words to transcribe speech-to-text and save notes while activated. Features can be enabled or disabled in the caregiver mode of the application to tailor the patient mode of the application to the needs of the user.

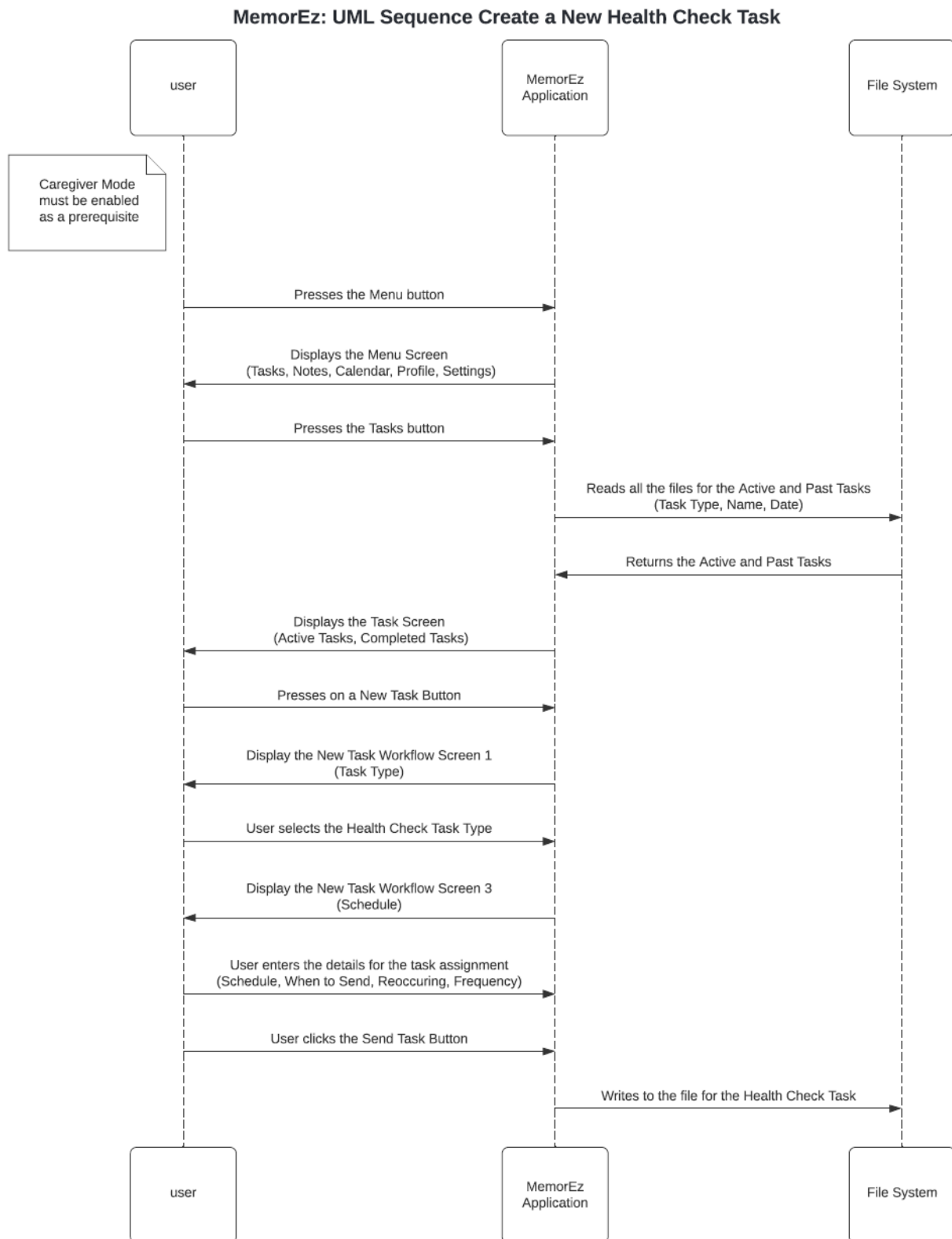
2.1 Sequence UML Diagram

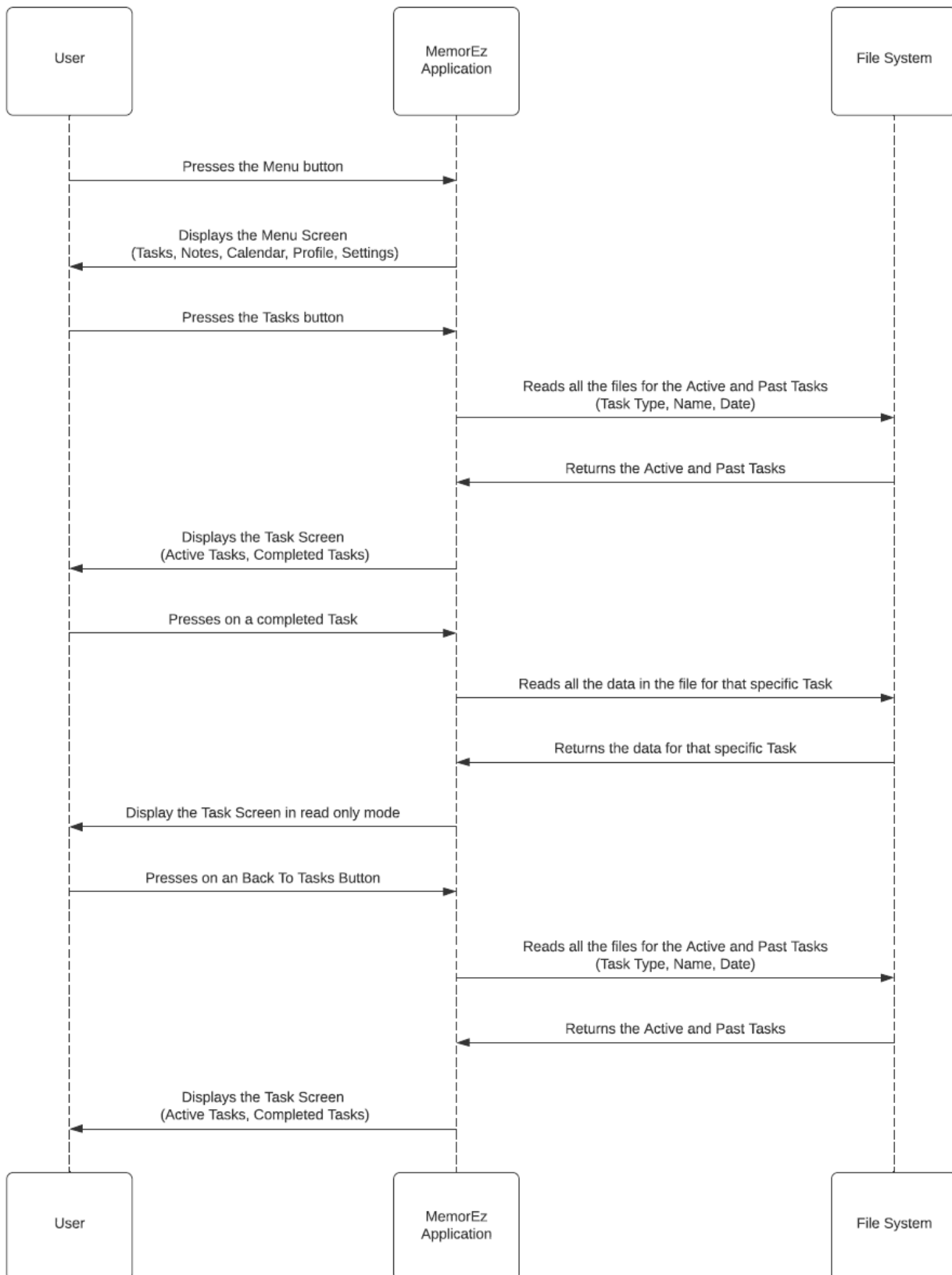
MemorEz: UML Sequence Opening The Application



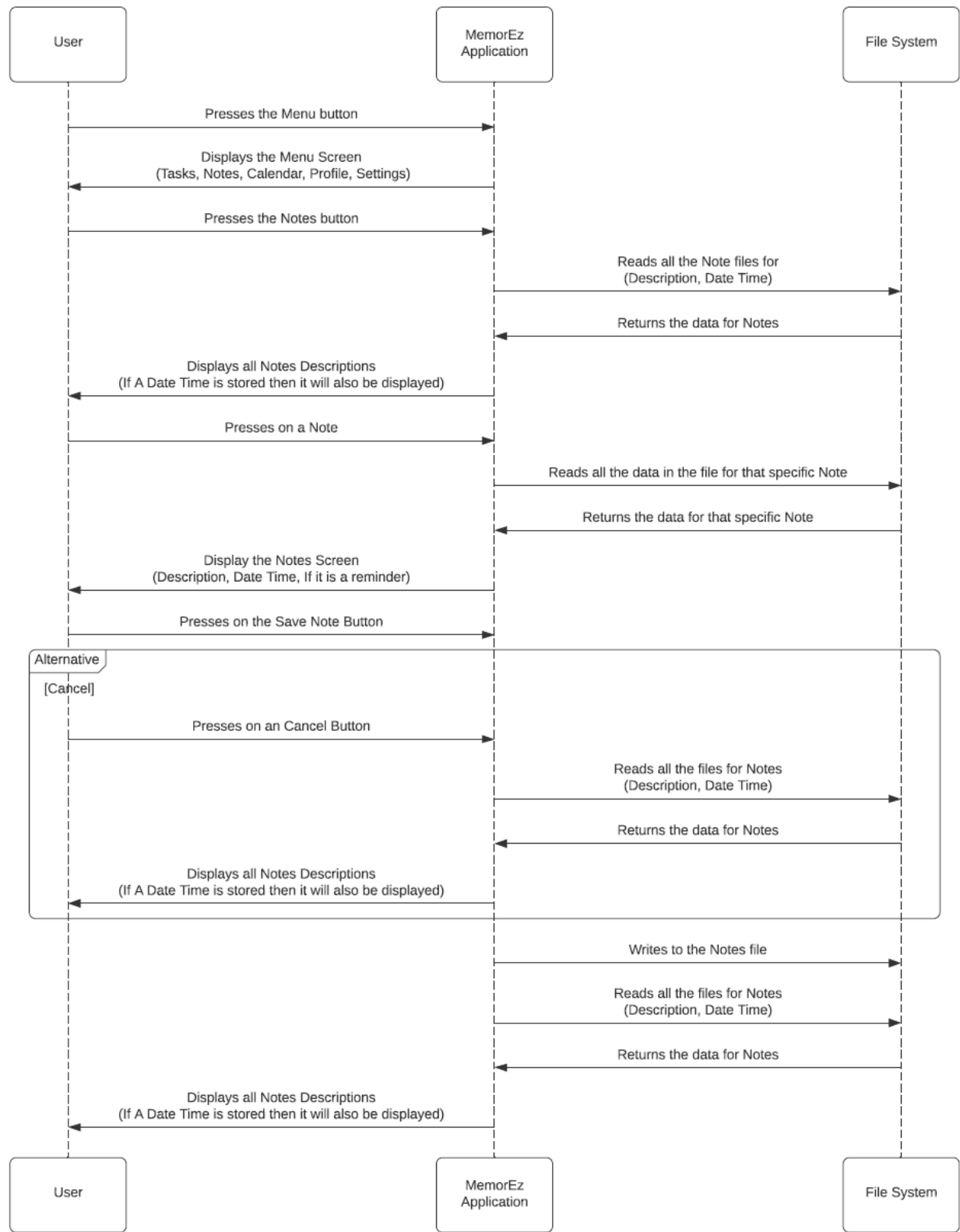


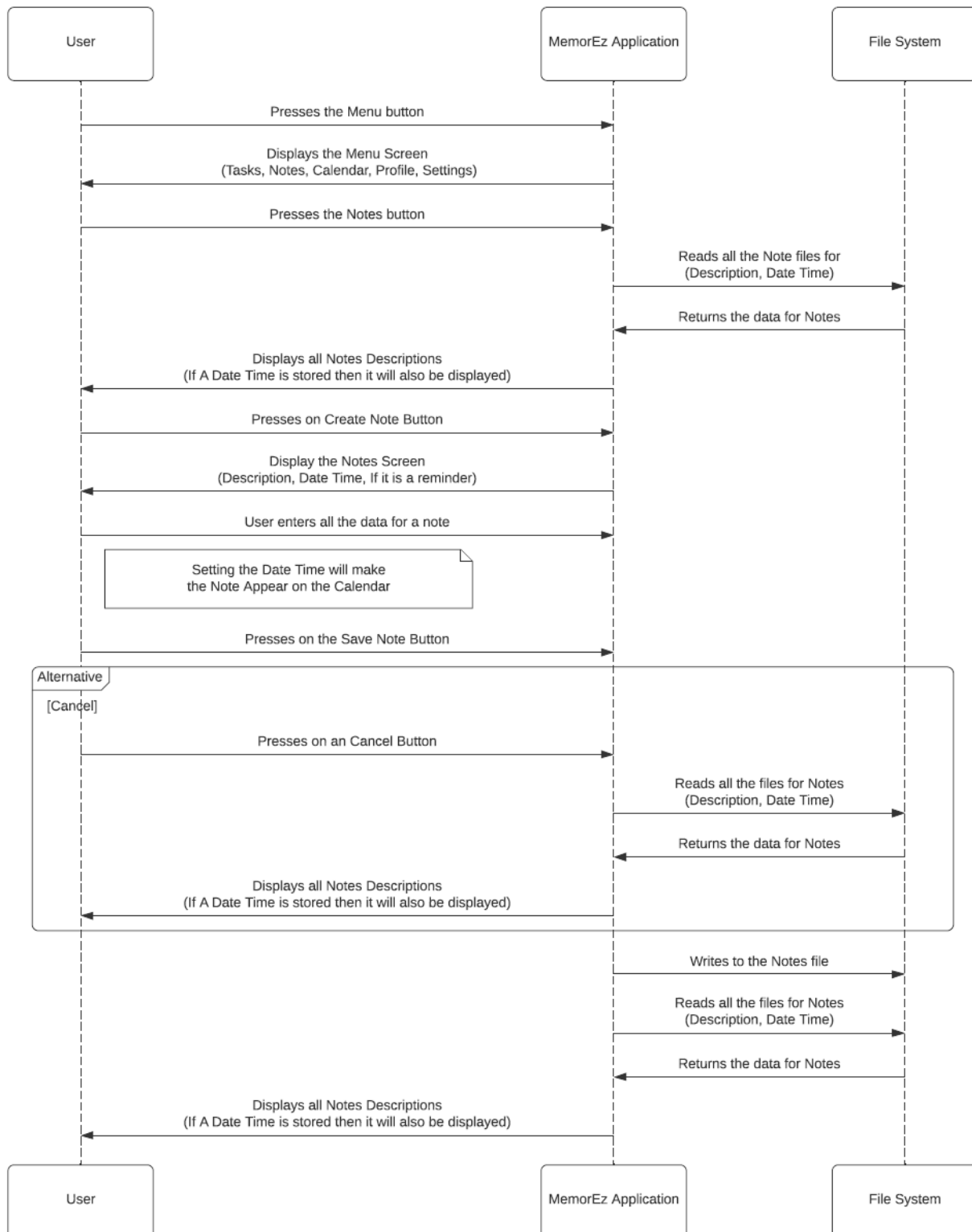
MemorEz: UML Sequence Completing a Health Check Task

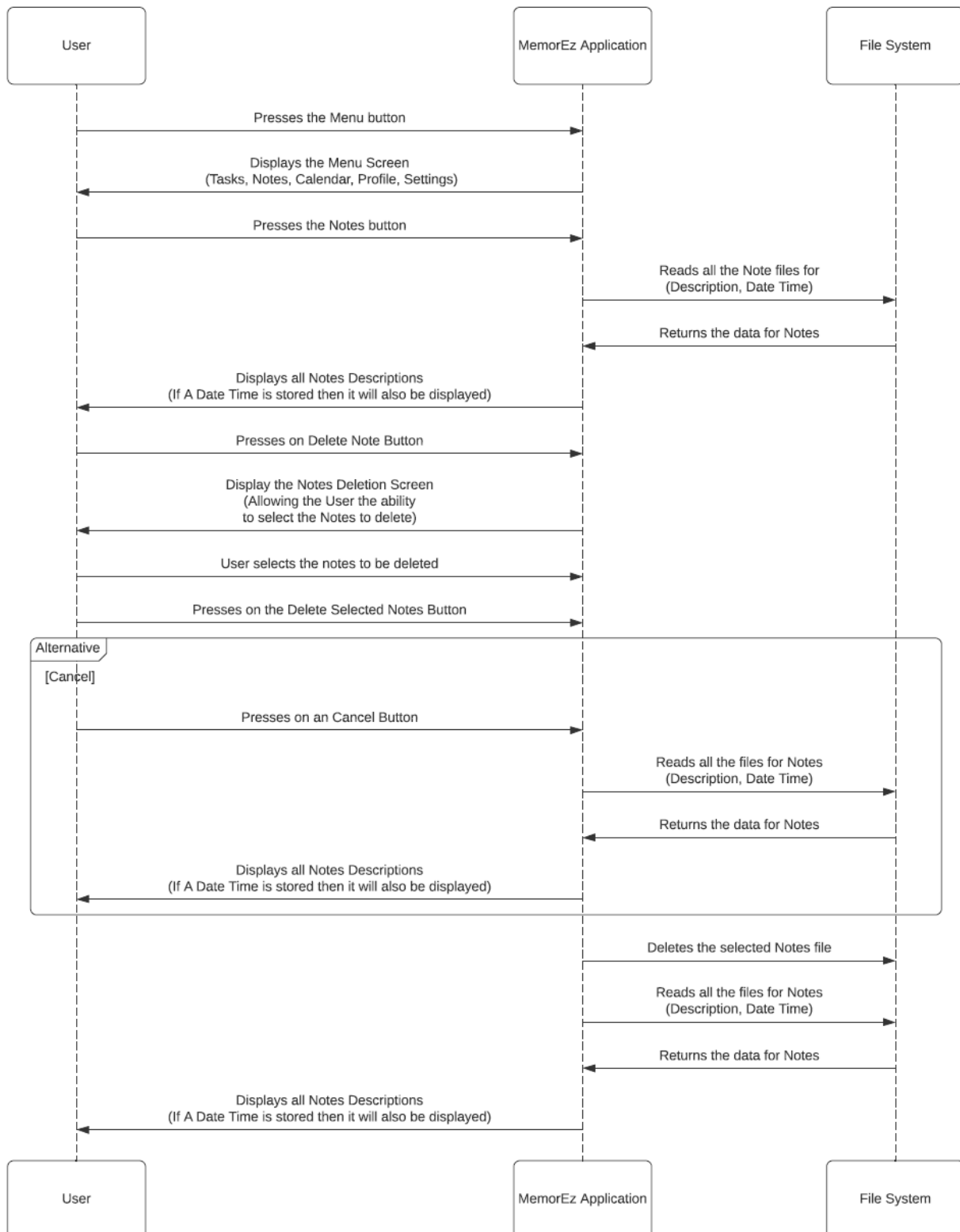


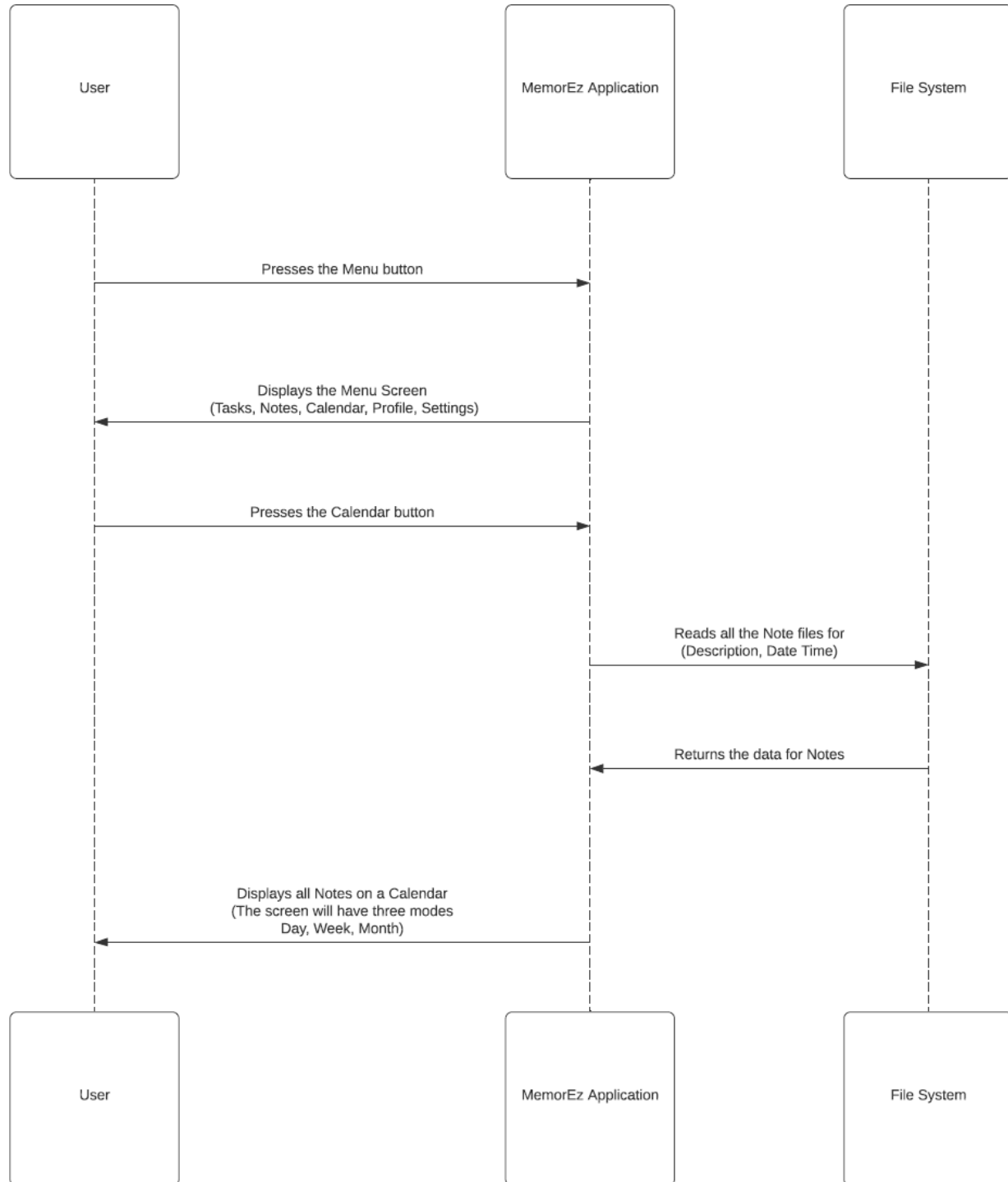
MemorEz: UML Sequence Viewing a Completed Task

MemorEz: UML Sequence Viewing & Edit a Note



MemorEz: UML Sequence Create a New Note

MemorEz: UML Sequence Deleting Existing Notes

MemorEz: UML Sequence Viewing the Notes Calendar

3. Architectural Design

The system architectural design is a conceptual representation of the MemorEZ Application that formally describes the system components and how the components will function in the overall system.

The components of the application include a listening mode, speech-to-text conversion component, data storage component, language translation component, Natural Language Understanding (NLU) component, calendar component, search component, and guided help component. Figure 1 depicts the flow between the components of the architectural design.

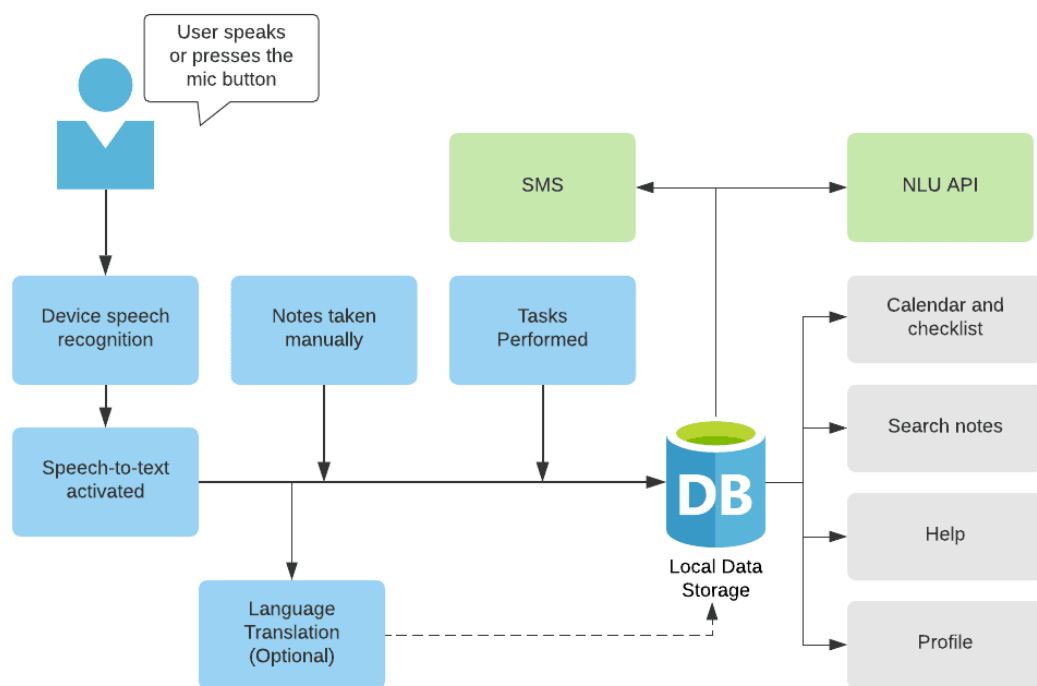


Figure 1: Architectural Diagram

3.1 Decomposition Description

The MemorEZ app goes through several phases once the user starts the app. Once the listening mode of the application has been activated, the device microphone captures the detected speech and transcribes the voice audio into text using the speech-to-text feature. The converted text gets saved into the data storage for later queries as notes. Other phases include the implementation of the app functionalities such as language translation, NLU components, calendar, search, and help features. To learn more of these phases, see the following descriptions:

3.1.1 Patient/Caregiver Modes

The MemorEZ app has two modes, the Caregiver mode, and the Patient mode. The default mode of the application is the Patient mode, which requires no login process from the user; the Caregiver mode shall require the user to login. The Caregiver mode shall provide access to additional features to the user such as creating and updating the patient's profile, assigning tasks, modifying settings, etc.

3.1.2 Profile

The MemorEZ Application has a Profile feature that provides helpful information about the user (patient). While the Caregiver mode can create, read, update, and delete information within the profile, the Patient mode provides read-only access to the Profile information.

3.1.3 Listening Mode

The application's ability to activate the listening mode of the application is dependent on the user's permission settings on the device. Given that the user has permitted access to the device microphone for speech recognition, the application's listening mode can be activated by tapping the mic button within the application or as a response to an assigned trigger word.

3.1.4 Speech-to-Text

When the application's speech recognition has been activated, voice audio is converted into text. The converted text is stored in the local storage and will be used as notes.

3.1.5 Language Translation

The app has a language setting that translates texts into a different language designated by the user during the onboarding process or from the Caregiver mode.

3.1.6 Data Storage

All information that is being stored in the device shall be encrypted and written in a JSON file.

3.1.7 NLU Component

The NLU component communicates with the NLU application. Acquired notes from the speech recognition component are sent to the NLU API and receive text notes as a response.

3.1.8 Calendar

The application has a Calendar component that displays upcoming events. Both patient and caregiver mode can control the calendar.

3.1.9 Daily Checklist

The MemorEZ app has a daily checklist feature that can be managed by both patient and caregiver mode. The checklist provides tasks and reminders for the patient.

3.1.10 Search

The search function allows users to search for a task within the list.

3.1.11 Help

Two types of help features are provided in the application. The first is the "how-to" help feature which is shown during the onboarding stage of the app, and the second is the help menu that assists patients in quickly accessing helpful links and phone numbers.

3.1.12 Tasks

The MemorEZ application has a tasking system. By accessing the Caregiver mode, the user can assign a task for the patient to perform. The caregiver can also view, update and delete an existing task. While in Patient mode, a user can view, update and complete an existing task. If a patient completes an existing task, the MemorEZ app shall send an SMS message to the caregiver's provided phone number.

3.1.13 Exception Handling

Exception handling within the API is handled in the cloud and an appropriate error message is returned to the application when an error occurs. Exception handling within the API manages voice input audio, allowing the system to process speech transcription into text. Speech accuracy and word-level confidence are features enabled to facilitate in avoiding errors.

4 Data Design

The application shall have data persistence. There shall be different types of data that shall be saved including images, strings, and classes. Due to the scope of the system, there shall be no need for a database. Based on storage requirements of the application, local device storage shall be utilized. Any data saved by the application shall be saved to a JSON file. Data will be saved using key:value pairs. There shall be different JSON files for the different types of data that need to be stored. Examples include: User profile details, user notes, and device settings.

4.1 Outgoing Data

The application shall be able to send data to a previously specified mobile number. The application shall send the image, mood or health update to the specified number as an SMS message. The diagram below outlines the flow of outgoing data.



Figure 2: Flow of Outgoing Data

4.2 JSON Files

Each subsection below includes the JSON file title and description of what is being stored in the JSON file.

4.2.1 Notes

The user's notes shall be saved to the device using a JSON file. There will be no use of cloud or backup for the current iteration of the application. The fields for the notes JSON shall include: Device ID, ID, Timestamp, Category, Text, Locale, RecordedLanguage and PreferredLanguage.

- **Device ID**- This is a unique ID that will identify the app instance. This will be the primary key
- **ID** – This is a unique ID that will identify the app instance.
- **Timestamp** – The timestamp on which the note was created.
- **Category** – The category of the note.
- **Text** – The text of the note.
- **Locale** – The location of the user (if applicable).
- **RecordedLanguage** – The original language that was set when the note was taken.

- **PreferredLanguage** – The user's current preferred language.

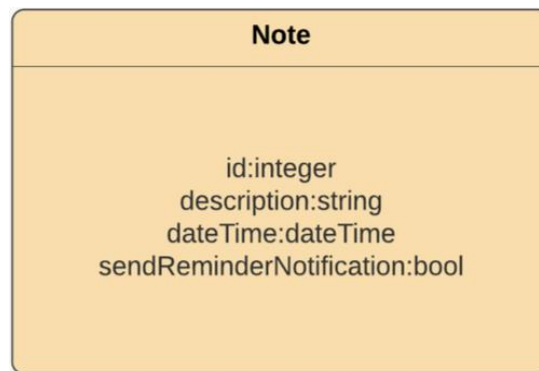


Figure 3: Note Data Model

4.2.2 Settings

This file shall store the user's preferred settings as set in caregiver mode. This includes which features are disabled, and language preference.

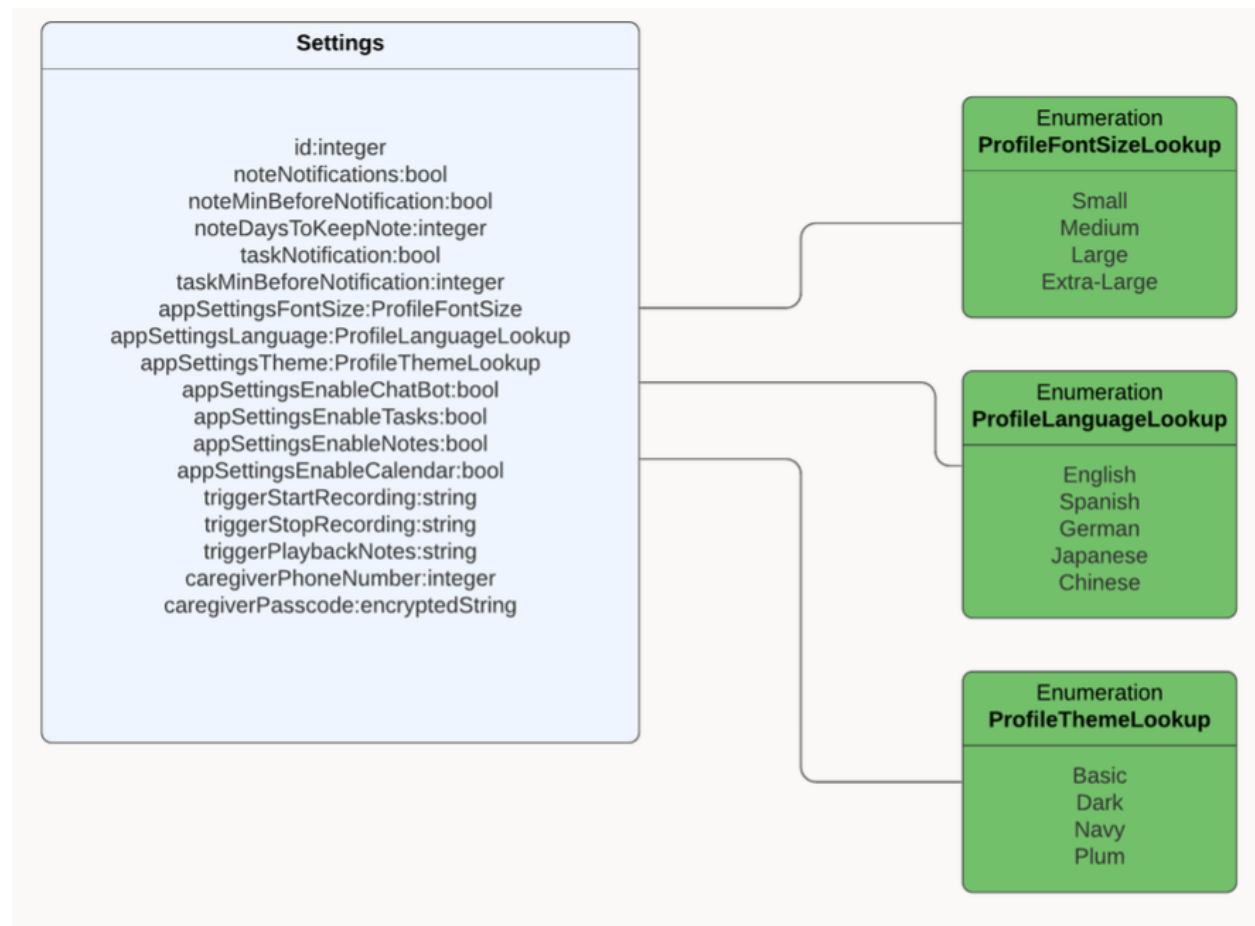


Figure 4: Settings Data Model

4.2.3 Tasks

This file shall hold the current and historical task data.

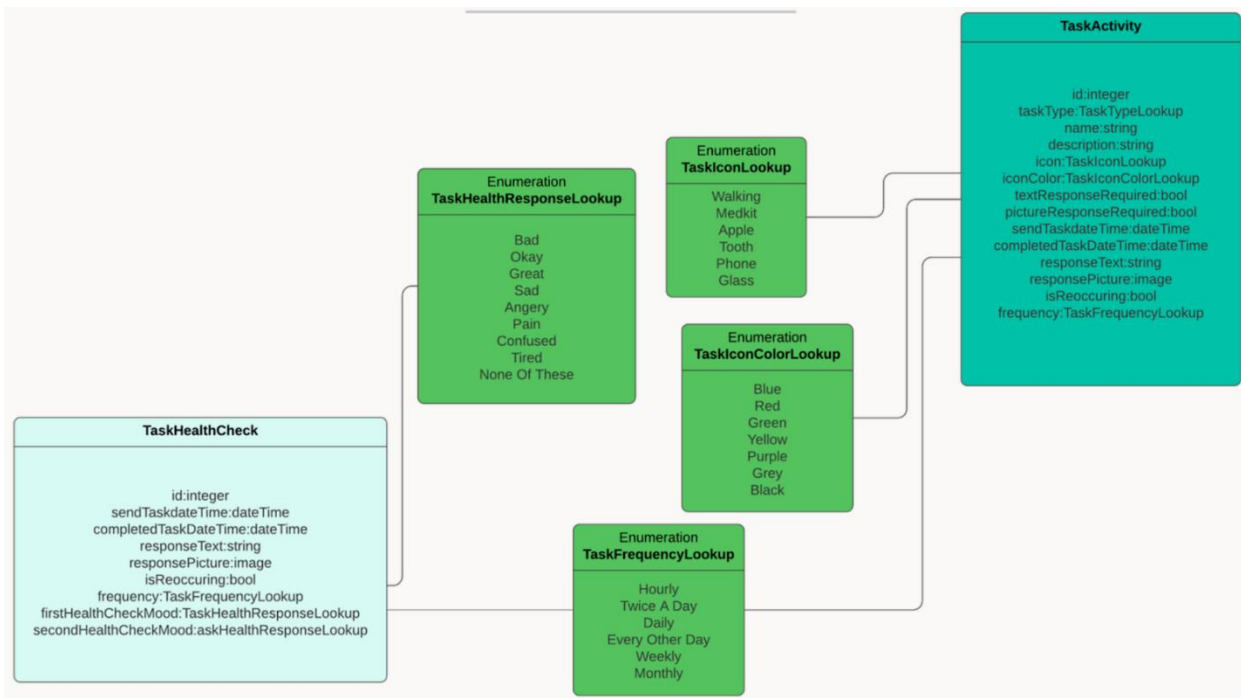


Figure 5: Task Data Model

4.2.4 STML Profile Information

This file shall include the information that shall be stored in the user profile. This shall include any profile information added into the application by the caregiver.

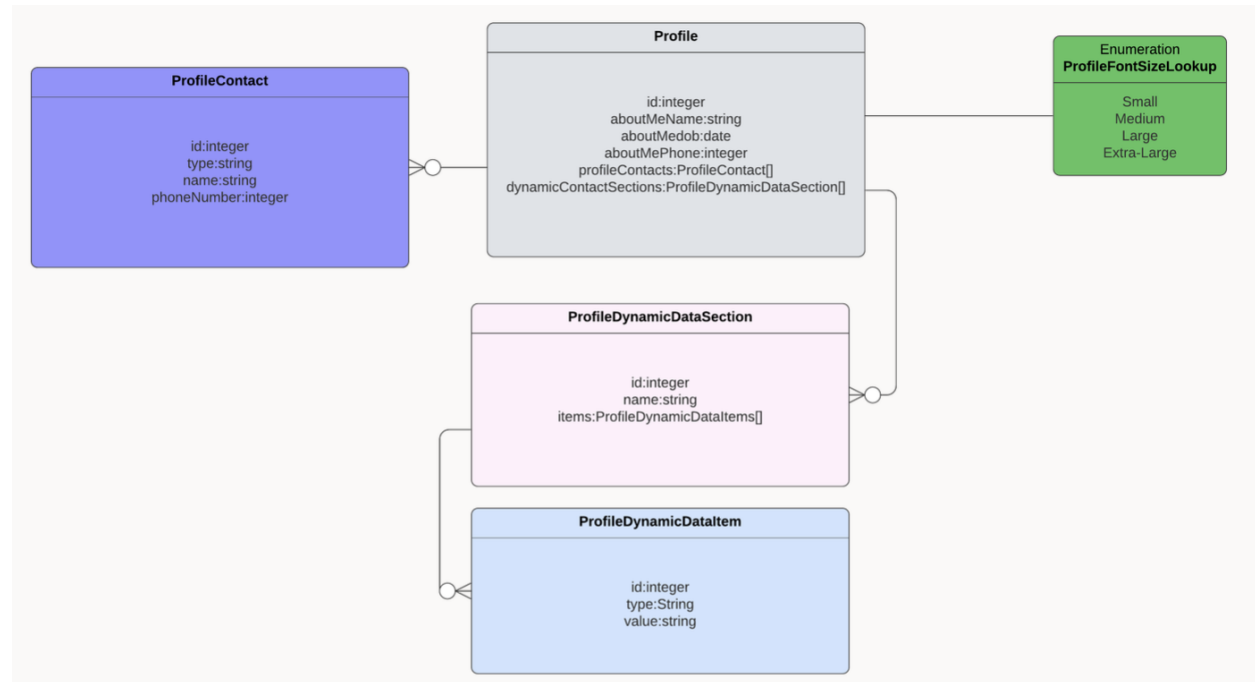


Figure 6: Profile Data Model

5 Component Design

As described previously in the Architectural design section, the following components are for the MemoreEZ application.

5.1 Patient/Caregiver Modes Component

The component of this application that allows two modes in the application, patient mode and caregiver mode.

5.2 Profile Component

The component that holds all of the patient's pertinent information.

5.3 Listening Mode Component

The component of the application that listens for audible speech. This will be triggered by the microphone button of the application.

5.4 Speech-to-Text

The component that processes speech. This component will be able to transcribe speech to text and will have trigger words for the patient to use.

5.5 Language Translation Component

The component that converts text in the application to other languages, based on the user's preference.

5.6 Data Storage Component

The component that stores data on the device.

5.7 NLU Component

The component where there is communication via API with the Natural Language Model. This shall send data from the application MemoreEZ to the NLU for context-level processing.

5.8 Calendar Component

The component that displays upcoming events along with the date and time of the event.

5.9 Daily Checklist Component

The component that displays daily tasks that need completion

5.10 Search Component

The component that allows searching for different keywords or dates.

5.11 Help

The component that provides assistance to users using the application.

5.12 Tasks

The component that stores tasks, allows tasks to be saved, and archives tasks. This component will notify the caregiver upon completion of the task.

6 Human Interface Design

6.1 Overview of User Interface

The MemorEZ User Interface (UI) shall be implemented using Flutter and Dart library. This section pertains only to the patient mode of the application. The application shall open up in the menu screen. The bottom navigation bar shall be visible from each screen. The bottom navigation bar shall display three icons from left to right: Menu, Chat, Help.

The menu screen shall contain a scrollable column of all features enabled by the caregiver. The user shall be able to click on each feature to navigate to that feature's screen. All enableable features shall be Tasks, Notes, Calendar, Profile, and Settings.

The chat screen shall display the conversation between the user and the AI. Clicking on this screen shall activate voice mode. The AI shall be set to only pick up the user's voice and ignore any other voices or sounds. The user shall be able to verbally create notes and reminders from this screen. The user shall also be able to ask questions on this screen.

The help screen shall be where help videos are displayed for each feature in the application. This shall be a scrollable column with a header for each different feature. Different how-to guides shall be listed under each header.

If enabled, the button linked to the tasks screen shall be listed on the menu screen. The task screen shall have a search bar at the top of the screen. The task bar shall display a column with two headers: Active Tasks and Completed Tasks. Any active task that has been assigned but not yet completed shall be displayed under active tasks. Any tasks that have been marked complete shall be displayed under the completed tasks header. The user shall be able to select a task to navigate to the complete a task screen. The complete a task screen shall list an icon for the task as well as details of the task and actions required to complete the task (select an icon, take a picture, input a response, etc.) A back to tasks button as well as a mark complete button shall also be displayed.

If enabled, a button linked to the notes screen shall be listed on the menu screen. The notes screen shall have a search bar at the top. The notes screen shall display a search bar, a list of saved notes as well as the date and time the notes were created. A button to navigate to the create a new note screen, and a button to allow the user to navigate to the delete notes screen is also displayed.

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The create a new note screen shall display a character box allow the user to enter details for a new note using text or speech-to-text, a date and time selector with a calendar icon, and a radio button to select if they would like to be reminded of the note at a future time. The user shall also have a toggle option to send a reminder notification for the note. A save note and back to notes screen shall also be displayed.

The edit note screen shall display a character box where the user shall be allowed to modify the note, a date and time selector with a calendar icon, radio buttons to allow a reminder notification to be sent, a back to notes button, a save note button, and a remove note button.

The delete note screen shall display a list of notes with checkboxes next to each note, a red button with text and a trash icon to delete note, and a back to notes button to return to the notes screen. The delete note screen shall display a popup message prompting the user to confirm deletion of the selected notes using a yes or no button after the user has selected notes to delete and selected the delete notes button.

A button linked to the calendar screen shall be listed on the main menu if enabled. The calendar shall display a search bar that the user can use to search for notes. The calendar screen shall show a week, month, and day toggle option at the top. The calendar shall display any notes that have a date attached to them.

If enabled, a button linked to the profile screen shall be listed on the main menu. The profile screen shall display information about the user added by the caregiver. Information can include text and images with sections separated with headers listing the type of information being displayed.

A button linked to the settings screen shall be displayed in the menu. The settings screen shall include options for the overall application as well as for each feature that can be adjusted. There shall also be a button that will link to the caregiver mode login. This enable caregiver mode button shall request the caregiver password and activate the caregiver features once the password is entered and authenticated.

6.2 Screen images

The images below are mock-up images with an explanation of the user experience for the screens described in the previous section. The list of screens is as follows:

- Menu Screen
- Chat Screen
- Help Screen
- Task List Screen
- Complete a Task Screen
- View a Completed Task Screen
- Note Screen
- Create a New Note Screen
- View and Edit Notes Screen
- Delete Notes Screen
- Profile Screen
- Calendar Screen
- Settings Screen
- Enable Caregiver Mode Screen

6.2.1 Menu Screen

In Figure 7, the Menu Screen shall display a scrollable list of features as enabled in the caregiver mode. Features that can be enabled by the caregiver to appear in the patient mode of the application are Tasks, Notes, Calendar, Profile, and Settings. Each feature button navigates the user to a separate screen once selected. Features disabled by the caregiver shall not appear on the Menu Screen for the user in patient mode.

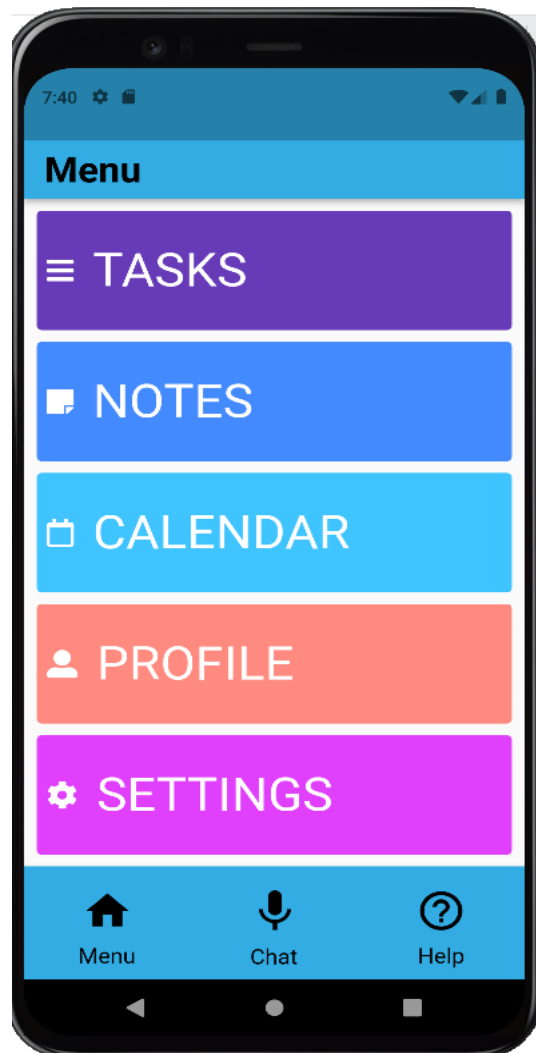


Figure 7: Menu Screen

6.2.2 Chat Screen

In Figure 8, the Chat Screen shall allow the user to interact with the System AI. Selecting the Chat Screen feature shall activate listening (voice) mode and turn on the device microphone. The AI shall be set to identify and listen to the user's voice, ignoring background audio. The user shall be able to create notes and reminders from the Chat Screen, as well as ask a question and receive a response. The Chat Screen shall display the dialogue between the user and the System AI.

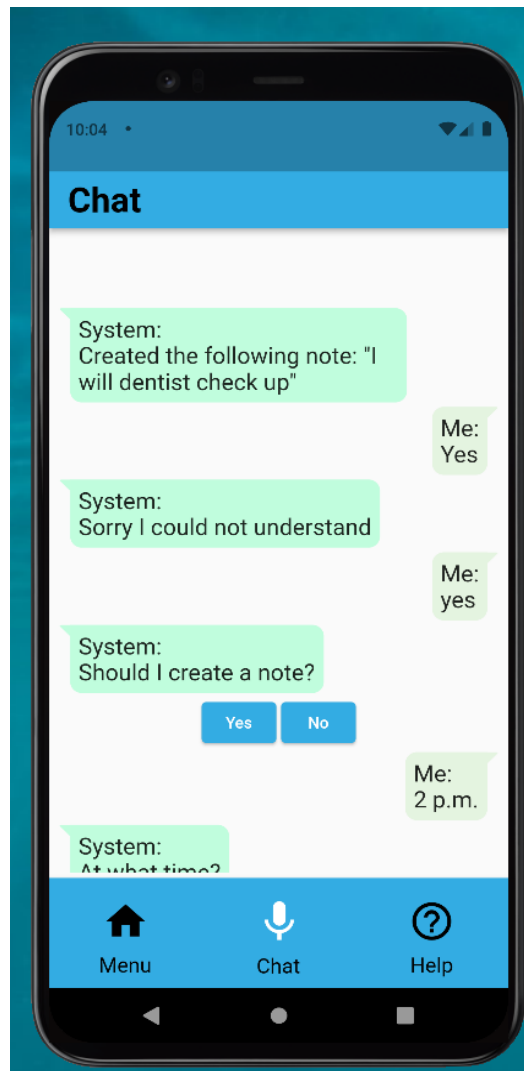


Figure 8: Chat Screen

6.2.3 Help Screen

In Figure 9, the Help Screen shall display a list of questions and answers on how to use the MemorEZ application.

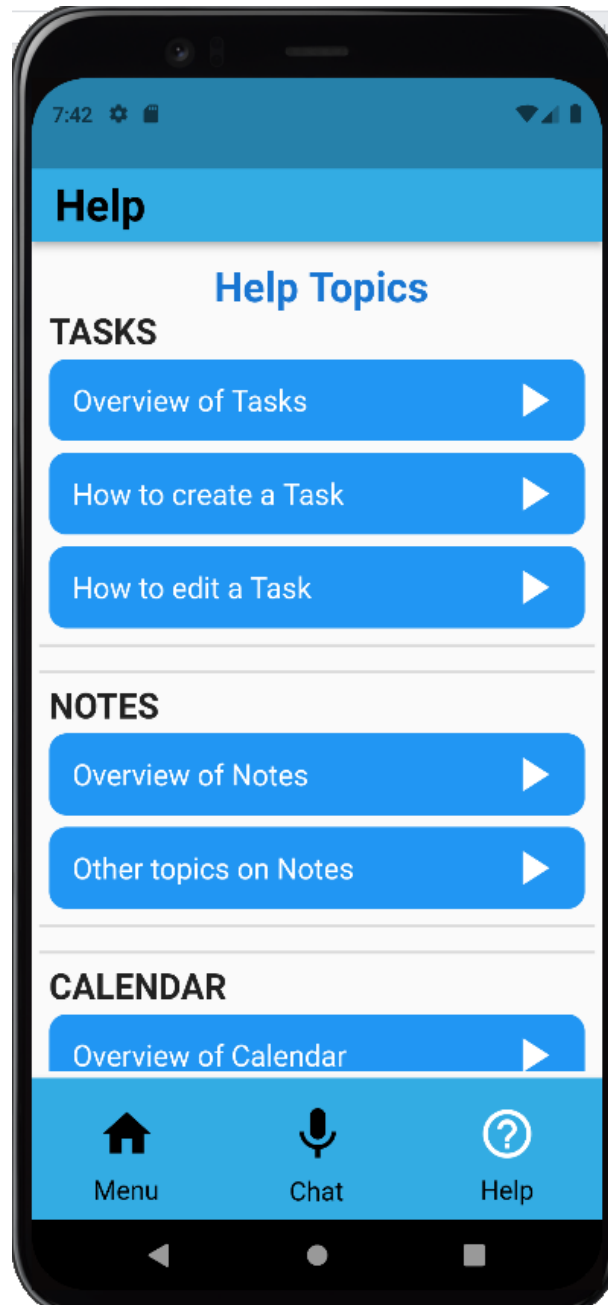


Figure 9: Help Screen

6.2.4 Task List Screen

The Task List Screen shall display a list of tasks for the user to complete as assigned from the caregiver mode, a list of completed tasks, and a search bar. The search bar shall allow the user to locate a task using keywords. Tasks that are assigned by the caregiver to the user that have not been completed shall be displayed under the Active Tasks header. Tasks that have been marked as completed by the user shall be displayed under the Completed Tasks header. Completed tasks shall display the date and time that the user marked the task as completed. The Task List screen shall allow the user to select a task to view additional details of the task.

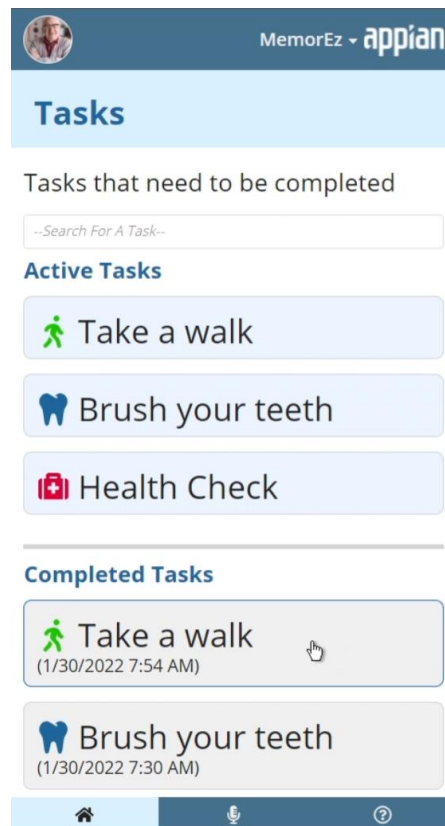
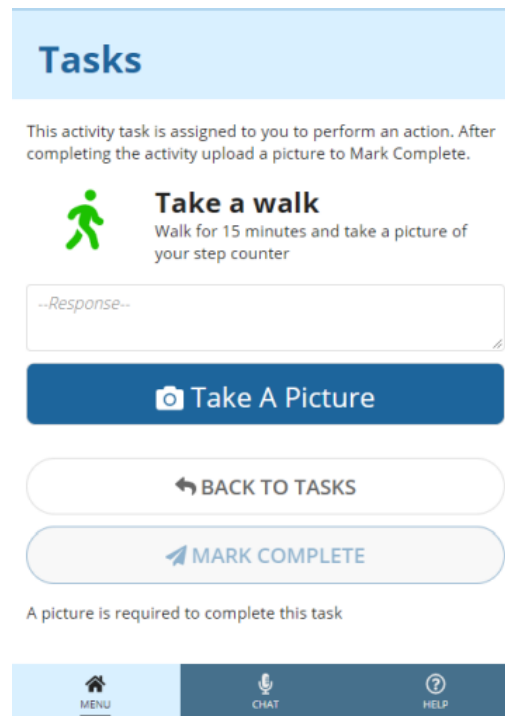


Figure 10: Task Screen

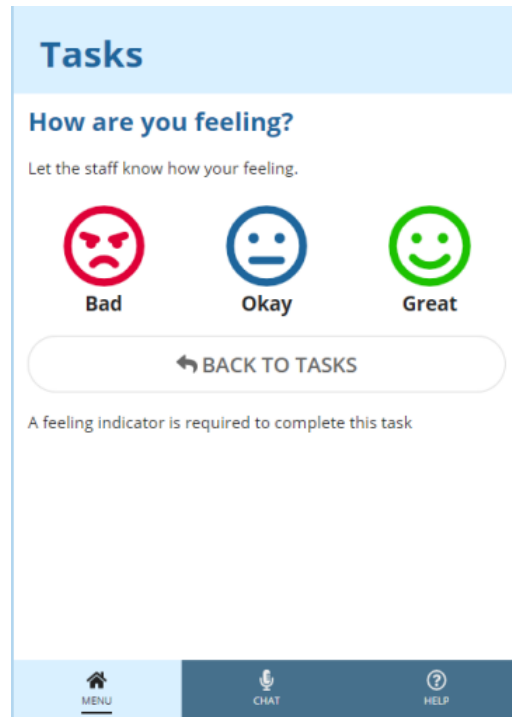
6.2.5 Complete a Task Screen

After the user has selected an Active Task from the task screen, the user is navigated to a screen showing details of the selected task. A description of the task, the type of task, and instructions for the user are displayed. The screen shall allow the user to respond to the task and include options for the user to respond based on the type of task assigned. Figure 11 displays an activity task, which shall allow the user to respond to the task with a written response in the text field and/or the option to take a picture. Figure 8 displays a mood task, which shall allow the user to respond to the task by selecting an icon. The application shall prompt the user for additional details of their mood if the Okay or Bad mood icons are selected as seen in Figure 12. Once the preconditions for the activity task have been met (i.e., take a picture, select a mood), the application shall allow the user to select the MARK COMPLETE button to send an SMS text message on the device to the contact designated in the caregiver mode. The screen shall allow the user to save the task to complete later if the user selects the BACK TO TASKS button.



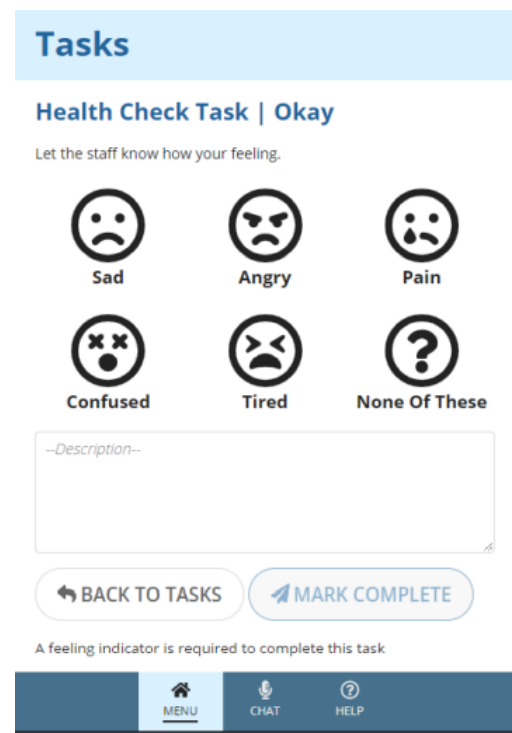
The screenshot shows a mobile application interface for an activity task. At the top, a light blue header contains the word "Tasks" in bold. Below this, a paragraph states: "This activity task is assigned to you to perform an action. After completing the activity upload a picture to Mark Complete." The main task is titled "Take a walk" with a green walking person icon. The instructions are "Walk for 15 minutes and take a picture of your step counter". Below the instructions is a text input field with the placeholder "--Response--". Underneath the text field is a dark blue button with a camera icon and the text "Take A Picture". Below that is a light blue button with a left arrow icon and the text "BACK TO TASKS". Below that is a light blue button with a right arrow icon and the text "MARK COMPLETE". At the bottom of the main content area, a note says "A picture is required to complete this task". The bottom of the screen features a dark blue navigation bar with three icons: a house icon labeled "MENU", a microphone icon labeled "CHAT", and a question mark icon labeled "HELP".

Figure 11: Activity Task Screen



The screenshot shows the 'Tasks' section of an application. At the top, a light blue header contains the word 'Tasks'. Below it, the heading 'How are you feeling?' is followed by the instruction 'Let the staff know how your feeling.' Three circular icons are displayed: a red one with an angry face labeled 'Bad', a blue one with a neutral face labeled 'Okay', and a green one with a happy face labeled 'Great'. A rounded button with a left arrow and the text 'BACK TO TASKS' is positioned below the icons. A note states 'A feeling indicator is required to complete this task'. At the bottom, a dark blue navigation bar includes icons for 'MENU', 'CHAT', and 'HELP'.

Figure 12: Mood Task Initial Screen



This screenshot displays the 'Health Check Task | Okay' screen. The 'Tasks' header is at the top. The heading 'Health Check Task | Okay' is followed by the instruction 'Let the staff know how your feeling.' Six circular icons are arranged in two rows: 'Sad' (frowning), 'Angry' (angry), 'Pain' (face with a single tear), 'Confused' (face with X's for eyes), 'Tired' (face with a heavy eyelid), and 'None Of These' (face with a question mark). Below the icons is a text input field with the placeholder text '--Description--'. Two rounded buttons, 'BACK TO TASKS' and 'MARK COMPLETE', are located below the input field. A note at the bottom states 'A feeling indicator is required to complete this task'. The bottom navigation bar is identical to the previous screen, with 'MENU', 'CHAT', and 'HELP' options.

Figure 13: Mood Task Additional Details Screen

6.2.6 View a Completed Task Screen

If the user selects a completed task from the task screen, the application navigates the user to the Completed Task Screen where the user can view details of the completed task. Figures 14 and 15 display the user response to the task including any text or images, the date and time the task was completed, the type of task and task details/instructions. The screen shall allow the user to return to the previous task screen if they select the BACK TO TASKS button.

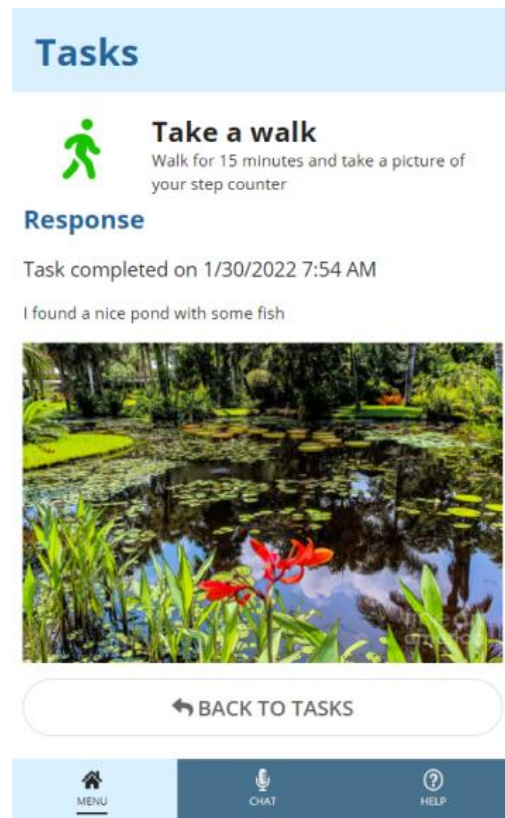


Figure 14: Completed Activity Task Screen

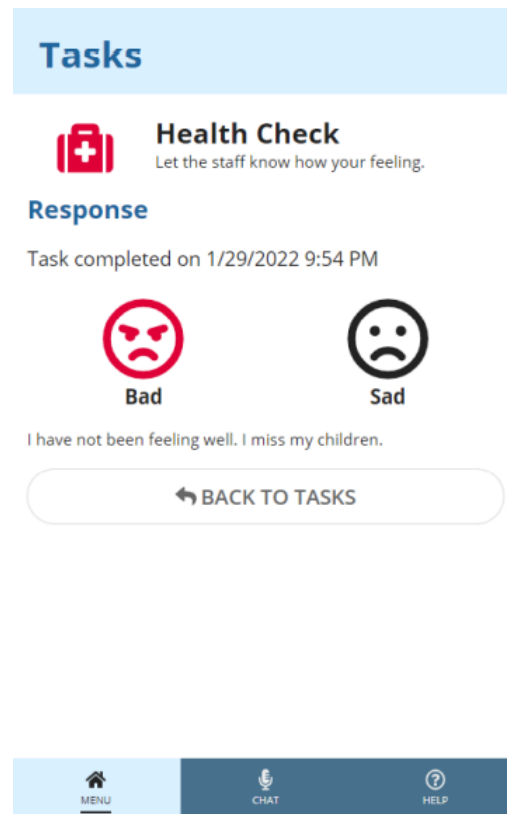


Figure 15: Completed Health Check Task Screen

6.2.7 Note Screen

Figure 16 displays the note screen. If enabled, the Note Screen shall display a list of saved notes, a search bar, a button to navigate to the Create a New Note screen, and a button to allow the user to navigate to the Delete Notes Screen. The search bar shall allow the user to search for a note using keywords.

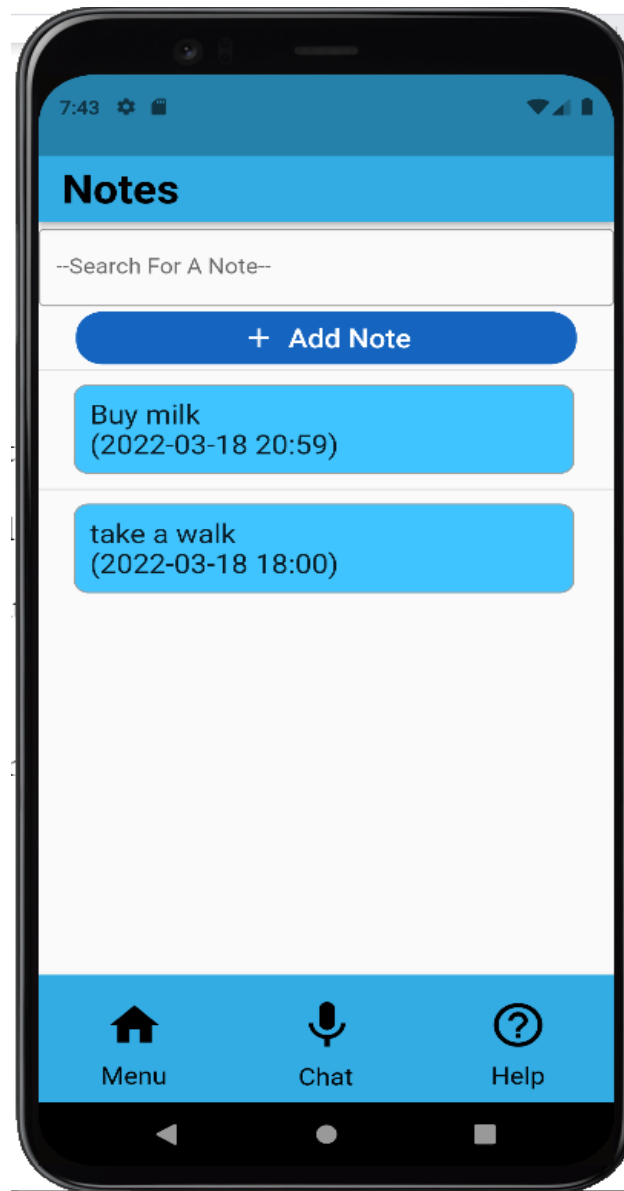


Figure 16: Notes Screen

6.2.8 Create a New Note Screen

In Figure 17, the Create a New Note screen is displayed. If enabled, the screen shall allow the user to enter details for a new note using text or speech-to-text and allow the user input a calendar date and time if they would like to be reminded of the note at a future time. The user shall also have the option to send a reminder notification for the note. The user can select the SAVE NOTE button to save the note or the BACK TO NOTES button to navigate to the Notes Screen.

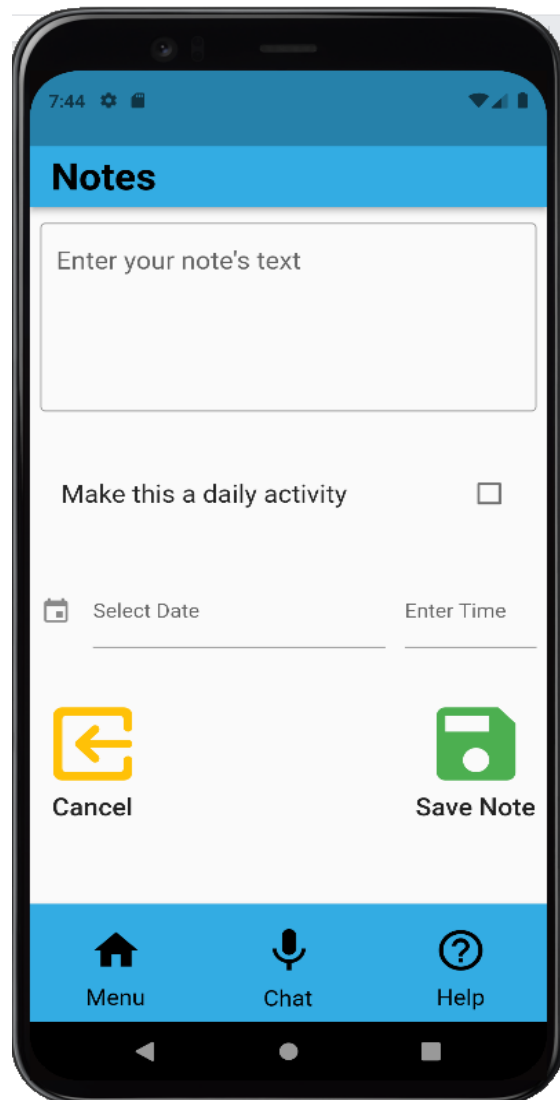


Figure 17: Create New Note Screen

6.2.9 View and Edit Notes Screen

Figure 18 displays the View Note screen. If enabled, the user can select a note from the Notes screen to view and edit the note. The user shall be allowed to edit the note text, change the date and/or time of the note, and allow for a reminder notification to be sent. The user can select the SAVE NOTE button to save changes to the note, the BACK TO NOTES button to discard changes and return to the note screen, or the REMOVE NOTE button to delete the note and remove it from the notes screen.

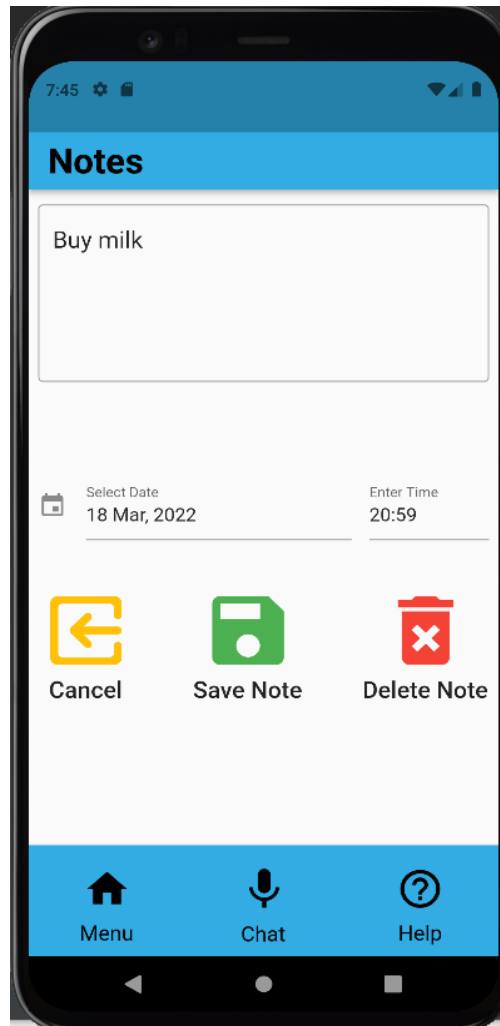


Figure 18: View and Edit Notes Screen

6.2.10 Delete Notes Screen

Figure 19 displays the Delete Notes Screen. The screen shall allow the user to select checkboxes corresponding to the note(s) that they wish to delete and select the DELETE SELECTED NOTES button to delete the note(s). The screen shall display a popup message prompting the user to confirm deletion of the selected notes; the user can select to confirm and delete the notes by selecting the YES button, or select the NO button to return to the Delete Notes screen. The user can select the BACK TO NOTES button to return to the Notes Screen without making changes.

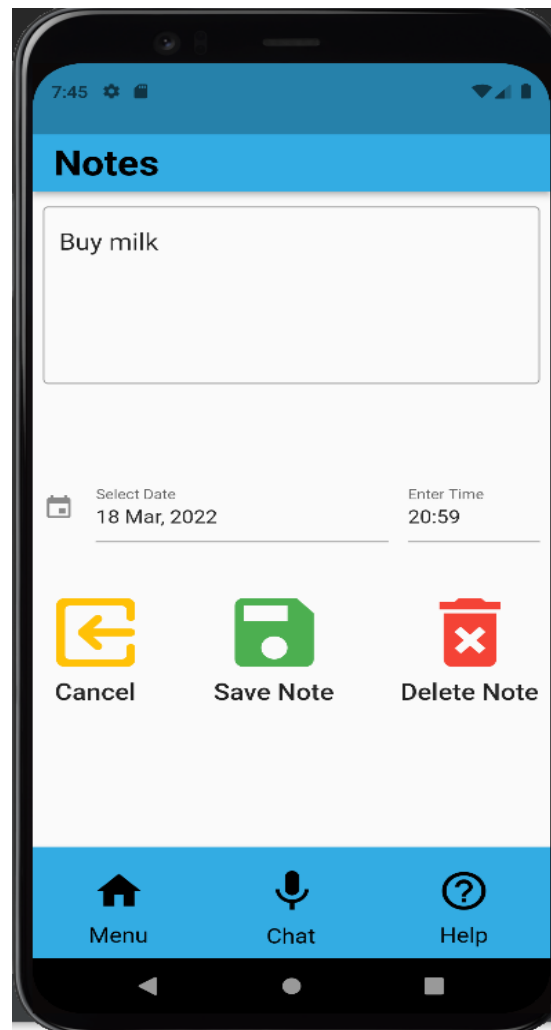


Figure 19: Delete Notes Screen

6.2.11 Profile Screen

Figures 20 and 21 depict the Profile Screen. If the Profile feature is enabled, the Profile Screen shall display information about the user as added by the caregiver. The Profile Screen shall display the text and images as entered by the caregiver in a scrollable list divided into sections which may include About Me, Contacts, Care Team, Medical History, Medications, Allergies, and Transportation preferences. The screen shall display a search bar to allow the user to search for information using keywords.

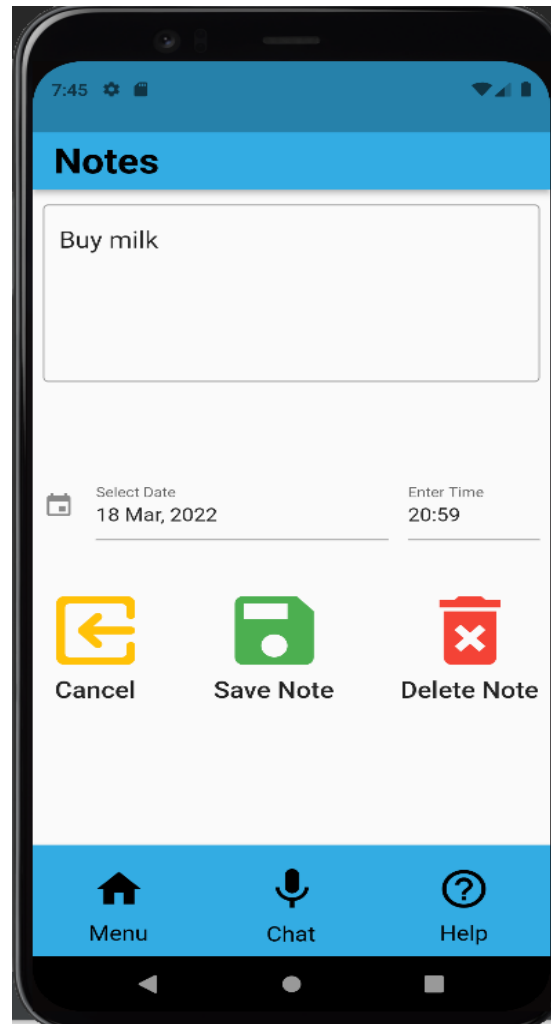


Figure 20: Profile Standard Data Screen

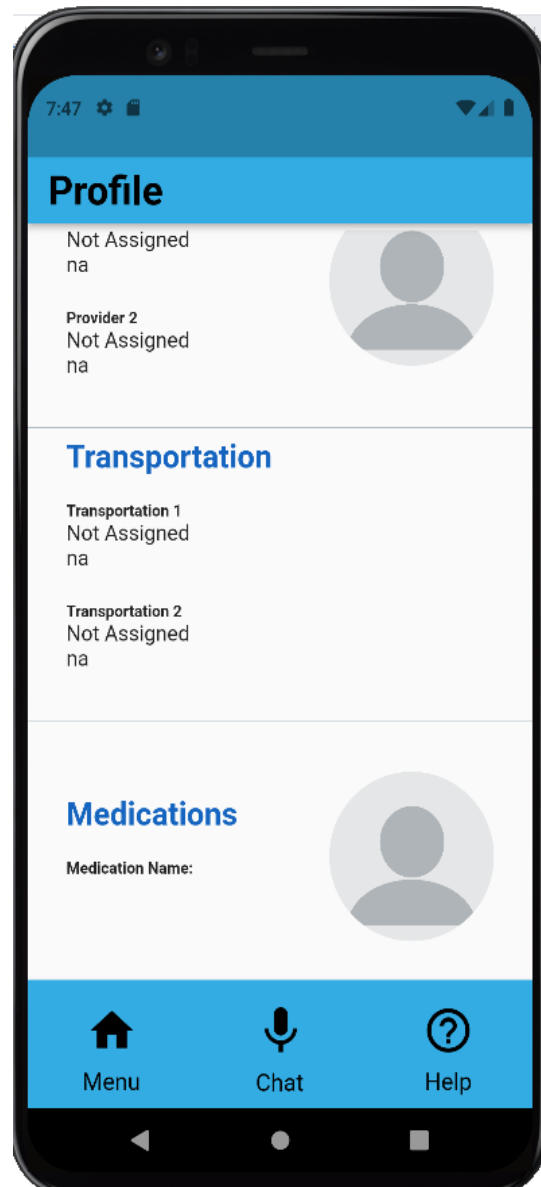


Figure 21: Profile Dynamic Data Screen

6.2.12 Calendar Screen

Figure 22 is the Calendar Screen. If enabled, the Calendar Screen shall display tasks, notes, and reminders for the selected date. The screen shall display a search bar that shall allow the user to search for information using keywords. The screen shall also allow the user to toggle the calendar view by selecting the Week, Month, or Day options below the search bar.

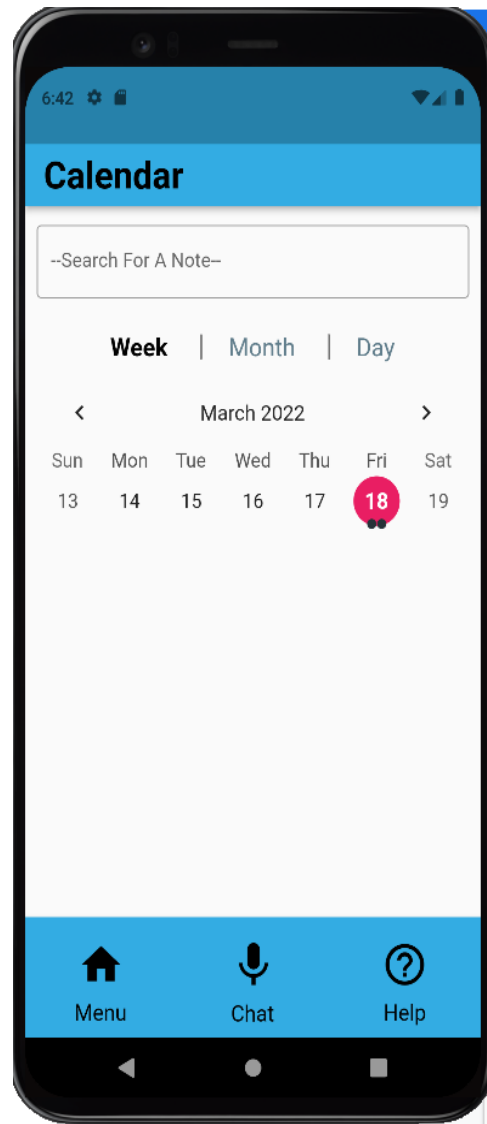


Figure 22: Calendar Screen

6.2.13 Settings Screen

Figure 23 displays the Settings Screen. The Settings screen shall allow the user to view the application settings as defined in the caregiver mode of the MemoreEZ application. The screen shall allow the user to view settings for Notes, Tasks, and Trigger words. The screen shall display a CAREGIVER MODE button that shall allow the user to enter credentials to access the caregiver mode of the application where settings can be changed and additional application features accessed.

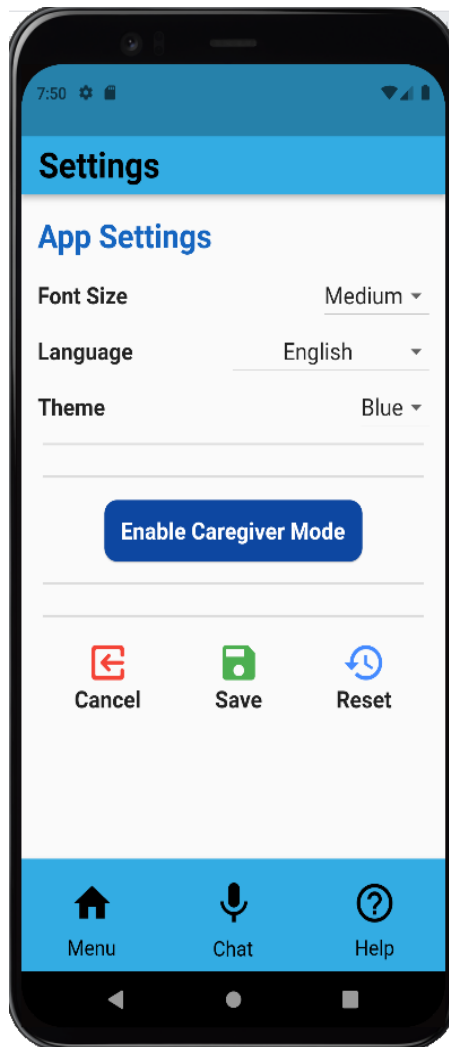


Figure 23: Settings Screen

6.2.14 Enable Caregiver Mode Screen

Figure 24 displays the Enable Caregiver Mode screen which is displayed if the user selects the Caregiver Mode button from the Settings Screen. The Enable Caregiver Mode screen shall prompt the user to enter a passcode to enable the caregiver mode of the MemorEZ application. Once the password has been entered, the user can select the SUBMIT button and the application will authenticate the password. The user shall have the option to select the CANCEL button to return to the Settings Screen. The user shall not be able to access the caregiver mode of the application without authenticating the password.

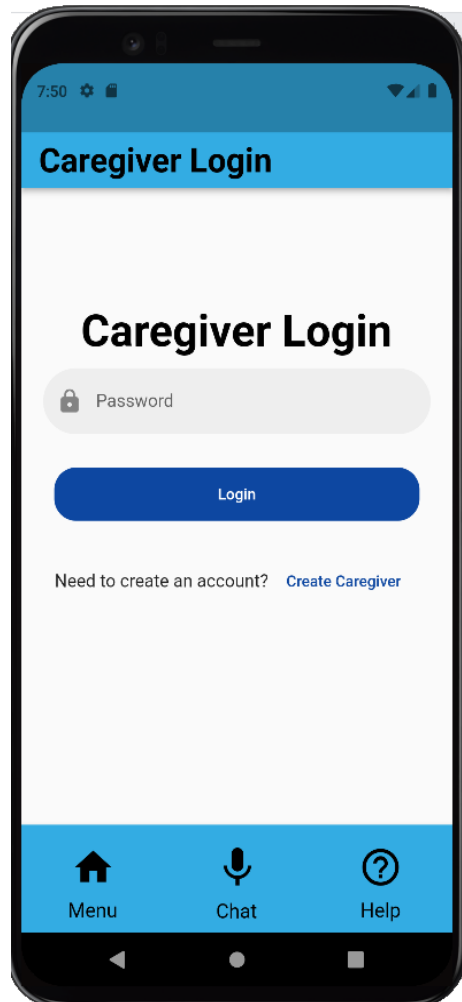


Figure 24: Enable Caregiver Mode Screen

6.3 Screen Objects and Actions

The section below lays out the main icons that shall be used and seen throughout the application. There shall also be icons that are associated with different tasks styles as well that are not listed below.



This is the menu icon. It shall take the user to the feature list/home screen.



This is the chat icon. It shall take the user to the interactive AI voice chat.



This is the help icon. It shall take the user to the help screen.



This is the trash can icon. It shall be used to delete data. It shall change to red when there are items selected to be deleted.



This is the icon for the task list screen button.



This is the icon for the notes screen button.



This is the icon for the calendar screen button.



This is the icon for the profile screen button.



This is the icon for the settings screen button.



This is the save icon. It shall be used to save data.



This is the icon that shall be used with a picture button to enable the device camera to take a picture.



This is the icon that shall be used to show an SMS is being sent.

7 Requirements Matrix

The requirement matrix below provides a list of mandatory and optional requirements for the MemorEZ application:

Table 2 - Requirement Matrix

Requirement	Code	Mandatory/Optional
The application shall listen to speech when the user taps on the microphone button	R.01	Mandatory
Upon recognizing of user's voice and phrases, the system shall begin recording a text memo/transcribe the user's speech	R.02	Mandatory
The application shall recognize and ignore background voices and environmental noises	R.03	Mandatory
The application shall transcribe speech when key trigger phrases are mentioned	R.04	Mandatory
The system shall save transcribed notes on the user's device	R.05	Mandatory
The system shall identify notes by date or subject category	R.06	Mandatory
The application shall allow notes to be typed and edited	R.07	Mandatory
The application shall allow personal information to be saved as notes	R.08	Optional
The application shall allow the user to customize and manage start, stop, and recall trigger words and phrases	R.09	Mandatory
The application shall have a flexible and functioning Graphical User Interface (GUI) with large, user-friendly icons	R.10	Optional
The application shall allow notes to be searchable by keyword and date	R.11	Mandatory
The application shall provide a help menu	R.12	Mandatory
The application shall support cloud storage via google drive	R.13	Optional
The application shall allow the users the ability to use biometrics capabilities from their mobile to increase security	R.14	Mandatory
The application shall support reminder notifications	R.15	Mandatory
The application shall have language settings to support language internationalization	R.16	Mandatory
The application shall allow the user to add, edit, update, and delete a note	R.17	Mandatory
The application shall keep track of event dates and times and remind the users	R.18	Mandatory
UI responses to user interaction shall not exceed 2 seconds	R.19	Optional
The system shall comply with 508 specifications	R.20	Optional
All data shall be encrypted (in transit and at rest)	R.21	Mandatory
The application must work with IOS and Android Operating Systems	R.22	Mandatory

Requirement	Code	Mandatory/Optional
Settings shall be made possible to allow either a caregiver or the user to set up the application	R.23	Optional
Data storage shall be in files	R.24	Mandatory
The application shall support voice interaction with the user	R.25	Optional
The application shall use the "Time Ago" feature	R.26	Optional
The application shall include an onboarding process when opening the application for the first time	R.27	Mandatory
The application shall include a calendar and daily checklist	R.28	Mandatory
The application shall have a patient mode and an caregiver/caregiver mode	R.29	Mandatory
The application shall provide a profile screen	R.30	Mandatory
The application shall display a list of Active tasks and event reminders	R.31	Mandatory
The application shall allow the user to upload an image as a response to an assigned task	R.32	Mandatory
The application shall remove completed tasks from the Active task list	R.33	Mandatory
The application shall allow the user to save an assigned task to be completed later	R.34	Mandatory
The application shall allow the caregiver/caregiver to enable and disable features for use in the patient mode	R.35	Mandatory
The application shall hide/disable features in patient mode when disabled in caregiver/caregiver mode	R.36	Mandatory
The application shall require user authentication to access the caregiver/caregiver mode of the application	R.37	Optional
The application shall be supported on Windows and Mac OS	R.38	Optional
The application shall support a memory game/challenge and track the user's scores	R.39	Optional
The application shall allow the user to send an SMS message to contacts from the patient mode as designated in the caregiver/caregiver mode	R.40	Mandatory

8 Appendices

8.1 Credits

The following members contributed to the development of this software:

Dr. Mir Mohammed Assadullah (Product Owner, Stakeholder)

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Brian Avadikian

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Lizset Chavez Chacaltana

Robert Edwards

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Vanessa Stringer

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Robert Wren

Credits to previous cohorts:

Johnny Lockhart, Jeroen Soeurt, Michelle Monfort, Robert Wilson, Ayodeji Famudehin, Chauntika Broggin, Christian Ahmed, Mitchell Olshansky, Mod Drammeh, Nicholas Ballo, Shawn Kelly, Raul Benavides, Maddison Dunning, Alec Baileys, Benjamin Cushing, Elshaday Mesfin, Tyler Puschinsky, Michael Le, Debashis Jena, Austin Johnson, Prince Antwi Aboagye, Didimus Kimbi, Damion Sevilla, Rebecca Johnson, Addisu Worku, Matthew Setiawan, Obinna Okonkwo, Andrew Rohn, Joseph Kalfus, Firehiwot Chari, Eskedar Endashw, Malik Webster, Leela Subramanian, Presley Muwan, Christian Cruz Jimenez, Daniel Avery, Karen Crumb, Kevin Bell, Sami Salim, Teresa Balbi, Endalkachew Girma

Section 3: Caregiver Mode TDD

Team FlutteringMind

Revision Number	Date	Description	Approved by
1.0	02/05/2022	Initial Release	Brian Avadikian
2.0	3/19/2022	Updated formatting, updated screen images with real application images from development, included UML Diagrams, Included JSON File storage information.	Brian Avadikian

1 Introduction

1.1 Purpose

The purpose of this technical design document (TDD) is to provide a detailed explanation of the architecture and design of the MemorEZ app. MemorEZ is an application that will help people with short term memory loss (STML) and their caregivers better manage their daily activities. The document will cover different parts of the design as architectural design, data component design and human design. The document is intended to be read by developers who will be responsible for the development and maintenance of the application, testers, business analysts and stakeholders.

1.2 Overview

The MemorEZ app aims to give greater insight into the daily activities of the STML users and provide a tool for caregivers that promotes/communicates key aspects of the STML user's health. RememberAll is specifically tasked with developing and implementing the requirements/features associated with the caregiver mode of the application. United Global Master Coders will modify previous features and incorporate feedback received from previous stakeholders to upgrade the usability and benefit of the flutter-dart mobile application "Memory Magic". The features will be based on sending STML user reminders to complete their daily task as drinking water, eating, standing up, etc. Additionally, the application in caregiver mode will manage appointments, labs and important resources as transportation for appointments, short memory tests and controlling some other apps settings.

The application in "Caregiver Mode" will allow the caregiver user to control the frequency of reminders, and the visibility of certain information and features in the STML User mode. As some of the features in caregiver mode affect the STML user mode, the RememberAll team will work in collaboration with the FlutteringMind team in the design and architecture of the MemorEZ application.

1.3 Scope

This document will be used to establish and collect a detailed explanation of the architecture / design of the MemorEZ app. The app will enhance the user interface of the Memory Magic application developed in previous semesters as well as adding new features like sending reminders/tasks to STML users, enabling, and disabling settings, and managing an STML user's information and resources on a "Profile" screen.

RememberAll will be focusing on the architecture and design associated with the “Caregiver Mode.” For the areas where the “STML User Mode” interfaces with the “Caregiver Mode,” both teams will work together in these efforts to come to an agreement on the design and architecture of those functions. Functionality of the application which is for the STML user only is outside of the scope of this document.

The document is divided into sections to better explain the design of the MemorEZ application. Collaboration between RememberAll and Fluttering mind was used in the User Interface sections and Data Design Sections to ensure that the class will be able to create a unified-cogent project during development.

1.3.1 In Scope

- **Architecture Design:** This section will cover the architecture design of the application and how each of the functions will interact with each other.
- **Data Design:** This section will cover the data design of the application and how data will be stored and retrieved to be used for distinct functions of the application.
- **Component Design:** This section is related to section 3 of the document, and it covers the components in the architecture design.
- **Human Interface Design:** This section will cover the user interface design of the MemorEZ app.

2 System Overview

The MemorEZ application shall enhance communication between STML users and their caregivers. The application is primarily developed for android and iOS mobile devices, but the use case can also be extended to web platforms. This project will build on the previously developed features and extend value to the UI/UX of the application. It will be designed to allow caregivers to set up features. The application defaults to the “STML User Mode” for ease of use by an STML user. A caregiver must log in using a username and password from within “STML User Mode.” The application will be developed using dart programming language on Flutter framework, storing data locally. In addition, the application leverages open-source packages.

-NOTE-
 The Caregiver will need to accept all the requested permissions during setup to enable all the functionality of MemorEZ
-NOTE-

Figure 1 presents the high-level flow of the caregiver’s UE through key functionality of Memory Magic. The initial Download and Setup is outlined with a dotted border. The initial step in this flow will take place from the Apple or Android “App Store”.

While progressing through this setup – several steps are required and may not be skipped like the “MemorEZ – Setup” where the permissions must be accepted for the application to operate. After that, the STML User Profile will have required fields that must be set up. Please refer to the Data Design Section of this document for a list of required fields. Any of the processes that allow for skipping of optional entries are shown with a “Set-up or Skip” above it in Figure 1. The items shown in green are for the caregiver only, and the items shown in blue accessible by the STML user as well. Note – all of the functionality that the STML user interacts with is toggleable, and this list can be seen in the Data Design – Settings section.

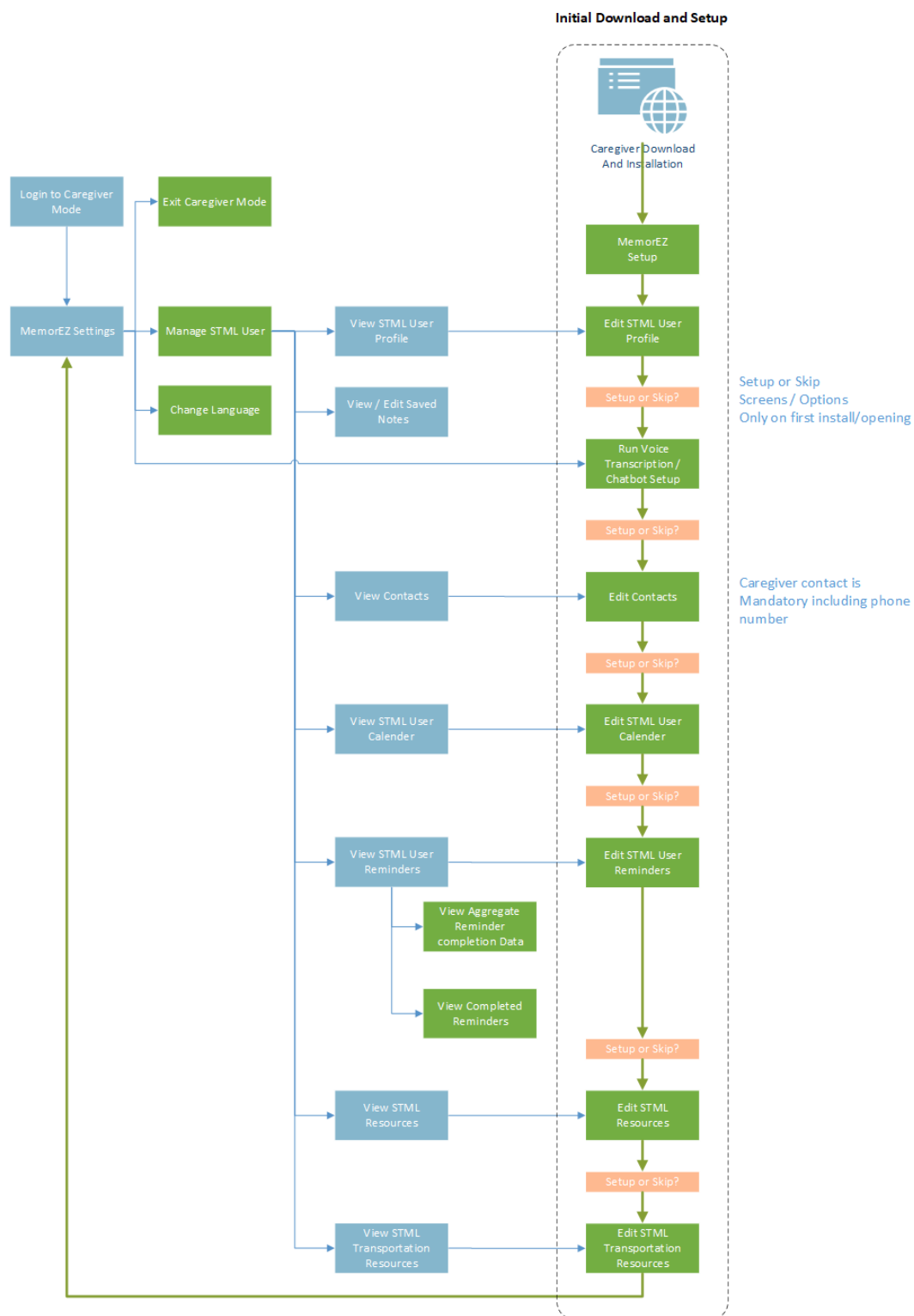


Figure 1: High Level Caregiver User Interface Flow including download and Installation

3 Software Architecture Design

The software architecture design will depict the components of the MemorEZ Application organization in the system. The decomposition design will explain how the different components will work together within the application.

MemorEZ Application has the following components: Settings, Language Translations, NLU Trigger Words, Chatbot, Notes, STML User Profile, Calendar, Tasks/Reminders, Message Sending, Search, Help, Natural Language Understanding, Local Data Storage.

Figure 2 is another depiction of the MemorEZ and its interface with local Data Storage. The specific files each of these components uses is explained in the Data Design section of this document.

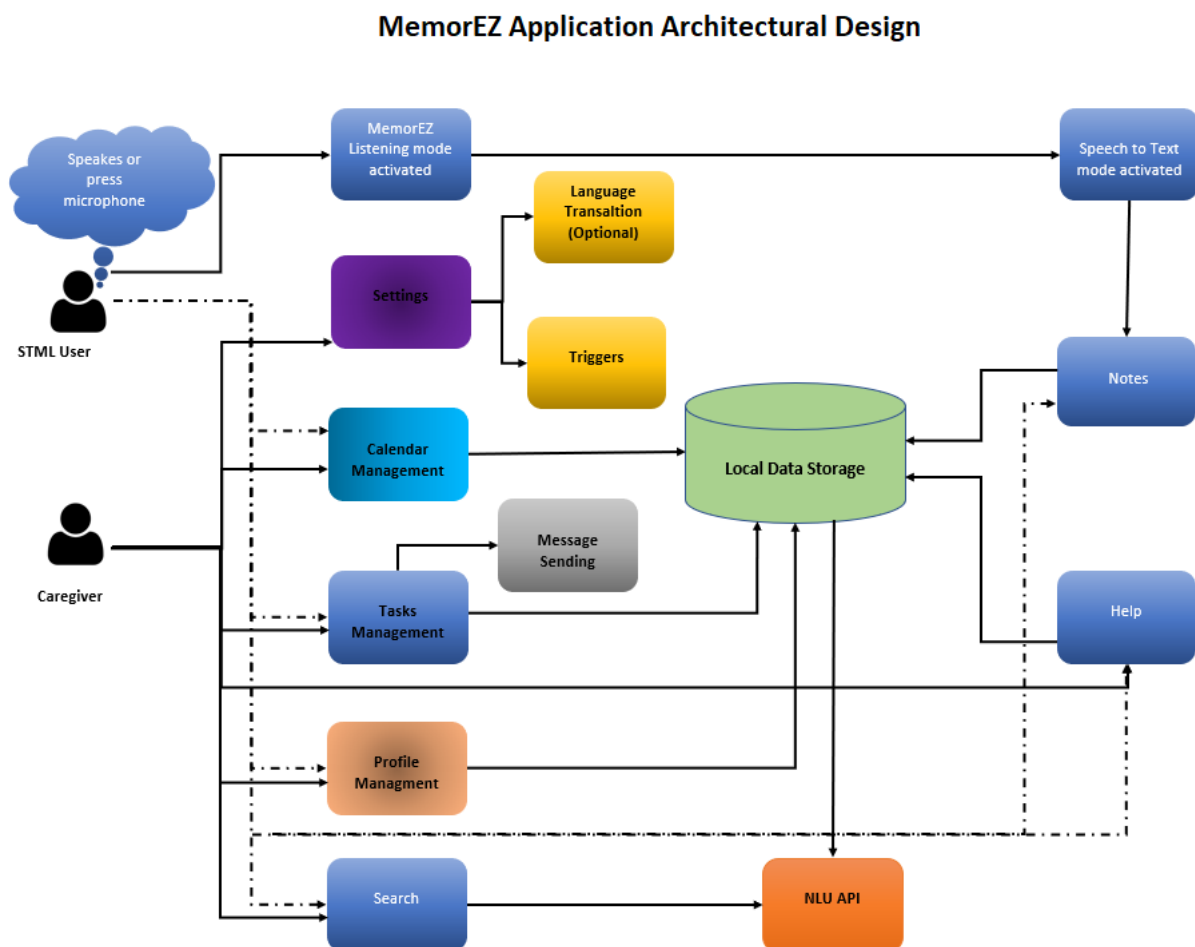


Figure 2: MemorEZ Application Architecture Design

3.1 Decomposition Description

3.1.1 Settings

MemorEZ settings component manages the overall application setting related to notes, tasks, app settings and triggers. The settings section of the app has a feature to enable or disable all the functionality accessible by the STML User.

3.1.2 Language Translations

MemorEZ app is designed to work with multilanguage settings. Settings section of has “App Settings” section where a user preferred language type can be selected and set as default.

3.1.3 Triggers

Triggers component of the app is designed to configure trigger words to start and end recording. Accordingly, based on these pre-defined trigger words the app will start recording the user conversation after recognizing the start recording trigger word and end the recording once stop recording trigger word is mentioned in the conversation.

3.1.4 Chat

MemorEZ has a chat feature where the microphone of the device will be used to listen for specific trigger words spoken by a user that will prompt the application to begin recording. The app will then start to convert speech-to-text operation and the resulting note file will be stored in the local storage location of the device. The app prompts a user permission to activate listening mode before activating the listening mode.

3.1.5 Notes

MemorEZ app generates notes that a user created using the chat component of the application. These notes are transcripts of the user voice instruction to create a note and converted using speech-to-text feature.

3.1.6 Profile

The profile function of the application captures information about the STML user, contacts, care team, medical history, medication, and transportation service for the STML user.

3.1.7 Calendar

MemorEZ app calendar used to display upcoming tasks and events. It will allow you to view tasks and events by Month, Week or Day.

3.1.8 Tasks

MemorEZ app can create and track activity and health check tasks for the STML User. These tasks include, taking a walk, brushing a tooth, or performing health check. In a Caregiver mode the app will create and schedule a task.

3.1.9 Message Sending

As a task component of the application, a STML User can be presented with health check tasks. In this task the STML user will be able to give feedback about his/her feeling by clicking a picture representation of bad, okay, or great mood feelings. The reply from the STML user is sent to Caregiver via text message.

3.1.10 Search

The user shall have the ability to search by date or keyword. The search feature shall integrate with the NLU AI service to search for notes with the context of the user's text (the text may be typed or voice-transcribed).

3.1.11 Help

The help area will be contextually sensitive when accessed for various screens. It will also have onboarding help to assist with the application set up when the user first logs on.

3.1.12 Natural Language Understanding

The NLU component will make calls to the NLU application being developed by Team Tongue Twisters. The note will be sent to an API and the response will be returned to the app.

3.1.13 Local Data Storage

Data will be encrypted and stored on the device in JSON files.

4 Data Design

MemorEZ will utilize system storage on whatever device it is installed on. There will be no cloud storage capability designed into this iteration of MemorEZ. Several features and their associated processes will utilize .JSON files to manage data in local storage to be viewed/edited throughout the operation of the App. This section depicts the flow of data to and from the users and processes of MemorEZ.

-CAUTION-
Data needs to be carefully managed to allow for publication on the app store and satisfy the “principle of least privilege” established by NIST (NIST, 2016) for Android Publishing (Google, 2020).
-CAUTION-

One of the major requirements this semester is to publish the application on the apple and android app stores. To do this, careful attention must be given to the application permissions/access to the phone. DevSecOps has identified a potential issue regarding an overreach in privileges that must be addressed before application publication on the android store. The “androidManifest.xml” file is responsible for requesting and maintaining access to all the various resources of the phone (Google, 2020).

In this file, the requirement to “MANAGE_EXTERNAL_STORAGE” is the issue and will not pass Googles “Principle of Least Privilege” unless it is removed or scoped down. The principle of least Privilege is defined by the National Institute of Standards and Technology as “The principle that users and programs should only have the necessary privileges to complete their tasks” (NIST, P.118).

4.1 Data Flow Diagrams

The diagrams in this section focus on the caregiver interaction with the application, but the users’ interaction with the system is crucial since the caregiver depends on the STML Users interactions with the MemorEZ application. The following data flow diagrams present the features from RememberAll’s SRS document in a way that RememberAll’s developers will be able to use as a roadmap for development.

4.1.1 Context Diagram

This context diagram was built upon the initial release from RememberAll's Project Plan Document and includes all of the functionality captured in Revision 2 of both the Project Plan and Software Requirements Specification. The context diagram depicts data/information from the Caregiver TO MemorEZ as **solid green lines**, and data/information from MemorEZ out to the Caregiver as dotted blue lines. The STML User interactions have been abstracted to a simple bi-directional arrow since they are not within the scope of this document.

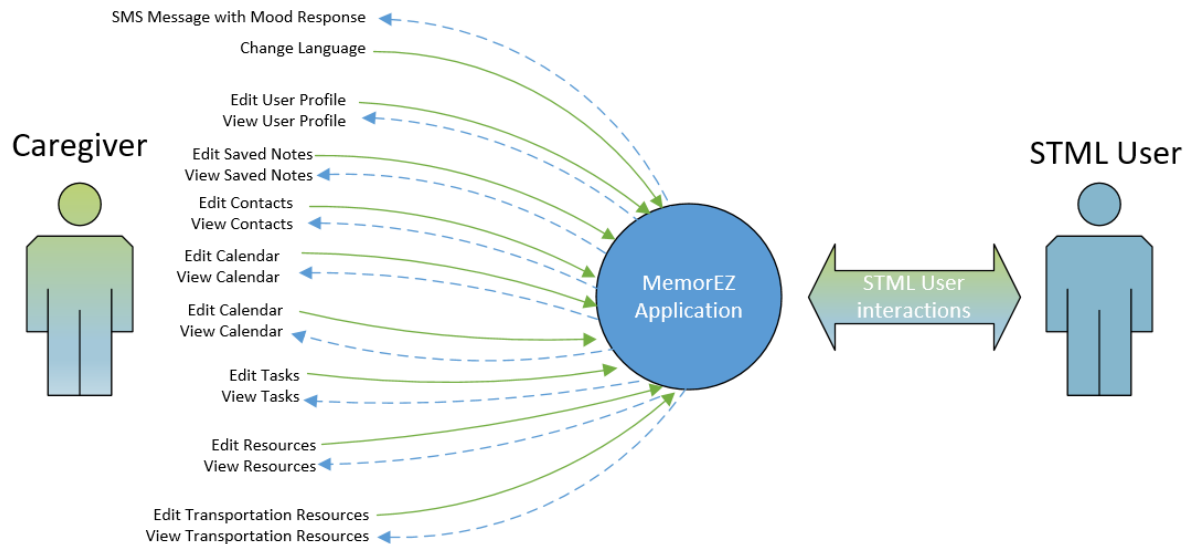


Figure 3: Context Diagram (Level 0 Data Flow Diagram) detailing Caregiver Interactions

4.1.2 JSON Storage Diagram

This diagram depicts 13 processes that interact with each-other and with system storage to support the Caregiver functionality of MemorEZ. These processes were built around the functionality proposed in the SRS. The processes are numbered to facilitate discussions with the team.

All of the data diagrams featured below are based off of the UI/UX images from fluttering mind/RememberAll featured in section 5. This document shall be updated to include pertinent information regarding .json storage as it is discovered throughout the previous app as it is implemented throughout RememberAll/Fluttering Minds development.

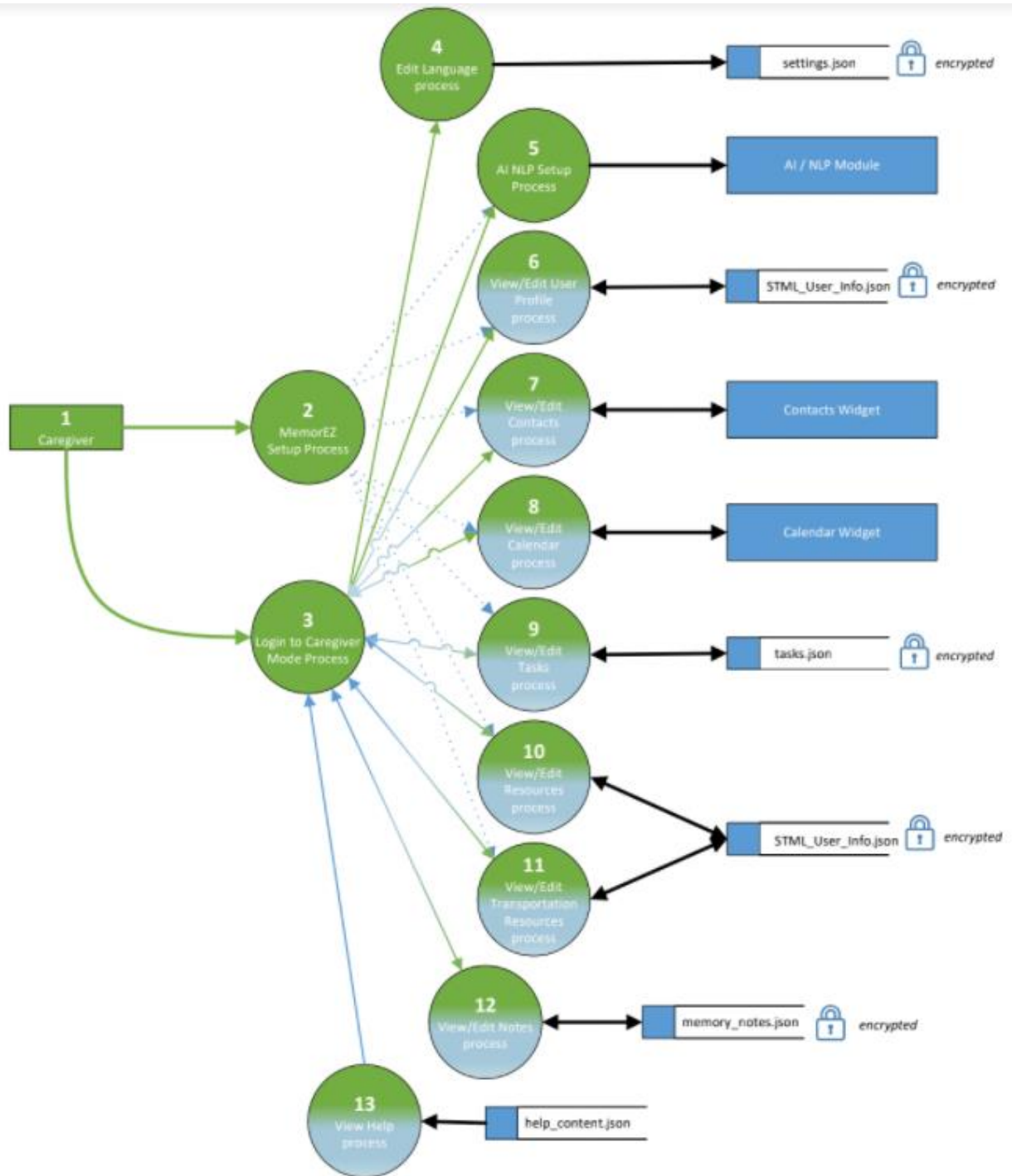


Figure 4: Memorz (Level 1 Data Flow Diagram) Caregiver Processes and Major Data Storage

4.2 settings.json

This file shall store all the users' preferred settings as set by the Caregiver / STML User through the UI. In collaboration Fluttering mind the main configurable settings of MemorEZ will include the data types included in Figure 5.

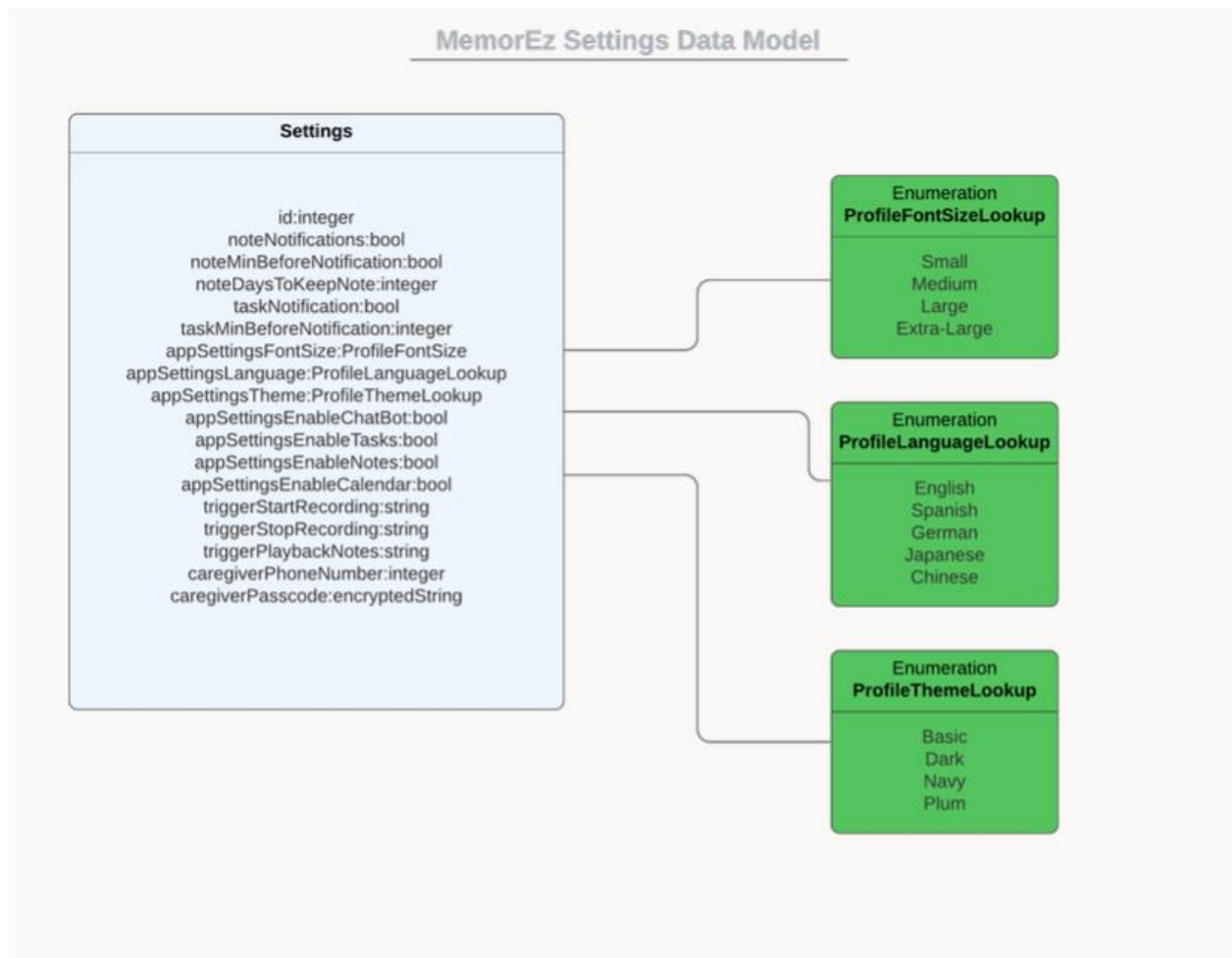


Figure 5: Data Model for settings.json Source: Fluttering Mind – Joshua Fischer

The key – Caregiver Only settings are configured and stored in this file are:

- **appSettingsLanguage** – contains the enumerated selection from ProfileLanguageLookup.
- **appSettingsEnableChatBot** -contains a Boolean indicating whether or not this feature is available to the user.
- **appSettingsEnableTasks**-contains a Boolean indicating whether or not this feature is available to the user.
- **appSettingsEnableNotes**-contains a Boolean indicating whether or not this feature is available to the user.
- **appSettingsEnableCalender**-contains a Boolean indicating whether or not this feature is available to the user.
- **appSettingsEnable**-contains a Boolean indicating whether or not this feature is available to the user.
- **appSettingsEnable**-contains a Boolean indicating whether or not this feature is available to the user.
- **careGiverPassword**-contains a string of the user's password that may be updated through the settings.

4.3 STML_User_Info.json

This file will hold profile information for the STML user. In Collaboration with Fluttering Mind – it was determined to split up the STML User data into two main categories: Static Data and Dynamic Data. The profile contact will be editable but static, while the Dynamic data allows for the user to include custom sections on the user profile. These custom sections are flexible enough to meet the requirements for the user profile like providing a memory test, links and info for government resources, and links to trusted transportation methods. Figure 6 depicts the attributes and UML relationships of the STML User profile entities.

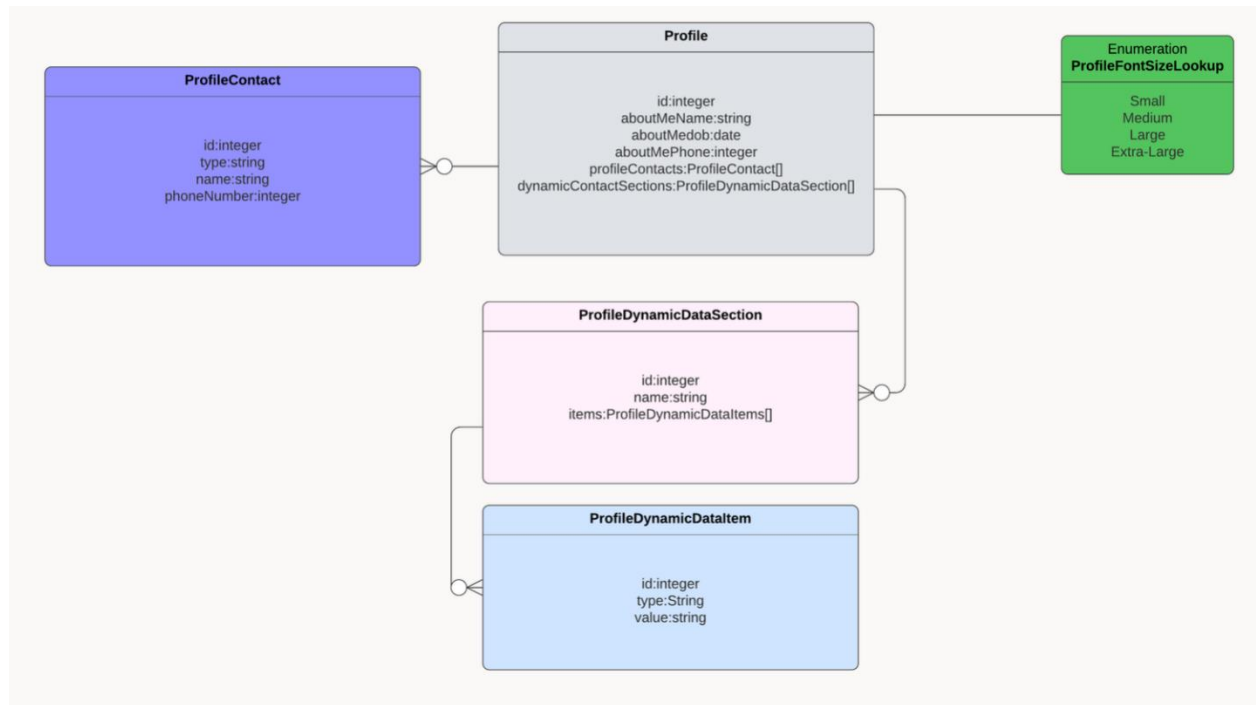


Figure 6: Data Model for STML_User_Info.json Source: Fluttering Mind – Joshua Fischer

There are several key attributes of static data in this User_Info.json file that must be established when the application is installed and set up for the first time. These attributes include:

- **aboutMeName** – This is a String that will contain the STML Users Full Name.
- **aboutMedob** – This is a date that will store the birthday of the STML User.
- **aboutMePhone** – This is an integer that will store the digits of the STML users phone number.

In addition to the STML User, the Caretaker will be a required contact for any installation of this app. This will happen during application setup where the Caretaker will input their information:

- **name** – This is a String containing the Caretakers full name.
- **phoneNumber** – This is an integer containing the caretakers phone number. This information is required to enable SMS functionality between the application and the caretaker.

4.4 tasks.json

The tasks.json file will hold all the information required to create edit store and retrieve the information necessary to support the task/reminder features of the application. Through the interactions of the Caregiver, the attributes of the tasks shall be updated and stored by the application and retrieved/displayed by the application when the user navigates to the tasking screens.

-NOTE-

Memory Magic originally had the reminders established as hard-coded sequence: that pushed notifications to the STML User. Figure 7 presents a new concept “TaskActivity” which is an abstraction of MemoryMagic’s implementation, and provides for the customization of tasks in Alignment with the system requiremen

-NOTE-

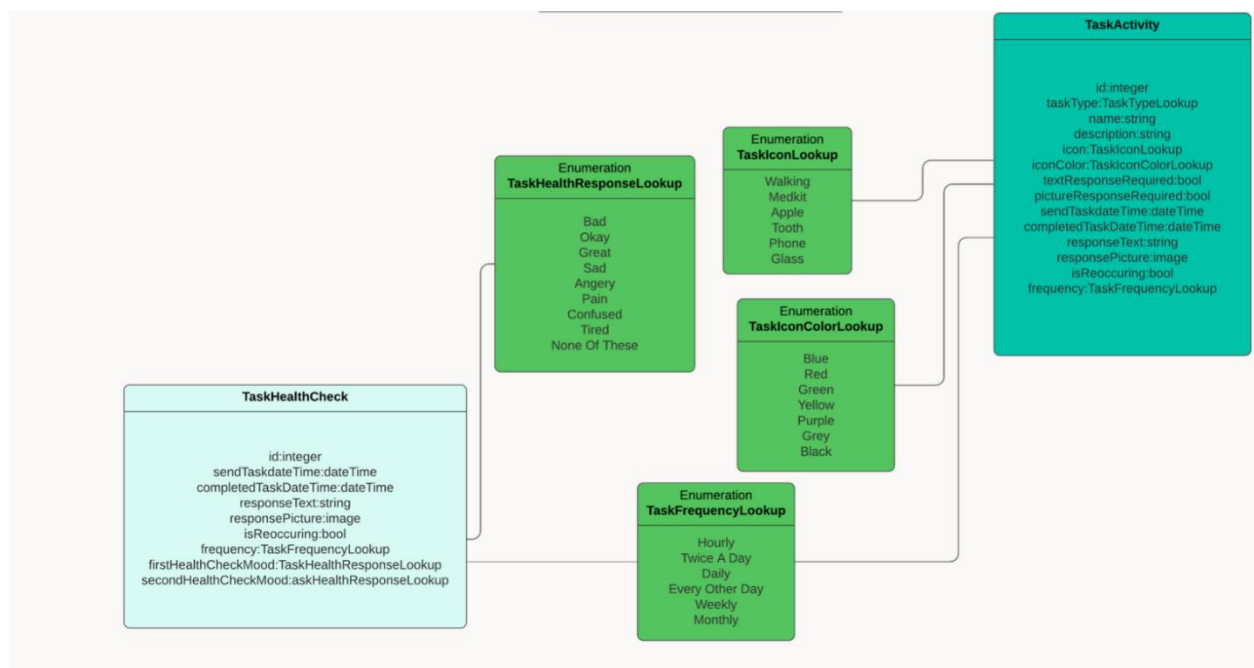


Figure 7: Data Model for tasks.json Source: Fluttering Mind – Joshua Fischer

While the full list of attributes is depicted in the figure above, the Enumeration boxes do a great job explaining the flexibility of the abstracted TaskActivity entity. This entity will store its information in .json files and capture the attributes in [Figure 7](#).

4.5 memory_notes.json

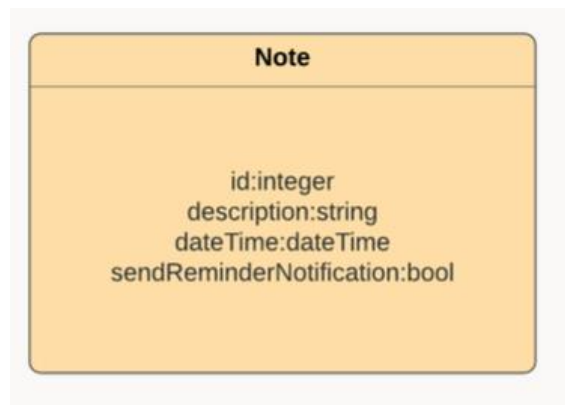


Figure 8: Data Model for note.json Source: Fluttering Mind – Joshua Fischer

The Note JSON shall store the user's notes. Figure 7 depicts the minimum attributes required by the user interface.

-NOTE-

The memory_notes.json is an existing file that RememberAll / FlutteringMind are expecting to pull forward into this next iteration of development. The detailed attributes pulled forward from that file have not yet been determined, but will be documented here as the development progresses.

-NOTE-

4.6 help_content.json

This .json file will be pulled as-is from the memory magic application. The file contains a list of paths and titles for all the help videos that will be displayed in the help section of the application. One important aspect of these help videos will be to ensure that they remain retrievable indefinitely, and not tied to the personal account of a previous developer. It is also important to note that the help_content.json file is also being pulled forward from the last cohorts development efforts, so the NOTE from Section 4.5 applies to Section 4.6 as well.

-CAUTION-

YouTube links presented by the application should minimize the usage of personal accounts to ensure that access to the content remains available in the future.

-CAUTION-

5 Component Design

This section describes the architectural design depicted in section 3.0 of this document. The components for this application are developed by leveraging the Flutter preexisting plugins and packages from pub.dev. We shall be building on the previously developed app, “MemoryMagic,” using dart widgets such as container, column, row, and text commonly used to create the app components. The material components widgets were used in the previous app for buttons, layouts, navigation, and information display. Cupertino widgets were also incorporated for the iOS platform. We shall continue using Flutter libraries such as provider to expose newly created objects, observable that listens to object change, mbox that provides the Observe widget that listens to observables and automatically rebuilds on changes. Below, we have highlighted the packages that are expected to be incorporated to build each component of the MemoryEZ application.

A list of packages we expect to use is presented in the following table. Each packages use is presented in the component sections below.

Table 1: List of Dart Packages to utilize

Package	Component	URL
dev_dependencies i18n_json: ^0.9.1	5.2	i18n_json Dart Package (pub.dev)
speech_to_text: ^5.4.2	5.3	speech_to_text Flutter Package (pub.dev)
expandable_text: ^2.2.0	5.3	expandable_text Flutter Package (pub.dev)
Timeago: ^3.2.1	5.3	timeago Dart Package (pub.dev)
chat_bubbles: ^1.2.0	5.4	chat_bubbles Flutter Package (pub.dev)
flutternToast: ^8.0.8	5.5	flutternToast Flutter Package (pub.dev)
table_calendar: ^3.0.3	5.7	table_calendar Flutter Package (pub.dev)
date_time_picker: ^2.1.0	5.7	date_time_picker Flutter Package (pub.dev)
font_wesome_flutter: ^9.2.0	5.8	font_awesome_flutter Flutter Package (pub.dev)
Url_launcher: ^6.0.18	5.9	url_launcher Flutter Package (pub.dev)
flutter_search_bar: ^2.1.0	5.10	flutter_search_bar Flutter Package (pub.dev)
video_player: ^2.2.18	5.11	video_player Flutter Package (pub.dev)
path_provider: ^2.0.8	5.13	path_provider Flutter Package (pub.dev)
shared_preference.dart: ^2.0.13	5.13	shared_preferences Flutter Package (pub.dev)
encrypt: ^5.0.1	5.13	encrypt Dart Package (pub.dev)

5.1 Settings

The MemoryEZ app settings component builds the feature that enables caregivers to toggle between the caregiver and STML user mode of the app and log in with their username and password. Team RememberAll will build on the UI of the previously developed setting for the MemoryMagic app leverage the [dart: UI](#) built-in types for flutter applications. The authentication of caregivers shall leverage the flutter_login: ^3.1.0, a readymade login signup widget .

5.2 Language Translations

The component that converts text in the application to other languages is based on the user's preference setting. The component will use Flutter's dev_dependencies i18n_json: ^0.9.1 translator.dart package.

5.3 Triggers

Listening mode will be triggered by pressing the microphone button and using the preconfigured trigger words. The application will convert caregiver's speech to text. The component that transcribes the speech to text will be developed by importing the speech_to_text.dart: by adding the dependence speech_to_text ^5.4.2. package.

5.4 Chat

The MemorEZ app shall enable the caregiver to communicate voice recording converted to chat. This component will be developed by incorporating the flutter package chat_bubble.1.1.0. image_picker: ^ to display the user 's image. ^0.8.4+6.

5.5 Notes

Notes shall be recorded on the MemorEZ application for the STML User. This component will exploit the expandable_text ^2.2.0, collection and io.dart and the Timeago: ^3.2.1, flutterstoast: ^8.0.8 packages.

5.6 Profile

Caregivers shall be able to edit and view STML User profile from the MemoryEZ app. This component shall be developed on the material.dart framework of flutter package.

5.7 Calendar

Calendar feature will be used by the caregiver to schedule an STML user's event date and time. This component will incorporate the flutter package table_calendar:^3.0.3. and the date_time_picker: "^2.1.0".

5.8 Tasks

Caregivers record and edit tasks for STML users using the MemoryEZ app. date_time_picker:^2.1.0 package shall be incorporated to record the time task is assigned. font_wesome_flutter:^9.2.0 will be imported to create icons that illustrate the tasks. Timeago:^3.1.0 will be leveraged to include timestamp.

5.9 Message

MemorEZ application receives message from the STML User and sends message to the STML User. The flutter package Url_launcher: ^6.0.18 shall be incorporated to build the SMS message component.

5.10 Search

Caregivers will use the search bar to search the application using keyword. This component will leverage flutter_search_bar.dart: ^2.1.0.

5.11 Guided Help

MemoryEZ app shall provide a guided help for first time users of the application. The guided help shall use the video_player.dart component with the package video_player:^2.2.18 dependence.

5.12 Natural Language Understanding (NLU)

MemoryEZ application shall communicate with the Natural Language Model via an API, that shall send data from the MemoryEZ Application to the NLU for context-level processing. We shall use an Amazon Web Service tool lex for creating conversational interfaces, and chatbots, utilizing speech and text.

5.13 Local Data Storage

Data storage used the `path_provider: ^2.0.2` to store data locally and `shared_preference.dart` package `^2.0.13`. for persistence of data on the device. Data encryption will be implemented by using `encrypt: ^5.0.1`. package.

6 Human Interface Design

6.1 Overview of User Interface

The Caregiver user interface will provide the caregiver the flexibility to manage the STML user through the application. The user interface will be designed to provide the option for the caregiver to view and edit option that pertains to the STML user. The Caregiver mode interface will differ from the SMTL user which will be a little more advanced to help the Caregiver make edits to the STML user tasks. Options available for the Caregiver user to view are Caregiver mode, app settings, STML user profile, STML user calendar, STML user reminder tasks, STML users' resources, and lastly the STML users' transportation information. Any options the Caregiver user can view they will have the ability to edit as well.

-NOTE-

The User Interface designs were spear headed by a Fluttering Mind Teammate an effort to maximize the cohesiveness of the final product. It was determined early on that UI/UX concepts stitched together during development would **NO** produce a Cogent Product

Some UI/UX still refers to "Admin" mode. This will be replaced with "Caregiver mode and updated in future revisions of this document.

-NOTE-

6.2 Screen Images

6.2.1 Enable Caregiver & Caregiver Login

Screen Name: *Enable Caregiver & Caregivers Login.*

Image(s):

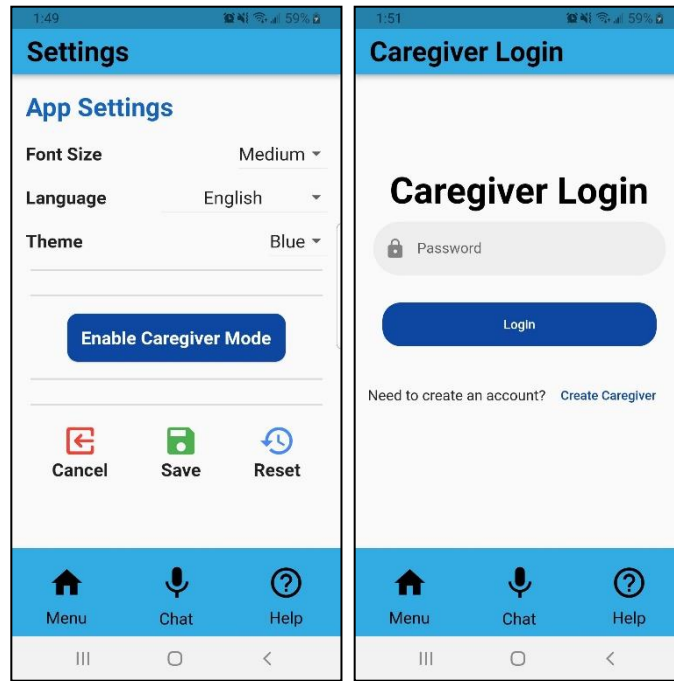


Figure 9: Enable Caregiver & Caregiver Login Screen. Source: Fluttering Mind – Joshua Fischer

Internal UI functionality:

The Caregiver user starts in the STML User profile before switching to the Caregiver mode.

External UI functionality:

The Caregiver user will click the Caregiver mode which will take the user to a new page where the Caregiver user will enter their credentials. Once on login page and the user has added their credential the user will be directed to a new

6.2.2 Notes

Screen Name: *Notes*

Image(s):

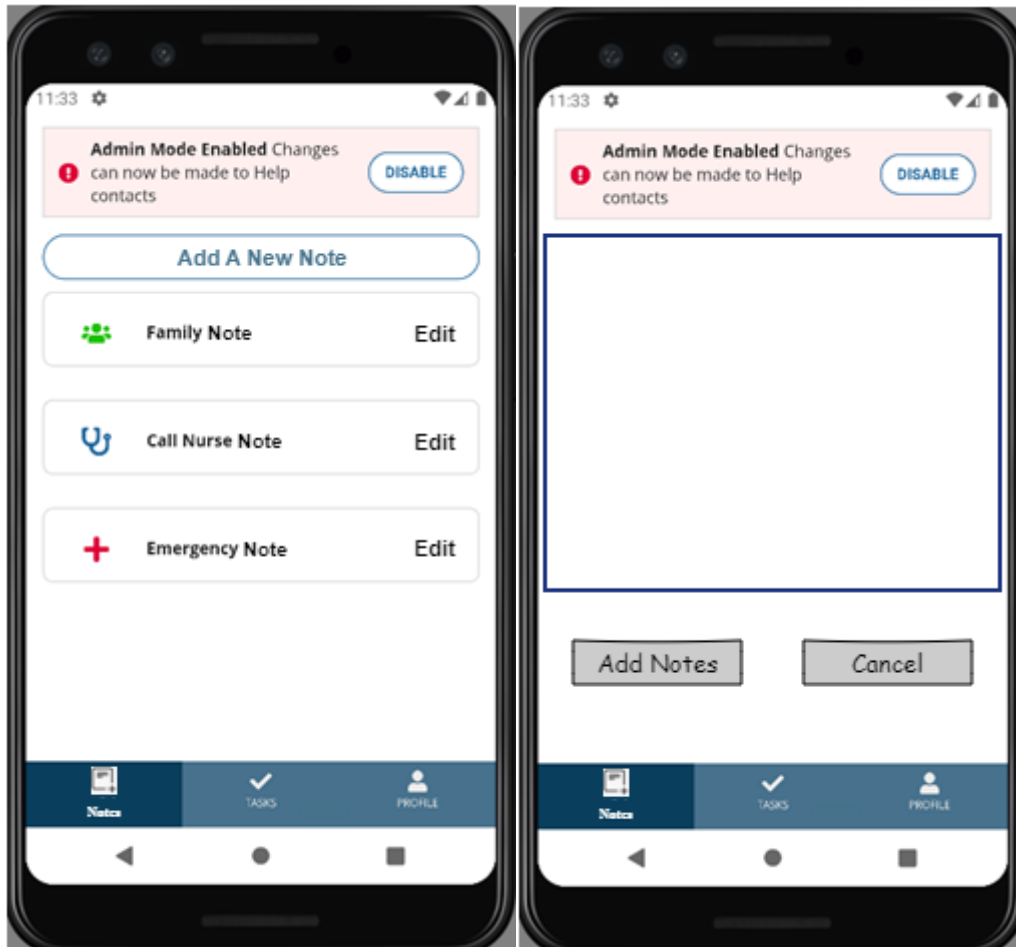


Figure 10: Notes Screen. Source: Fluttering Mind – Joshua Fischer

Internal UI functionality:

The Caregiver user can scroll up and down to view the different notes on the STML user.

External UI functionality:

The Caregiver can click the edit option and the app will direct the user to a new screen where they can make the edit. Once on that screen the user can either add the note or cancel the note then app will return to the list of notes.

6.2.3 Contact and Resource

Screen Name: *Contact and Resource*

Image(s):

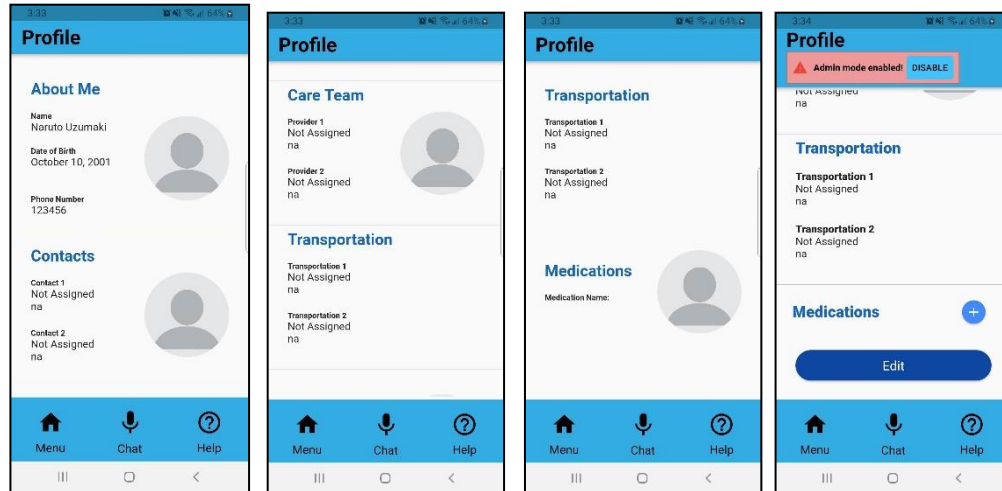


Figure 11: Contact and Resource Screens. Source: Fluttering Mind – Joshua Fischer

Internal UI functionality:

The Caregiver user can scroll up and down to view the STML users contact and resource information. The Caregiver user can click through the different contact and resource options to view in the app. In the edit mode the user can enter options to edit the contact and resource information.

External UI functionality:

The Caregiver user can click the edit contact or resource to edit the information. This will take the user to the contact or resource option page where the edits can be made.

6.2.4 Calendar and Reminder

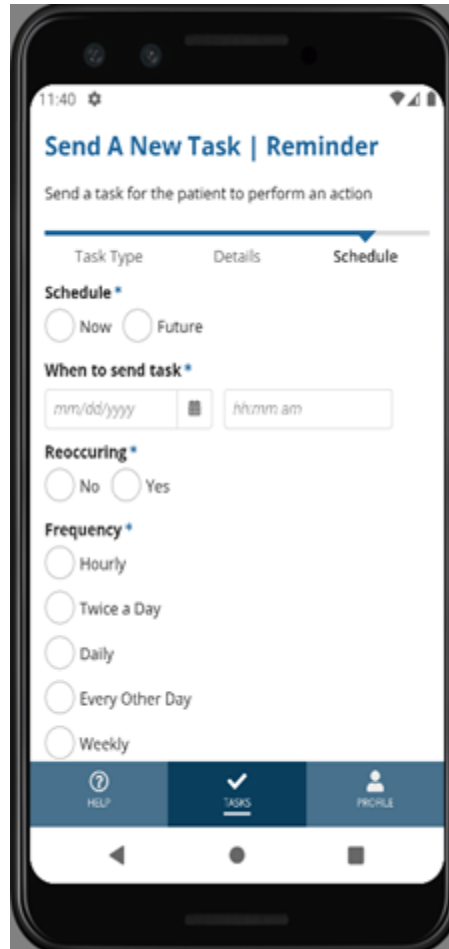
Screen Name: *Calendar & Reminder***Image(s):**

Figure 12:Calendar & Reminder Screen. Source: Fluttering Mind – Joshua Fischer

Internal UI functionality:

The Caregiver user can view the STML user's calendar and view the date based on the different task type. The user can click the drop option to view the different task type, or the user can search for task on the calendar. The user can select reminder options in the edition of the tasks and when they are first created.

External UI functionality:

The Caregiver user can click on edit calendar task and it will take the new screen where the user can make the edits to a task.

6.2.5 Transportation

Screen Name: *Transportation*

Image:

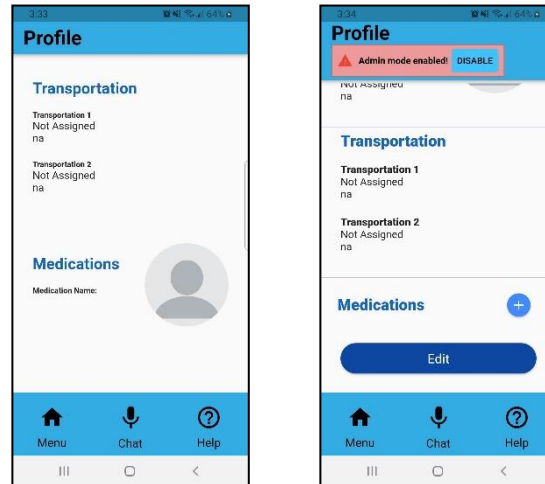


Figure 13: Transportation Screen. Source: Fluttering Mind – Joshua Fischer

Internal UI functionality:

The Caregiver user can view the STML user's transportation options. The Caregivers can click on the transportation options to view the information.

External UI functionality:

The Caregiver user can click on the transportation data they would like to edit, and they can either add or delete information.

Table 1: System Requirement Matrix

Number	Requirement	Requirement Description
REQ-1	The user must have the ability to change the user mode to "Caregiver Mode."	The MemorEZ application will always be in "STML User Mode" upon loading. At any time while the application is running, a user has the ability to change the user mode to "Caregiver Mode."
REQ-2	In "Caregiver Mode," the user must have the ability to view user-controllable app settings.	While in "Caregiver Mode", the user can view the current settings of the application for the "STML User Mode" and "Caregiver Mode."

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Number	Requirement	Requirement Description
REQ-3	In "Caregiver Mode," the user must have the ability to change user-controllable app settings.	While in "Caregiver Mode", the user can change settings that affect the functionality of the application for the "STML User Mode" and "Caregiver Mode." This will reduce the possibility of the STML user accidentally making changes to the application that may negatively affect the STML user's experience. This will also reduce the possibility of the STML user making changes that the user unable to undo without the assistance of the caregiver.
REQ-4	In "Caregiver Mode," the user must have the ability to view the profile of the STML user.	While in "Caregiver Mode," a user can view the profile information that has been saved for the STML user.
REQ-5	In "Caregiver Mode," the user must have the ability to edit the STML user profile information.	While in "Caregiver Mode," a user can enter and change profile information for the STML user. The profile can include information about the STML user, and information about the STML user's contacts. The STML user's information can include name, phone number, address, insurance information, allergy information, and medical conditions. The STML user's contact information can include names, phone numbers, and addresses of emergency contacts, relatives, friends, and healthcare providers.
REQ-6	In "Caregiver Mode," the user must have the ability to view the STML user calendar information.	While in "Caregiver Mode," a user can view the appointment information that has been saved for the STML user.
REQ-7	In "Caregiver Mode," the user must have the ability to edit the STML user calendar information.	While in "Caregiver Mode," a user can enter and change appointment information for the STML user. Appointment information can include the appointment description, time, date, and notes.
REQ-8	In "Caregiver Mode," the user must have the ability to view the STML user reminders that are automatically pushed to the STML user at various times during the day as scheduled by the user.	While in "Caregiver Mode," a user can view the reminders saved for the STML user.
REQ-9	In "Caregiver Mode," the user must have the ability to edit the STML user reminders that are automatically pushed to the "STML User Mode" device at various times during the day as scheduled by the user, such as reminders to eat, reminders to drink water, reminders to go to the bathroom, reminders to stand up and move around, reminders to brush teeth, etc.	While in "Caregiver Mode," a user can enter and change reminders for the STML user. Reminder information can include reminder description, frequency of reminder notification, and reminder response options.
REQ-10	In "Caregiver Mode," the user must have the ability to view the STML user resource information.	While in "Caregiver Mode," a user can view the resource information saved for the STML user.

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Number	Requirement	Requirement Description
REQ-11	In "Caregiver Mode," the user must have the ability to edit the STML user resource information.	While in "Caregiver Mode," a user can enter and change the resource information. Resource information can include name, organization, description, website link, phone number, notes.
REQ-12	In "Caregiver Mode," the user must have the ability to view the STML user transportation information.	While in "Caregiver Mode," a user can view the transportation information saved for the STML user.
REQ-13	In "Caregiver Mode," the user must have the ability to edit the STML user transportation information.	While in "Caregiver Mode," a user can enter and change the transportation information. Transportation information can include organization, name, address, phone number, and notes.

7 Appendices

7.1 Acronyms, Abbreviations, and Definitions

See the most used acronyms/abbreviations and their definitions below:

Acronym	Definition
TDD	Technical Design Document
APP	Application
UI/UX	User Interface
API	Application Programming Interface
STML	Short-Term Memory Loss
STM	Short-Term Memory
FAQ	Frequently Asked Questions
NLU	Natural Language Understanding

7.2 References

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