Old age Home Mobile Application

By

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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

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ABSTRACT

The development of information and communication technologies have accelerated the pace of people's life. Thus, many young people are spending a lot of time to struggle for business. One case to take specifically into account is older people. Since offering a good quality elderly healthcare is an enduring and complicated process, there is a significant need to develop innovative solutions to benefit the society as large. The mobile application is not always applied for them and meet their needs. Therefore, this project is concentrated on mobile application design for academic purpose. It mainly focuses on the field of user-friendly old age home mobile application that provide the essential information for the family members about the plan, activity, meal, and services offered for the elder. The mobile application is expected to help elder in using mobile application as well as family members to contact with their elder. From the perspective of design, the project is emphasis on system that enable users to log-in, check daily activities, record medical record, communicating with others, providing relevant information about the elder to the family members and etc. There are several parts for the mobile application which included Medical Record, Chat and Message, Pill Reminder, Emergency Call, Remote Monitoring and etc. This project is making use of use case diagrams to describe the system processes and class diagram to illustrate the flow between the actions in an activity. Since mobile programming and real-time Firebase is well suited for the mobile application development, therefore it is used in this project. Even though there have numerous mobile application that focused on the elderly healthcare, however; there are still lack of some functionalities that able to improve the quality of life for the elder. By studying this project, it presents the mobile application functionalities and emerge the strategies that can satisfy the needs of the elder and improve their quality of life.

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CHAPTER 1

1.1 Problem Statement and motivation

1.1.1 Cognitive decline

Changes in memory are a normal symptom when people are getting older [10]. People with higher age is tends to face the symptoms such as memory loss, cognitive function decrease or even development of conditions like dementia or Alzheimer's disease. It is important for us to focus on this issue since memory changes can impact other aspects of daily life [10]. When an older people become forgetful, they will be doing some activities that are not beneficial to them such as forget to take medicine, get lost, refuse to talk to people and also loss of self-confidence. Elderly people are at a higher risk of safety-related events than younger people due to the natural process of ageing and their health status due to multiple chronic diseases [14]. Especially for the older people that have no family members accompanied in their home, they might be run away from home and forget the ways to back home. Furthermore, they also will refuse to eat because they do not remember the time, they consumed the food. In this case, it will cause worse to their illness. Thus, there is a need for the system to assist the elder people to accomplish their daily tasks.

1.1.2 The need for enhanced support and monitoring

On the other hand, some of the family members are always work overtime or work abroad. These issues will probably cause the elderly people to be sent to old age home. Since the adults are busy on their business, thus they are possibly not sufficient time to visit their parents when doing their jobs. This situation becomes even more critical when it comes to caring for elderly individuals who require long-term support and assistance. It is impossible for people to accompany with them 24hours. For instance, dealing with elderly people who suffer from disease such as dementia, they may wander off or get lost, putting their safety at risk. Unfortunately, due to the lack of constant supervision, it becomes challenging to retrace their steps or understand the events that cause the incidents. The absence of detailed information obstructs the ability to provide prompt assistance and locate individual efficiently.

Motivation

The problem of forgetfulness to the elder people is crucial because it may cause the adverse consequences to them. The study is aiming to establish a system that consists of a series of features included "Emergency Help" to make the emergency call and send the alert email to their caregiver, Remote monitoring for their elderly, pill reminder, chat, and medical record. The target users of this mobile application are elderly people, family members and nurses at the old age home. By using these features, we believe that it can assist elder people and their family members, or nurses at the old age home to better manage the daily tasks. All of them can utilize different features designed in the mobile application to complete elderly-care related activities. According to [1], mobile and internet technologies such as mobile application, it offers possible methodologies to increase the empowerment of elder people, support social activities, prevent cognitive and physical decline, decrease loneliness, and aid in everyday activities.

1.2 Objectives

The aim of the project is to propose improved mobile application and efficient algorithms for helping old age home elderly people. There are **three objective**s in this project which consists of:

1. **To develop effective *Pill Reminder and Medical Record* features for improved medication management and medical history accessibility within the completion of FYP2.**

   This module will help to improve medication management and medical history accessibility. The "Pill Reminder" module ensures users take prescribed medication on time through customizable reminders, while the "Medical Record" module allows efficient recording of medical data for nurses or staffs. This will enhance the understanding of medical histories among healthcare providers and caregivers.

2. **To facilitate engaging *Chat and Message* features for real-time communication and daily activity sharing within the completion of FYP2.**

This module is aims to encourage user especially elderly people engagement and communication through the "Chat and Message" module. This objective focus to foster active and real-time communication among all users, enabling them to share daily activities, concerns, and delightful as well as grieved moments.

3. **To develop seamless *Emergency Help and Remote Monitoring* features for enhanced elderly care within the completion of FYP2.**

   This module is intent to enhance elderly care. The "Emergency Help" module ensures rapid seeking assistance by calling the hospital or medical center, while the "Remote Monitoring" module allows the family members or the caregivers to actively monitor their elderly relatives, providing an additional layer of security and peace of mind.

1.3 Project Scope and Direction

This project is expected to produce a more efficient mobile application than existing system by introducing the new functions such as "Emergency Help" into the system. The user's culture, age, experience with technology and mobile devices, perceptions will influence the way they use mobile devices and technology [15]. Thus, this project is only targeting elderly people, family members and the nurses at the old age home. The users of this mobile application are going to access various type of functionalities to help them to complete daily tasks. On the other hand, the project is designed into multifunction which can fit the different needs for elderly people, family members and nurses' team at the old age home. The users can get the pill reminder alert, create medical record, remote monitoring, chat, and messages etc. Every side of the users can use this mobile application as their "Everyday App".

1.4 Contributions

Our analysis confirm that the elder people can live in healthier and smoother. Firstly, it is because we can help them to set the time for taking medicine or drinking water. For example, the system is set to be alert the elder people to take pills at 2pm which is the time after lunch or alert elder people to drink water for every 1-2hours. Secondly, elder people could use the "Emergency Help" feature designed in the mobile

application to seek help from the medical centre if they faced any difficulties such as fall down or asthma. Thirdly, the older people can use the chat and message feature to communicate with their family members or friends and share their daily activities so that they would not feel loneliness and boring. Last but not least, the family members of the elder people could also monitor the actions and activities of their parents so that they can have a peace of mind in accomplish their working.

1.5 Project Background

The percentage of Malaysia's population aged 65 and above has increased incrementally, leading Malaysia to meet the United Nation's criteria for categorizing it as an ageing society. This research underscores a consistent upward trend in the number of elderly individuals over time. The smartphone penetration rate as share of the population in Malaysia from year 2010 to 2020 and forecast up to 2025 is still in increasing [9]. Hence, it is important that the elder people can also keep up with the information and communication technology such as mobile application to ease their daily life. In this fast-paced society, majority of the younger people have no choice but choose to fight for their cause. Therefore, many of the elder parents are being forced to stay at home without accompanied by family. The feel of loneliness, less importance, and illness are most of the perilous situation that elderly are facing. However, old age home is becoming the preferred choice for many busy families to send their elderly parents when there is not a single person able to perform caregiving duties for them. Part of the younger generation also think that their parents can be better cared if they stay at old age home compared to stay at their own home. Nevertheless, living with strangers with unknown background at an unfamiliar place can be a daunting experience for the elderly.

Since 1990s, information and communication technologies (ICT) have been seen rapid growth in the society [6]. The investment in the ICT also lead to excellent performance to the political, economic and education sectors. Everyone will be having a smartphone to access various services or entertainment on Internet. By referring to the *Figure 1.5*, we can see that up to 99.6% of households are with the

access to mobile phone in year 2020 to 2021 [5]. Thus, mobile application also plays an important role that enable users to access quality services and experiences. However, different people will have different desirability towards the use of mobile application. In the case of elderly people which the people aged 65 years old and above, some of the possible approaches have been offered by the mobile application technology to increase the social communication, reduce loneliness, and assist elder in daily life. These elder people will access the mobile application in different ways because they are not grown in the environment that surrounded in ICT [6]. One of the reasons they will think that mobile application is not easy to use is because they find that ICT is expensive. In the elder people generation, most of the people are just using mobile phone for texting or calling purpose. They are lacking skills and knowledge of the use of the device. In short, user-friendly old age home mobile application could be the innovation solutions to help the elderly people having more interesting activities. It is necessary to understanding the needs and demand of elder people to develop an efficient user-friendly old age home mobile application. Products and services must be tailored to the needs and inclinations of this increasing number of elderly people as well as to the requirements of the new economic context [8].

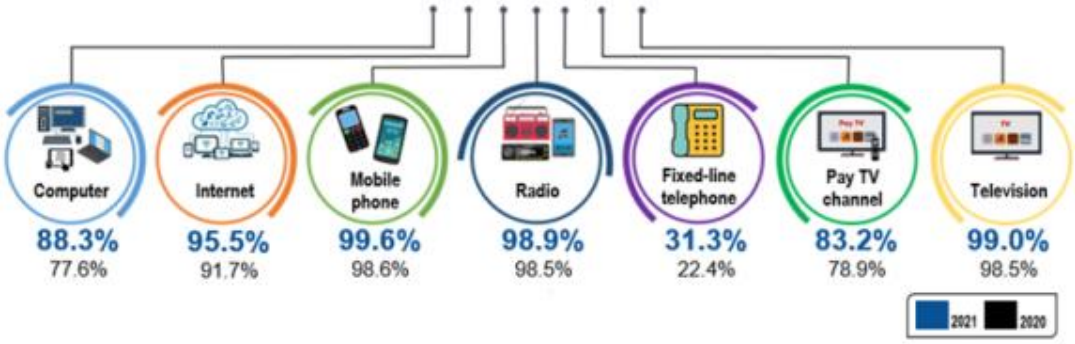


Figure 1.5: The percentage of household with access to ICT services and equipment, Malaysia, 2020-2021

CHAPTER 2

Literature Review

2.1 Previous Works on Deep Learning

2.1.1 All-Well: Access real-time updates on parents' activities

This mobile application is mainly providing 24/7 healthcare and well-being reports for the elderly, and their family members. It also contains the features of texting, calling, and recording the health status. According to the *Figure 2.1.1a,* it shows the chat and message feature provided by the All-Well mobile application. By these features, the loved one's family members can view the parents' health status any time of the day without considering the place. The family members are free to remote monitoring the activity of their parent. All-Well also updates on parent wake-up times, activity, and daily mood. One special feature that designed in this mobile application is it provide the simple but different type of puzzle games for the senior which can better improve their memory and observation as shown in *Figure 2.1.1b*.

Strength

One of the strengths of All-Well is **Health Data Monitoring**. It contains the ability to monitor and track the health data of elderly people. In this case, it helps the caregivers and healthcare professionals such as nurses to collect and analyze essential health information such as heart rate, blood pressure, body temperature, and other vital signs. Thus, this feature assists elderly residents in early detection of any health disease and allows for timely medical interventions. On the other hand, All-Well also possess **Daily Data Tracking** function. By this feature, it becomes a platform for caregivers to track the daily activities which including meals, exercise routines, medication, daily living tasks of elderly people. These records help in monitoring the overall well-being of the elderly individuals and ensuring they receive proper care and support.

Weakness

The weakness of All-Well is required **Manual Entry of Health Data**. All the health data and records are required to be entered by the users which had make it difficult to update the information in first time. The nurses need to manually help elderly individuals to measure their health parameters and enter their records accordingly into the system. Besides that, All-Well also faced the weakness of **Limited Communication Features**. It only contains the text area for users to enter their message without any emoji or multimedia options. Emoji have become an integral part of modern digital communication; it provides a visual representation of emotions and expressions of users. Additionally, the inability to upload multimedia content such as images and videos can also hinder effective communication. Visual media has become a fundamental means of expression, enabling users to share experiences and enhance storytelling. The absence of these features can make it challenging to convey their message in a comprehensive and engaging way.

Figure 2.1.1a
All-Well Chat & Message

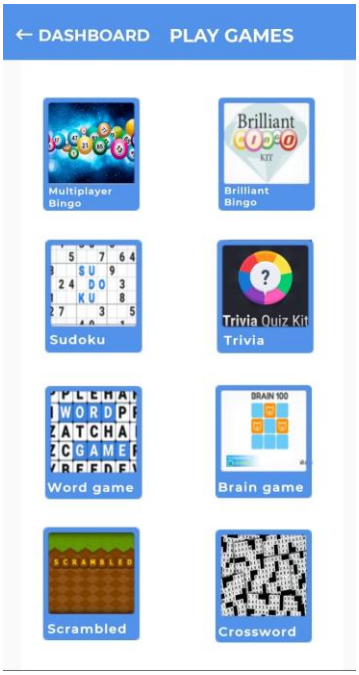


Figure 2.1.1b
All-Well Games

2.1.2 Homage: Full and holistic range of healthcare services

Homage is a mobile application that offer both in-person and online delivery of holistic services. They have the diverse team which highly qualified professionals to deliver the excellent care for elder people. Various type of care and support have been provided such as personal care, nursing care, medical care and rehabilitation therapy as shown in *Figure 2.1.2a*. and *Figure 2.1.2b.* For instance, they deliver the assistance with daily living activities for the elderly and house call doctors and medication delivery. Homage is a very helpful and user-friendly mobile application as it has been giving the family members of the elderly people peace of mind in their daily life. Apart from that, users are also free to make the appointment to request care and medical services instantly through this mobile application.

Strength

The strength of Homage is **Booking Licensed Local Nurses**. Homage provides a comprehensive and reliable platform for the users to book licensed local nurses who are trained and experienced in providing specialized care. Caregivers can easily view through a list of qualified nurses available in their area and schedule an appointment for the procedures such as tube feeding, stoma care, wound care, and other services. This function ensures that elderly residents receive medical care and support in the comfort of their home and minimizing the frequency for hospital visits. Furthermore, Homage also providing the **Detailed Care Reports** for the users after each appointment with the nurses. The care report will capture all the important information of the care provided. For example, procedure performed, medication administered, wound status and any relevant observation will all recorded in the report. Hence, this report serves as a valuable record for the healthcare professional, caregivers, and elderly people to better understand the care received.

Weakness

One potential weakness of Homage is **Reliance on licensed local nurses for specialized procedures**. Especially in some geographic areas or during peak time, it may result to limitations in terms of nurse availability. In this case, this could also cause delays and securing timely appointments for essential procedures. Apart from that, Homage also facing the weakness of **Limited communication with healthcare professionals**. While the detailed care reports being generated after each appointment, there may still be a lack of direct communication platform or collaboration between the nurses and the residents or caregivers. This problem could result in oversight and fragmented care.

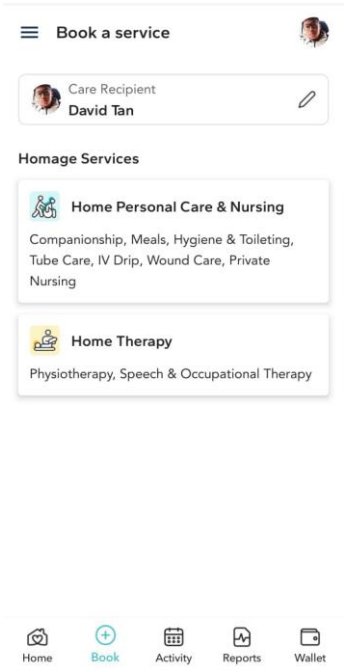


Figure 2.1.2a

Homage Book a service

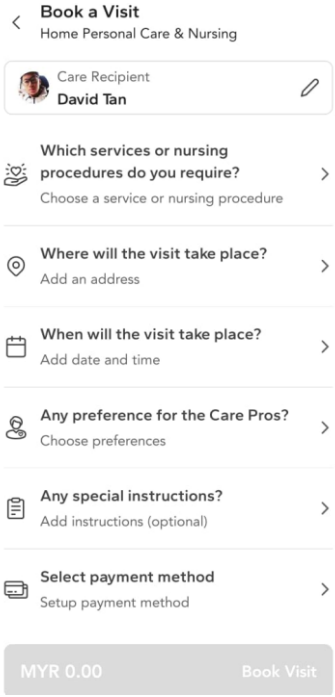


Figure 2.1.2b

Homage Book a Visit

2.1.3 Medisafe: Get reminders to take medicine and refill prescriptions

Medisafe offer the features such as pill reminder and alarm for all medication needs, doctor appointment manager and calendar, support for complex dose schedules, daily, weekly, and monthly medical report with logbook etc as shown in *Figure 2.1.3a*. and *Figure 2.1.3b*. It is not just used for giving reminder to the elder people for taking medicines, but it also acts as a medication management platform that compiles all the relevant medical and health information in single place. Medisafe is designed to be user friendly mobile application as it lets users to personalize the reminders for each of their medication which meet the needs of the elderly people. Not only that, but users are also able to send the health report to their doctors by using the "Send Status Report" feature.

Strength

One of the key strengths of Medisafe is the **Pill reminder and alarm** functionality. It used to help the elderly people to stay on track with their medication schedules by providing the timely reminders and alarms for each medication. Not only that, caregiver or nurse can also input the medication details such as dosage, frequency, description into the system to make it easier to understand. Moreover, Medisafe also provide **Doctor appointment manager and calendar**. Caregivers can easily schedule and manage the appointments with the healthcare providers for their parents. It also provides reminders and notifications to ensure that the elderly residents or caregivers are well-prepared for the upcoming consultation. This has enables better coordination between caregivers and healthcare providers. In addition, **Send status report** feature also facilitates the coordination between the caregivers and healthcare providers. By using this feature, caregivers can easily share up-to-date health report with the doctors or nurses which make the health professional better monitoring their health status.

Weakness

One of the potential weaknesses of Medisafe is **Lack of communication channels**. Although Medisafe has provided the send status report feature to make it easier to send the health report to the health professional, but the report is sent based on the email provided. In this case, it required the users to open another application to keep update with the information reply from the doctor. On the other hand, Medisafe also **Lack of drug information**. All the medicine information needs to be fully inserted by the user without a list of medicine available in the system. This can make it troublesome for user difficult to enter medical information one-by-one.

Figure 2.1.3a
Medisafe Pill reminder

Figure 2.1.3b
Medisafe doctor appointment

Table 2.1: Summarization table of existing system

Systems / Functions	All-Well	Homage	Medisafe	**Proposed project**
Pill reminder			√	√
Health data record	√	√		√
Chat/ Message	√		√	√
Make appointment with doctor		√	√	
Medicine recommendation		√	√	√
Emergency Help				√ **(Innovation)**
Remote monitoring				√ **(Innovation)**

2.2 Limitation of Previous Studies

By analysing the previous studies which had summarized in the *Table 2.1*, we noticed that most of the systems do not provide "Emergency Help" feature for the elderly people. Therefore, it could be the expected innovation for the proposed project. Apart from that, some of the systems also did not cover on the pill reminder feature, there are just a few of existing systems that are able to notify elderly people to take the pills on time. This can cause the elder people for easily forget to take pills on time. Besides that, since some of the family members will be on a business trip or work abroad, therefore; the elder people will perhaps send to the old age home for better care. In case of family members are not rest assured, they are not able to know what their parents are doing. Most of the existing systems not providing remote monitoring function for them to observe their parents. In addition, health data record, make appointment and medicine recommendation are all the standard features that provided by majority of the system.

2.3 Proposed Solutions

According to [7], understanding users' needs is important for the success of any information system, including mobile applications. This project aims to propose the system that able to provide the functions which enable to help the elder people with their family members in terms of healthcare monitoring and completing daily life tasks. The proposed solutions for the limitation of previous studies are to develop the "Emergency Help" feature which the elder people can use as a convenient way to seek help from others. By implementing this feature, elderly people can receive timely assistance, ensuring their safety and well-being during emergencies. Moreover, the proposed solutions to solve the problem of remote monitoring is to develop the system that can view elderly people not only old age home but also own home. The staff or caregiver can seamlessly join the same live conference to monitor or access the conditions and activities of elderly individuals, facilitating enhanced care and support. The use of mobile technologies such as computers, smartphones, and tablets with integrated apps for gathering data and monitoring different conditions, is increasing in the healthcare system [3]. Not only that, but the social platform will also be developed to let the elder people to share their daily activities video or their frame of mind. Elder people are free to chat and message using the mobile application with their family members and friends. By this it helps the elderly people to facilitate their positive thoughts and relationships. The mobile application is also designed to be simple and user-friendly. It is because the system should be easy to learn so that the users can rapidly start getting work done with the system [13].

CHAPTER 3

System Methodology/ Approach

3.1 System Design Diagram

3.1.1 Use Case Diagram

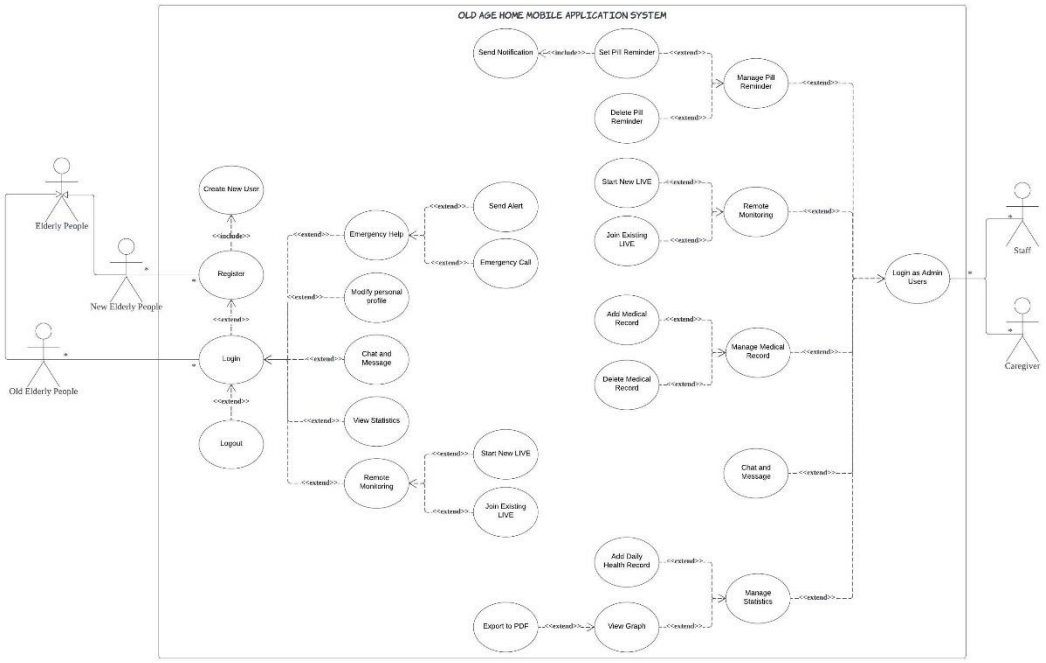


Figure 3.1.1a Use Case Diagram for old age home mobile application system

According to the *Figure 3.1.1a*, we can see that there have total 3 actors which stand for 3 users that will interact with this system. For the elderly people, it consists of two types of users, one is old elderly people, and another is new elderly people. For the new elderly people, they have one use case which is register. New elderly people must do the account registration before they able to login to the system. However, for the old elderly people, they can directly login to the system with the account registered in the system. Upon login successfully, elderly people able to use the feature such as chat and message, modify personal profile, emergency help, view statistics, remote monitoring etc. Elderly individuals are granted access to send the alert message and make emergency call when needed. In addition, remote monitoring is allowed on elderly users to ensure that they can connect live streaming with staff or caregiver. On the other hand, staff and caregiver are another two users which will login as admin users. They can manage pill reminder, remote monitoring elderly people, manage

medical record, chat and message, manage statistics etc. Upon set the pill reminder, the system will update the pill reminder timer and send notification for the elderly people. Besides that, they are also able to start or join the existing live streaming to remote monitoring the elderly individuals. The permission is given to staff and caregiver for perform the addition or deletion of pill reminder, medical record and daily health records for statistics.

Table 3.1.1a: Sign-Up Use Case

<table>
<tr><th colspan="3">Old age home mobile application system</th></tr>
<tr><td>Use Case Name: Sign-up case.</td><td>ID: 1</td><td>Importance Level: High</td></tr>
<tr><td>Primary Actor: Elderly people, Staff, Caregivers</td><td colspan="2">Use Case Type: Detail, Essential</td></tr>
<tr><td colspan="3">Stakeholders and Interests:
Participant: To register and create the account.</td></tr>
<tr><td colspan="3">Brief Description: This use case describes how elderly people, staff and caregivers register for their account.</td></tr>
<tr><td colspan="3">Trigger: Users registration for new account
Type: External</td></tr>
<tr><td colspan="3">Relationships
Association: Old elderly people, New elderly people
Include: Create new user
Extend: null
Generalization: null</td></tr>
<tr><td colspan="3">Normal Flow of Events:
1. New users sign up for login and enter their personal details for data record.
2. The system will create a new account for the sign-up users once the request has been approved.
3. Elderly people will get the new account that approved by the system.</td></tr>
<tr><td colspan="3">Sub Flows: Not applicable</td></tr>
<tr><td colspan="3">Alternate / Exceptional Flows:
2.a The system will display the message of “Please fill in all the field” if the new elderly people do not fill in the required field for the registration.</td></tr>
</table>

Table 3.1.1b: Login Use Case

Old age home mobile application system		
Use Case Name: Login case.	**ID**: 2	**Importance Level**: High
Primary Actor: Elderly people, Staff, Caregivers	**Use Case Type**: Detail, Essential	
Stakeholders and Interests: Participant: To login into the homepage.		
Brief Description: This use case describes how user's login into homepage.		
Trigger: Users login into homepage **Type**: External		
Relationships **Association**: Old elderly people **Include**: null **Extend**: null **Generalization**: null		
Normal Flow of Events: 1. Users enter their email address. 2. Users enter the passwords. 3. Users click the "Log In" button to enter. 4. System will then validate the input. 5. Users successfully log in to the home page.		
Sub Flows: Not applicable		
Alternate / Exceptional Flows: 4.a System will hint the users "Invalid email or password" when users enter invalid input.		

Table 3.1.1c: Homepage Use Case

Old age home mobile application system		
Use Case Name: Home Page case.	**ID**: 3	**Importance Level**: High
Primary Actor: Elderly people, Staff, Caregivers	**Use Case Type**: Detail, Essential	
Stakeholders and Interests: Participant: To explore different feature in the mobile application.		
Brief Description: This use case describes how different users can access different features provided in the mobile application.		
Trigger: Users successfully login to the homepage. **Type**: External		
Relationships **Association**: - **Include**: null **Extend**: Medical record, Chat and Message, Pill Reminder, Emergency Help, Remote Monitoring **Generalization**: null		
Normal Flow of Events: 1. Users click on the drawer menu to access general setting for the account. 2. Staff click on the medical record button to access medical record page. 3. Elderly people, staff, or caregiver click on the chat and message button to access chat and message page. 4. Staff or caregiver click on the pill reminder button to access pill reminder page. 5. Elderly people click on the emergency button to access emergency page. 6. Elderly people, staff or caregiver click on the remote monitoring button to access remote monitoring page. 7. Elderly people, staff, or caregiver click on the statistics to access statistic page.		
Sub Flows: Not applicable		
Alternate / Exceptional Flows: Not applicable		

Table 3.1.1d: User Profile Use Case

Old age home mobile application system		
Use Case Name: User Profile case.	**ID**: 4	**Importance Level**: High
Primary Actor: Elderly people, Staff, Caregivers	**Use Case Type**: Detail, Essential	
Stakeholders and Interests: Participant: To allow users to customize their account setting.		
Brief Description: This use case describes how users can modify their profile settings.		
Trigger: Users click on the drawer menu in the homepage **Type**: External		
Relationships **Association**: - **Include**: null **Extend**: null **Generalization**: null		
Normal Flow of Events: 1. Users click on the "Profile" button in the drawer menu. 2. The system will retrieve users' personal information details from the firebase and display the username, email, and age. 3. Users click on the camera icon. 4. Users choose and upload the picture from their gallery or google drive. 5. The uploaded image successfully updates and set as user profile picture.		
Sub Flows: Not applicable		
Alternate / Exceptional Flows: Not applicable		

Table 3.1.1e: Medical Record Use Case

Old age home mobile application system		
Use Case Name: Medical Record case.	**ID**: 5	**Importance Level**: High
Primary Actor: Staff, Caregivers	**Use Case Type**: Detail, Essential	
Stakeholders and Interests: Participant: To allow staff or caregiver to record the medical record that have taken by the elderly people.		
Brief Description: This use case describes how staff or caregiver can record the medical records.		
Trigger: Staff or caregiver click on the medical record button. **Type**: External		
Relationships **Association**: - **Include**: null **Extend**: null **Generalization**: null		
Normal Flow of Events: 1. Staff or Caregiver being navigates to medical record page. 2. Staff or Caregiver able to view the medical record that have taken by the elderly people. 3. Staff or Caregiver click on the add floating action button at the bottom right corner. 4. A list of elderly people registered in the system will be display. 5. Staff or Caregiver choose one elderly people from the elderly user list. 6. Staff or Caregiver enter medicine name and dosage, then click submit button. 7. Medical record successfully added to the elderly people's medical records.		
Sub Flows: Not applicable		
Alternate / Exceptional Flows: 6a. Staff or Caregiver click on the cancel button, then they will be directed back to medical record page.		

Table 3.1.1f: Chat and Message Use Case

Old age home mobile application system		
Use Case Name: Chat and Message case.	**ID**: 6	**Importance Level**: High
Primary Actor: Elderly people, Staff, Caregivers	**Use Case Type**: Detail, Essential	
Stakeholders and Interests: Participant: To allow all users to chat and message using this platform.		
Brief Description: This use case describes how all the users can communicate and send message and make new friends.		
Trigger: Users click on the chat and message button. **Type**: External		
Relationships **Association**: - **Include**: null **Extend**: null **Generalization**: null		
Normal Flow of Events: 1. Users being navigates to chat and message page. 2. A list of registered users that have been categorized according to their registered role will be display on screen. 3. Users choose one of the users from the list. 4. Users start to communicate and chatting with each other with available functions provided. 5. Users enter the message and click on sent button.		
Sub Flows: Not applicable		
Alternate / Exceptional Flows: 6a. A "Please enter a message" will be pop up to alert users to enter if the users did not enter any message.		

Table 3.1.2g: Pill Reminder Use Case

Old age home mobile application system		
Use Case Name: Pill Reminder case.	**ID**: 7	**Importance Level**: High
Primary Actor: Staff, Caregivers	**Use Case Type**: Detail, Essential	
Stakeholders and Interests: Participant: To allow the staff and caregiver to set the pill reminder for the elderly people.		
Brief Description: This use case describes how staff and caregiver can customize the pill reminder to remind elderly people to take pills.		
Trigger: Users click on the pill reminder icon at the home page. **Type**: External		
Relationships **Association**: - **Include**: null **Extend**: null **Generalization**: null		
Normal Flow of Events: 1. Staff and caregiver being navigates to pill reminders page. 2. A list of added pill reminder will be display on screen. 3. Staff and caregiver can click on the "Add Pill Reminder" button at the center bottom of the page to add the pill reminder. 4. Staff and caregiver required to select the elderly name, enter pill name, dosage, frequencies, date, and time for pill reminder. 5. Staff and caregiver click on the add button to add the reminder.		
Sub Flows: Not applicable		
Alternate / Exceptional Flows: 4a. Staff or Caregiver click on the cancel button, then they will be navigated back to pill reminder page.		

Table 3.1.2h: Emergency Help Use Case

Old age home mobile application system		
Use Case Name: Emergency Help case.	**ID**: 8	**Importance Level**: High
Primary Actor: Elderly people	**Use Case Type**: Detail, Essential	
Stakeholders and Interests: Participant: To allow elderly people to make emergency call or send alert message if something emergency happen.		
Brief Description: This use case describes how elderly people make emergency call or send alert message.		
Trigger: Elderly people click on the emergency call button. **Type**: External		
Relationships **Association**: - **Include**: null **Extend**: null **Generalization**: null		
Normal Flow of Events: 1. Elderly people being navigates to emergency help page. 2. Elderly people click on the emergency call button at the top right of the screen. 3. Elderly people confirm that they want to send the notification. 4. The emergency call is then made.		
Sub Flows: Not applicable		
Alternate / Exceptional Flows: 2a. Elderly people click on the send alert button at the top right of the screen. 2ai. Email app is opened and let the user to send the alert message to their caregiver. 3a. Elderly people does not confirm to send the emergency notification, then they will navigate back to emergency help page.		

Table 3.1.1i: Remote Monitoring Use Case

Old age home mobile application system		
Use Case Name: Remote Monitoring case.	**ID**: 9	**Importance Level**: High
Primary Actor: Elderly people, Staff, Caregivers	**Use Case Type**: Detail, Essential	
Stakeholders and Interests: Participant: To allow the elderly people, staff and caregiver to remote monitoring the elderly people condition and activities.		
Brief Description: This use case describes how staff and caregiver can view the condition and activities perform by the elderly people.		
Trigger: Users click on the remote monitoring icon at the home page. **Type**: External		
Relationships **Association**: - **Include**: null **Extend**: null **Generalization**: null		
Normal Flow of Events: 1. Elderly people, Staff and caregiver being navigates to remote monitoring page. 2. Elderly people can start the new live by filling the name and clicking the start new live button. 3. Staff and caregiver able join the meeting by filling in the live id and name. 4. Users can view each other's and communicate in the live conference.		
Sub Flows: Not applicable		
Alternate / Exceptional Flows: Not applicable		

Table 3.1.1j: Statistics Use Case

Old age home mobile application system		
Use Case Name: Statistics case.	**ID**: 10	**Importance Level**: High
Primary Actor: Elderly people, Staff, Caregivers	**Use Case Type**: Detail, Essential	
Stakeholders and Interests: Participant: To allow the elderly people, staff and caregiver to record and view the health records.		
Brief Description: This use case describes how elderly people, staff and caregiver can view and update the daily health records.		
Trigger: Users click on the statistics icon button at the home page. **Type**: External		
Relationships **Association**: - **Include**: null **Extend**: null **Generalization**: null		
Normal Flow of Events: 1. Elderly people, Staff and caregiver being navigates to statistics page. 2. All users can choose the type of health records they intended to view or add. 3. All the users by default can view their authorized user's health records. 4. Only staff and caregiver are allowed to enter the new daily health records. 5. All users can click on the Graph button to view the trends of the health. 6. All users also allowed to click on "Export to PDF" button to export graph to PDF.		
Sub Flows: Not applicable		
Alternate / Exceptional Flows: Not applicable		

3.1.2 Activity Diagram

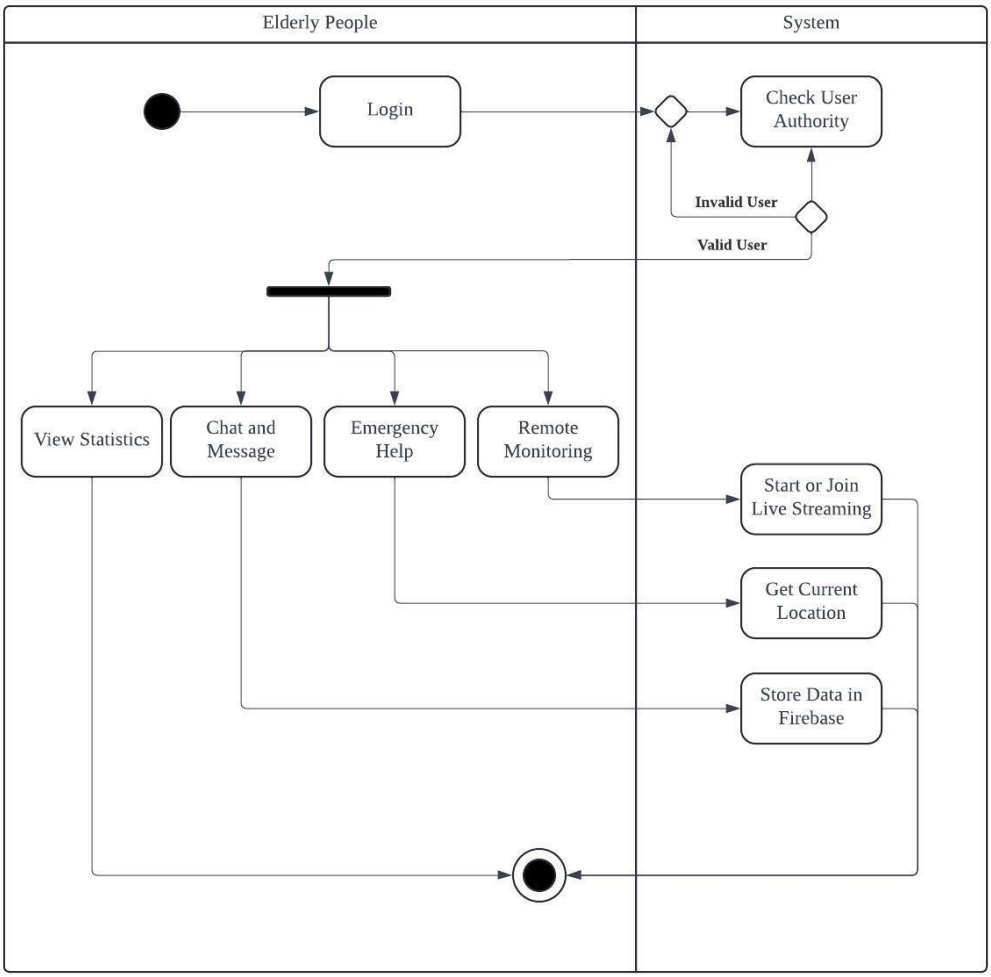


Figure 3.1.2a Activity diagram for elderly people

As shown in *Figure 3.1.2a,* elderly people will with login to the mobile application system. Besides that, the system will check the user authority by verify their email and password. If the email or password entered is incorrect, then the system will request the users to enter again. Upon valid user, system will let them enter the mobile application. Elderly people can use the view statistics function, chat and message function, emergency help function and remote monitoring function in the system. If they choose chat and message function, the messages sent, or retrieve will all done by using Firebase. If the emergency help function is chosen, then it will ask to get the users current locations using Google Maps API. Furthermore, if the remote

monitoring is chosen, then all the operations include start or join the live steaming will all manage by using ZEGOCLOUD.

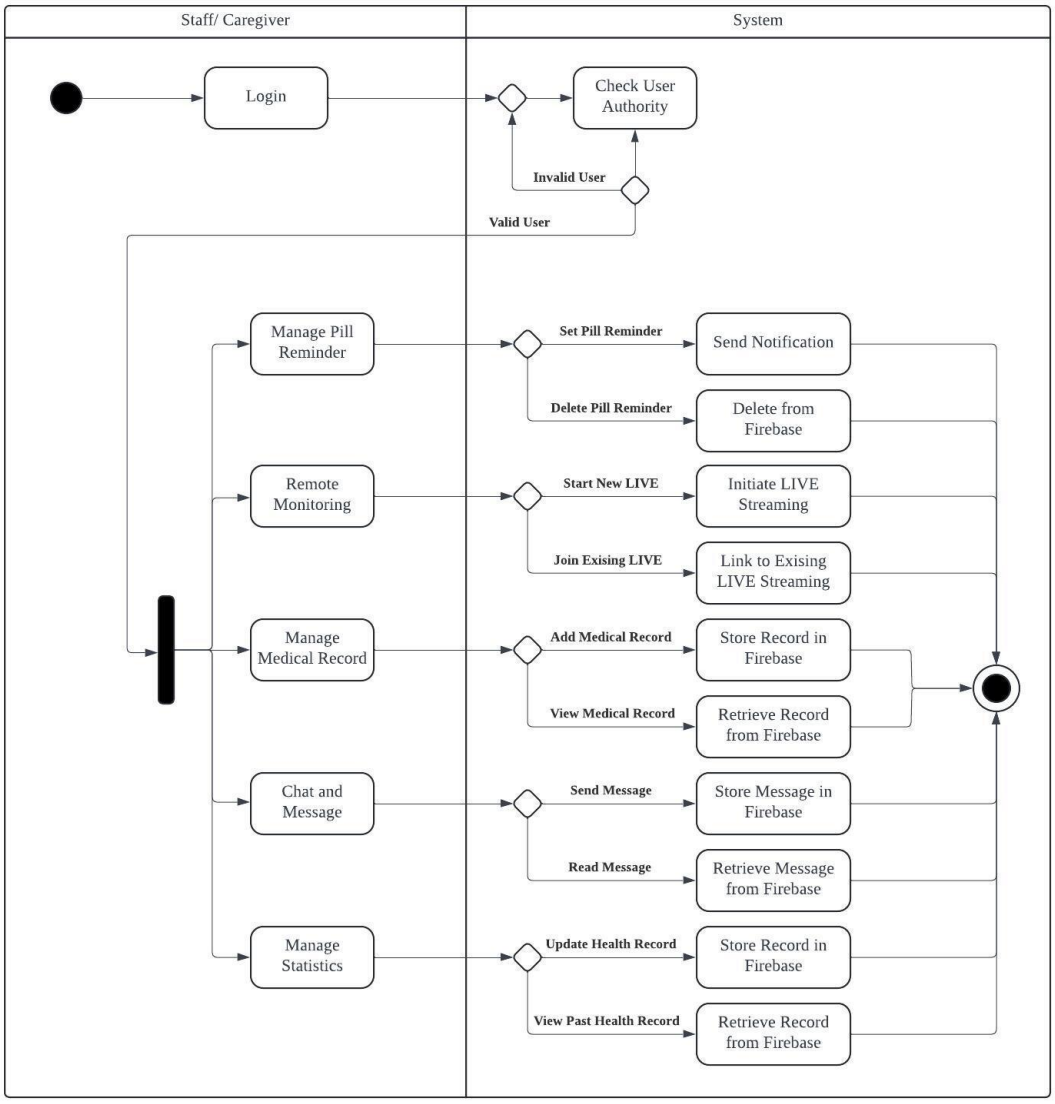


Figure 3.1.2b Activity diagram for staff and caregiver

Based on the *Figure 3.1.2b*, it shows that after staff or caregiver enter the mobile application system, the system will check the user authority. If the users are valid, then they can enter the system to access the functions such as manage pill reminder, remote monitoring, manage medical record, chat and message, manage statistics etc. If the users intend to manage the pill reminder, medical record chat and message and statistic, the system will check what type of operation they need to perform. If they just want to view the data, then the system will just retrieve the corresponding data according to user's decision. On the other hand, if the users want to update or add new

data, then the system will also ensure that all the records in Firebase get update accordingly. Similarly, the remote monitoring for live streaming will all performed by using ZEGOCLOUD. Lastly, staff and caregiver exit from the system.

3.2 Timeline

		Week											
No	**Task Description**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	Improve UI design for existing application												
2	Improve Medical Record function												
3	Improve Chat and Message function												
4	Improve Pill Reminder function												
5	Develop Emergency Help function												
6	Develop Remote Monitoring function												
7	Implement new Statistics function												
8	Fixing bugs and errors												
9	Finalize FYP2 report												

Figure 3.2 Timeline for the project

Figure above shows the whole project timeline for developing this elderly care mobile application. It includes the entire process from designing the user interface to implementing all the functions in the application. Moreover, the process also involves identifying and resolving the bugs found in the application as well as finalizing reports to ensure that the application functions as expected and thoroughly documented for clarity and transparency.

CHAPTER 4

System Design

4.1 System Block Diagram

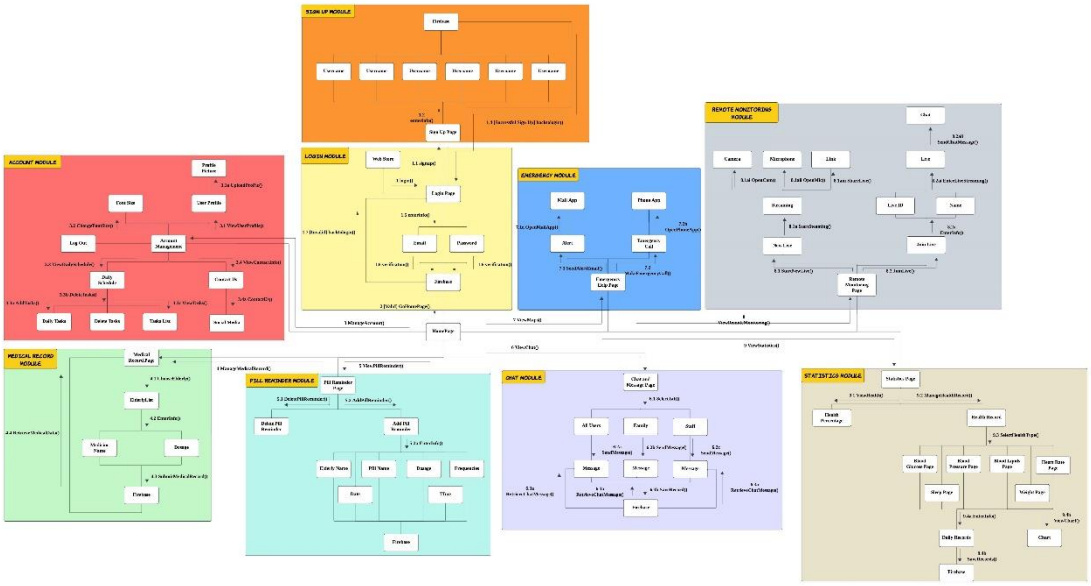


Figure 4.1.1: Block Diagram for old age home mobile application

According to the *Figure 4.1.1* above, it shows total of 9 modules which consist of Login module, Sign-up module, Account module, Medical Record module, Pill Reminder module, Chat module, Emergency Help module, Remote Monitoring module and Statistics Module. This block diagram shows how different module in the system communicate with each other and show their relationship. Based on the *Figure 4.1.1*, it shows that the user journey start with **login module**, users are required to have their unique email and password to login. To have the valid email and password, users are required to go to the sign-up page to do the account registration. Users need to fill in all the compulsory field before they submit their registration form.

Upon successfully login, users will be directed to **homepage** and have different access to the functions of the application. By default, all users will have the access to customize their account setting which is the module highlighted in red in *Figure 4.1.1*. Inside **account management module**, users are free to update their profile picture, change font size, setting daily schedule, contact customer service or logout.

On the other hand, for the **medical record module**, it is the module specifically for staff or caregivers. They able to add the medical record by filling medicine name and dosage. All the medical record will be stored in firebase for database storage. Apart from that, **pill reminder module** also categorized as the module that specification for staff and caregiver only. Staff and caregivers are allowed to enter a list of pill reminder information before they add a new pill reminder for the elderly people. Similarly, the pill reminder details will be saved in the firebase.

Moreover, **chat module** is the module that belongs to all type of the users. Users are free to chat and send message with each other by selecting their username. In addition, the users are separated and categorized according to their registered role during sign up the account. Not only that, but **emergency help** also represent the module that dedicated for elderly people, they are given right to click on the emergency call button when something emergency happen. They also given access to use the send alert feature to send the alert message to their respective caregiver. This feature will automatically open the available mail application in the user's device and fill out the recipient email with the caregiver's email that link with the elderly.

Apart from that, **remote monitoring module** is another module that belongs to all type of users, all the users have the authority to start the new live and join the live. Users can use this function to see each by opening the camera and chat by opening the microphone. Last but not least, the **statistics module** is a specification that allowed the all the users to view their daily health records, the health records including blood glucose, blood pressure, blood lipids, heart rate, sleep and weight. However, only the staff and caregiver user can add the new daily health records. Upon filling in all the records, the pie chart will show around the elderly profile picture about the health percentage of the elderly. The percentage will be refresh upon the record update and clear on a daily basis.

4.2 System Components Specifications

Table 4.2: System Components Specifications Table

Modules	Descriptions	Technical Specifications	Performance Characteristics	Interfaces
Login	Responsible for user authentication and access control.	Interface with secure login mechanisms Encryption protocols for secure transmission of login credentials	Fast authentication process Secure handling of user credentials	Interface with user database for authentication
Sign-up	Handles user registration process	User-friendly interface for registration form. Validation of required fields before submission	Efficient processing of registration request.	Interface with database for storing user information
Account	Upload user profile picture	Allowed users to customize profile settings Options for scheduling and contacting customer service.	Responsive interface for account customization	Interface with database for storing user profile picture and preferences.
Medical Record	Allow staff and caregiver to manage medical records	Integration with database for storing medical records	Efficient data entry for medical records.	Interface with database for medical record storage.
Pill Reminder	Allow staff and caregiver to manage pill reminders for elderly people.	Integration with database for storing pill reminders.	Timely reminders for medication Accurate storing and retrieving reminder information	Interface with database for reminder storage

Chat	Facilitates communication between all users.	Categorization of users based on their roles. Interface for chat and messaging	Real-time messaging capabilities.	Interface with user database for user categorization
Emergency Help	Provide emergency assistance features for elderly users.	Integration with email application for sending alerts function. Integration with phone call application for emergency help function Integration with Google Maps API to show the maps and user current location	Reliable alert transmission to caregivers Quick access to emergency assistance.	Interface with email application for sending alerts message.
Remote Monitoring	Enables users to initiate and participate in live monitoring sessions.	Integration with camera and microphone for live communication	Smooth video and audio steaming.	Interface with camera and microphone for streaming
Statistics	Allows users to view and manage daily health records	Integration with database for storing daily health data	Clear visualization of health statistics by showing the graph. Able to show the elderly's health percentage via pic chart.	Interface with database for health data storage and retrieval.

CHAPTER 5

System Implementation

5.1 Hardware Setup

The hardware involved in this project is personal computer (PC), a laptop and two android mobile devices. The computers is used to applying the mobile application algorithm as well as Firebase. Besides that, the android mobile device is used for testing and deploying this old age home mobile application.

Table 5.1.1a: Specifications of personal computer (PC)

Description	**Specifications**
Model	DESKTOP-3MUT20P
Processor	Intel(R) Core(TM) i5-9400F CPU @ 2.90GHz 2.90 GHz
Operating System	Windows 10
Graphic	NVIDIA GeForce RTX2060
RAM	16.0 GB
Storage	476 GB

Table 5.1.1b: Specifications of laptop

Description	**Specifications**
Model	MSI
Processor	Intel(R) Core(TM) i7-7700HQ CPU @ 2.80GHz 2.80 GHz
Operating System	Windows 10
Graphic	Intel® HD Graphics 630
RAM	16.0 GB
Storage	98 GB

Table 5.1.1c: Specifications of android device 1

Description	Specifications
Model	YAL-L21
Processor	Huawei Kirin 980
Operating System	Android 9.0 (Pie) with EMUI 9.1
Resolution	2340 x 1080
RAM	8.0 GB
Storage	128 GB

Table 5.1.1d: Specifications of android device 2

Description	Specifications
Model	OPPO Reno8T 5G
Processor	QualComm® Snapdragon™ 695 5G Octa-core
Operating System	ColorOS 13
Graphic	2412x1080
RAM	8.0 GB
Storage	256 GB

5.2 Software

Android Studio

Android studio is the official integrated development environment (IDE) for Android applications development. It provides a comprehensive set of tools and function ability to help the developers to create, test and debug Android applications efficiently.

Table 5.2.1: Android Studio Setup

Component	Description
Operating System	Window 10
Development Language	Java
IDE	Android Studio Hedgehog | 2023.1.1 Patch 1
Software Development Kit	SDK 26 and above
Version Control	Git
Database and Backend	Firebase, ZEGOCLOUD and others

Technologies	

5.3 Setting and Configuration

build.gradle (:app)

```
apply plugin: 'com.android.application'
apply plugin: 'com.google.gms.google-services'
apply plugin: 'com.google.android.libraries.mapsplatform.secrets-gradle-plugin'


android {
    compileSdkVersion 34
    buildToolsVersion "33.0.3"

    defaultConfig {
        applicationId "my.edu.utar.evercare"
        minSdkVersion 26
        targetSdkVersion 34
        versionCode 1
        versionName "1.0"
        testInstrumentationRunner "androidx.test.runner.AndroidJUnitRunner"
    }

    buildTypes {
        release {
            minifyEnabled false
            proguardFiles getDefaultProguardFile('proguard-android.txt'), 'proguard-rules.pro'
        }
    }
    buildFeatures {
        viewBinding true
        buildConfig true
    }
```

Figure 5.3.1 Gradle script for Oldage Home Mobile Application part 1

```
    configurations.all {
        resolutionStrategy.force 'androidx.annotation:annotation:1.3.0'
    }

}

dependencies {
    implementation fileTree(dir: 'libs', include: ['*.jar'])
    implementation 'androidx.browser:browser:1.4.0'
    implementation 'androidx.constraintlayout:constraintlayout:2.1.0'
    implementation 'androidx.appcompat:appcompat:1.3.1' // Use the AndroidX appcompat library
    implementation 'androidx.recyclerview:recyclerview:1.2.1'
    implementation 'androidx.annotation:annotation:1.3.0'

    implementation 'com.google.android.material:material:1.5.0'
    implementation 'androidx.appcompat:appcompat:1.4.0'
    implementation 'at.favre.lib:bcrypt:0.9.0'
    implementation 'de.hdodenhof:circleimageview:3.1.0'
    implementation 'androidx.preference:preference:1.1.1'
    implementation 'androidx.viewpager2:viewpager2:1.0.0'
    implementation 'me.relex:circleindicator:2.1.4'

    //Firebase
    implementation(platform("com.google.firebase:firebase-bom:32.1.1"))
    implementation 'com.google.gms:google-services:4.3.10'
    implementation("com.google.firebase:firebase-analytics")
    implementation 'com.google.android.gms:play-services-tasks:18.0.2'
    implementation 'com.google.firebase:firebase-auth:22.0.0'
```

Figure 5.3.2: Gradle script for Oldage Home Mobile Application part 2

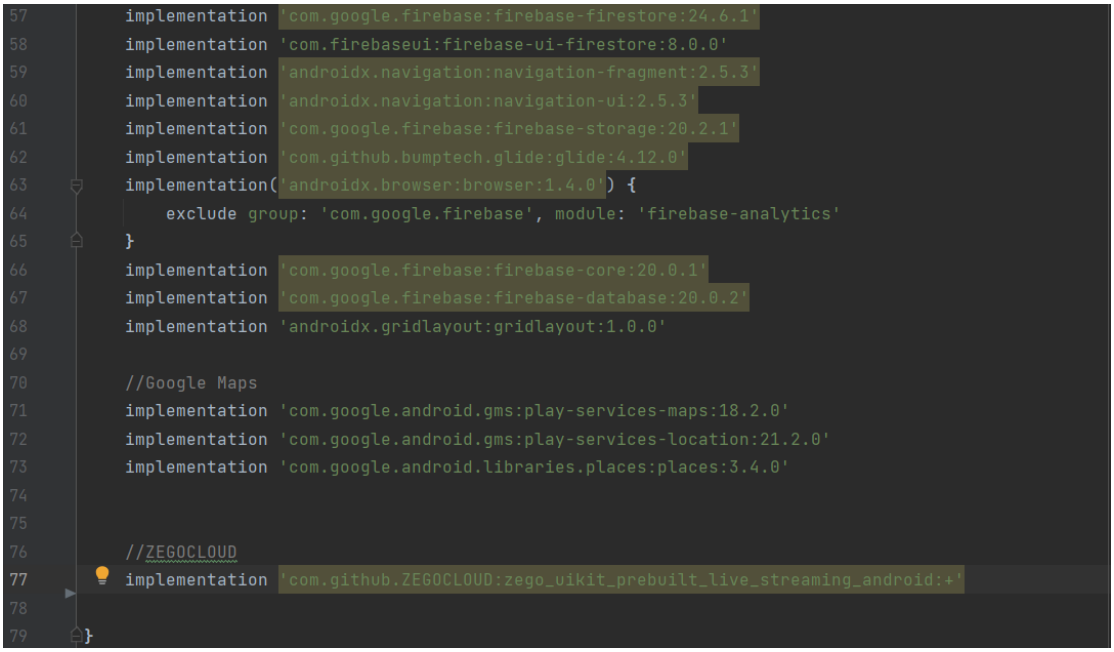


Figure 5.3.3: Gradle script for Oldage Home Mobile Application part 3

According to the figures above, they show the Gradle script for the Oldage Home mobile application. At the outset, there are 3 plugins are being applied in the mobile application which consists of 'com.android.application', 'com.google.gms.google-services' and 'com.google.android.libraries.mapsplatform.secrets-gradle-plugin'. The first plugin is necessary for building the Android applications. The second plugin is used for configuring the Google services required by the application. The third plugin is specifically employed for managing sensitive information such as API keys, pertinent to the Emergency Help function within the application, particularly in relation to the Google Maps Platform integration.

Turning to android configuration, the application is compiled against version 34 of the Android SDK. Furthermore, the Android used the 33.0.3 version build tools as the build system. The 'defaultConfig' block defines vital parameters such as applicationId, minSdkVersion, targetSdkVersion, versionCode and versionName for defining the fundamental configuration of the Android application. Not only that, it also specifies the testInstrumentationRunner for running unit tests.

The next aspect to discuss is dependencies. These include standard Android libraries for UI components such as ConstraintLayout, RecyclerView, and Material

Components. Besides that, it also integrates Firebase services for analytics, Authentication, Firestore database, Storage, and Realtime database operations. Google services dependencies are also included for tasks, maps, and location functionality. Notably, the third-party libraries such as bcrypt for encryption, CircleImageView for circular user profile picture and Glide for image loading are incorporated. Lastly, ZEGOCLOUD plays the main library for live streaming capabilities which used for Remote Monitoring function in the application.

Overall, this Gradle script comprehensively sets up the Android application project, configuring essential settings, enabling the important features, and including dependencies that are crucial for the app's functionality.

5.4 System Operation (with screenshot)

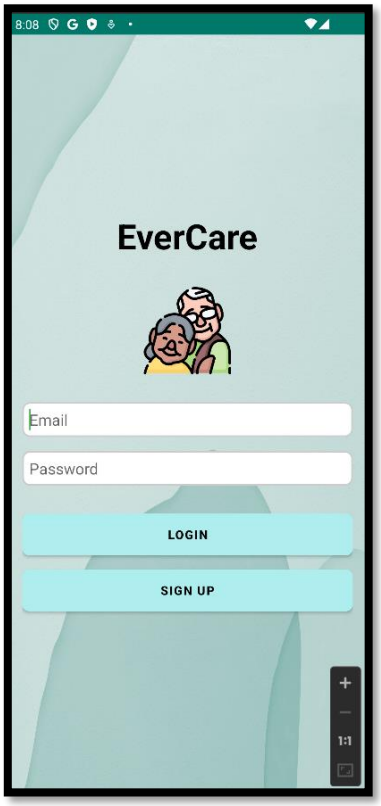


Figure 5.4.1 Login Page

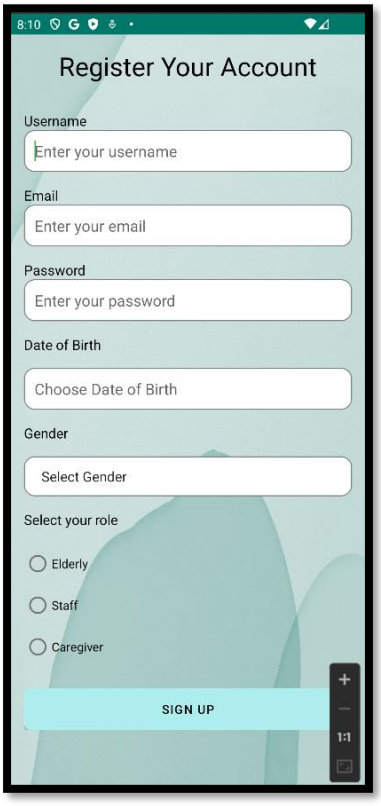


Figure 5.4.2 Sign Up Page

Based on the *Figure 5.4.1 Login Page*, it shows the UI for login page of the application. When the user first launches the old age home application, the system will first navigate the user to this login page for users to perform login account. The login page consists of two text fields which ask the users to enter their registered email and password. Besides that, there also contains two buttons below of the text fields namely login and sign up. If the user clicks on the login after filling in their email and password, the system will compare their inputs with the Authentication information stored in the firebase. If the inputs match with the records in the firebase, then the users will be direct to the homepage. However, if the user does not fill in any information to login, then the system will prompt the message "Invalid email or password" to alert user to enter the information correctly.

On the other hand, the application is set to only allows the registered user to login, therefore if the user do not sign up a new account, then they will need to click on the sign-up button as shown in *Figure 5.4.1 Login Page* to do the account registration. Upon clicking the "Sign Up" button, the user will be directed to sign up page as shown in *Figure 5.4.2 Sign Up Page*. The user required to fill in all the personal information such as username, email, password, date of birth, gender and also role of the users. There are 3 types of roles of the users namely Elderly, Staff or Caregiver. It is worth to noting that, if the user select caregiver as their role, then an addition existing elderly people list will be prompt out to let the caregiver to choose. They are required to choose their elderly parent name so that they can link their account with their parent account. After filling in all the information, then the "Registration Successfully" message will be pop out to indicate the users account created successfully.

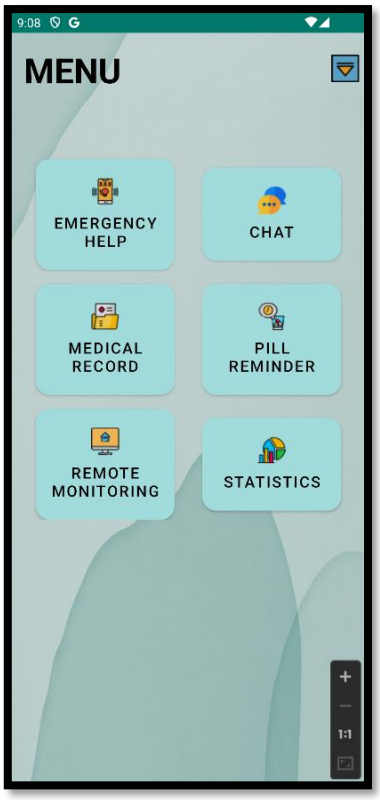


Figure 5.4.3 Home Page

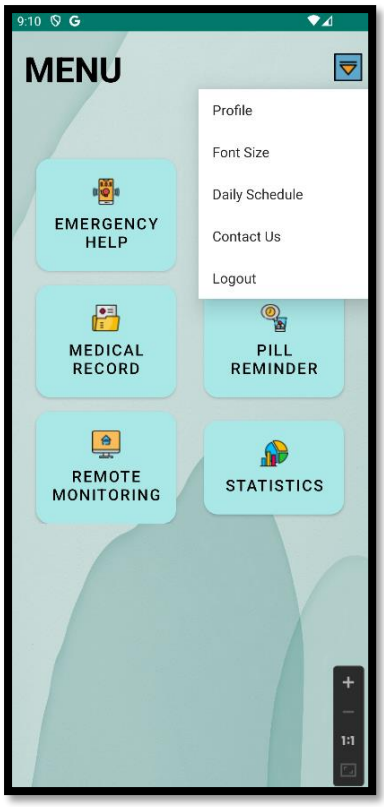


Figure 5.4.4 Drawer Menu

After user successfully login with their registered email and password, then they will be directed to Homepage as shown in *Figure 5.4.3 Home Page*. Different roles of users will have different access or authority to use the function provided in the application. Below table shows the functions available for different role of users:

Table 5.1: Functions availability for different role of users

Roles	**Function available**
Elderly	Emergency Help, Chat, Remote Monitoring, Statistics
Staff	Medical Record, Pill Reminder, Remote Monitoring, Statistics
Caregiver	Medical Record, Pill Reminder, Remote Monitoring, Statistics

Although the users can access the same function, but they will also have different access to the certain functions. Moreover, users can access various functions by clicking on the image buttons show on screen as shown in *Figure 5.4.3 Home Page*. Additionally, at the top right corner, a drawer menu provides access to general

account settings, including options such as profile settings, font size adjustments, daily schedule management, contact information, and ability to log out.

Figure 5.4.5 Profile Page

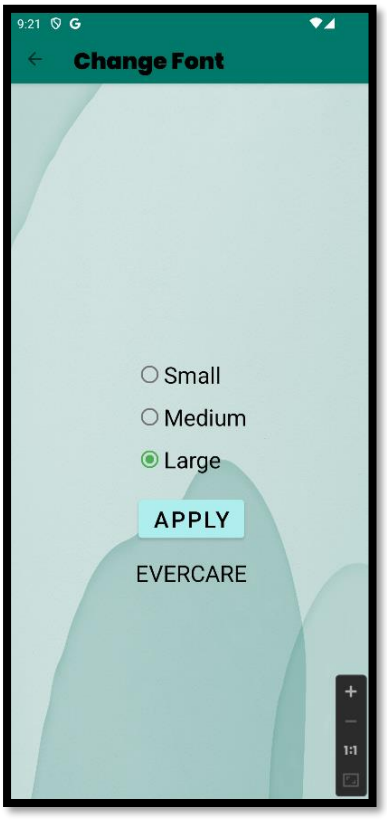


Figure 5.4.6 Font Size Page

When the user clicks on the profile in the drawer menu, they will be navigated to the user profile page as shown in *Figure 5.4.5 Profile Page*. User will be able to view their basic information which include name, email and age. Users are also allowed to upload their profile picture from their gallery or google drive by clicking on the camera icon at the bottom right of their profile picture. On the contrary, the user also allowed to customize font size in the mobile application. There are 3 options namely small, medium and large for user to apply as shown in *Figure 5.4.6 Font Size Page*.

Figure 5.4.7 Daily Schedule Page

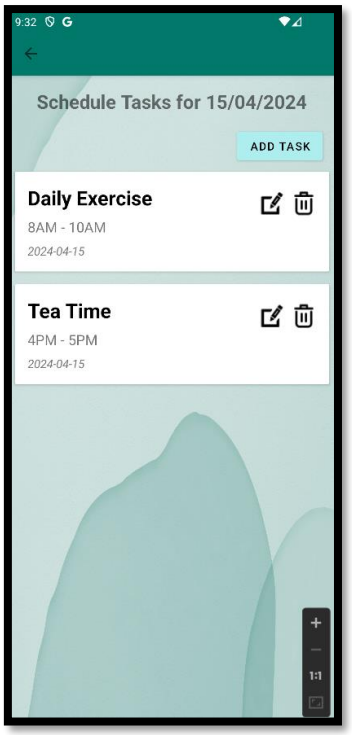


Figure 5.4.8 Manage Scheduled Task Page

Figure 5.4.9 Contact Us Page

Transitioning to daily schedule page which is a subfunction in the drawer menu. This function is mainly developed for all type of users to record daily schedule tasks. It first displays a calendar as shown in the *Figure 5.4.7 Daily Schedule Page* on screen, then the user able to choose the date they intend to schedule the task. After chosen the date, the user being navigated to next page as shown in *Figure 5.4.8 Manage Scheduled Task Page* to add the new tasks for that particular date. The scheduled record will be automatically store into real-time firebase and then display on screen according to the date chosen by the user. An important aspect is that this daily schedule task can be view by all registered users at this stage. This feature facilitates easier announcement management for staff members. Not only that, but we also provided the users all the contact information such as phone number, email, and different social media as shown in *Figure 5.4.9 Contact Us Page*. In this case, users have the option to provide feedback or comments when they encounter any difficulties or issues.

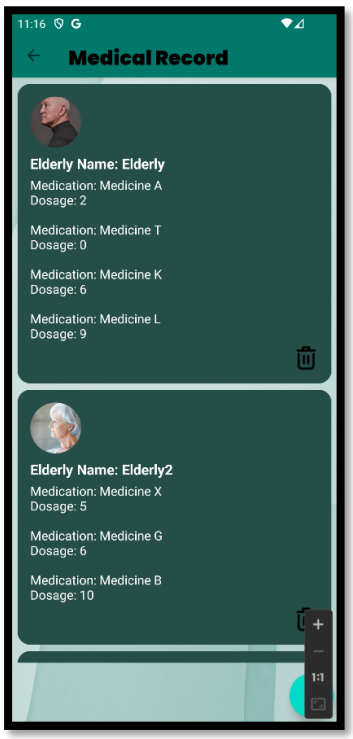


Figure 5.4.10 Medical Record Page

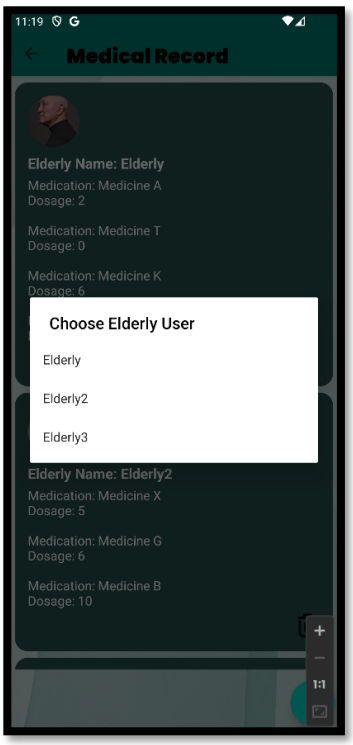


Figure 5.4.11 Choose Elderly User Dialog

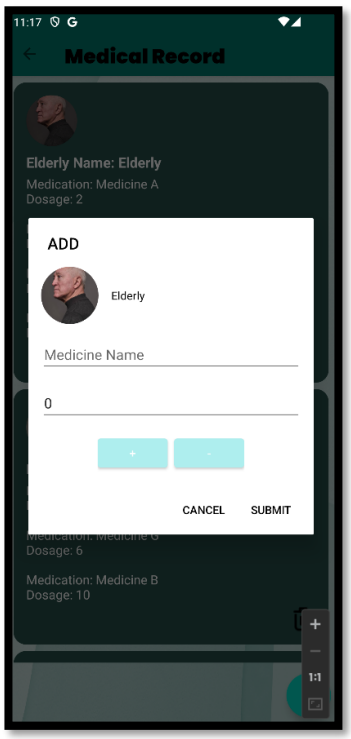


Figure 5.4.12 Add Medical Record Dialog

In continuation, Medical Record function is a function that dedicated for staff and caregiver users, providing them with a centralized platform to manage and access essential health information for elderly individuals under their care. If the user intends to add new medical record for the user, they can just click on the floating action button at the bottom right corner on the page as shown in *Figure 5.4.10 Medical Record Page*. After that, the existing registered elderly list will be listed as shown in *Figure 5.4.11 Choose Elderly User Dialog*, users can simply choose the elderly individual they want to add. Subsequently, the Add medical record dialog will be prompt out to let user fill in the medicine name and dosage. Once the information is filled out and submitted, the medical record is securely stored in firebase and dynamically displayed on the screen, tailored to each elderly individual. Essentially, caregiver will only able to view and edit the record of their registered elderly parent name during registration.

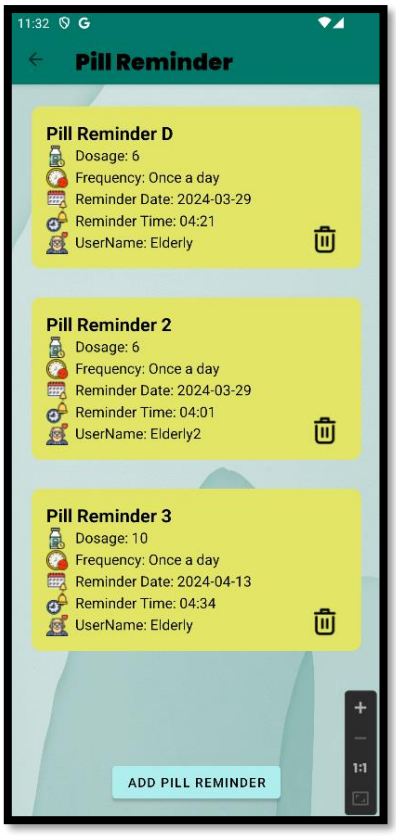


Figure 5.4.13 Pill Reminder Page

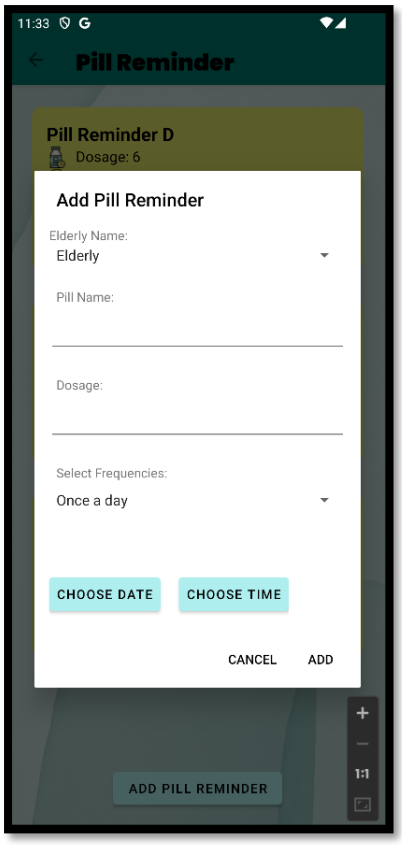


Figure 5.4.14 Add Pill Reminder Dialog

Turning to the next function, pill reminder will be another easy-to-use function that enable staff and caregiver to set the pill reminder for the elderly people. Similarly, staff members have the capability to view and edit pill reminders for all elderly individuals under their care. However, caregivers are granted access to view and edit pill reminders exclusively for the elderly individuals they are linked to as parents. Upon clicking the "Add Pill Reminder" button positioned at the center bottom of the screen, as depicted in *Figure 5.4.13 Pill Reminder Page*, a modal dialog labelled as the "Add Pill Reminder", showcased in *Figure 5.4.14 Add Pill Reminder Dialog* will emerge, providing users with an intuitive interface to input and configure new medication reminders. Users will be required to choose the elderly by selecting the elderly username from the list, fill in the pill name, dosage, frequencies and the date and time for the reminder.

Figure 5.4.15 User Selection Page

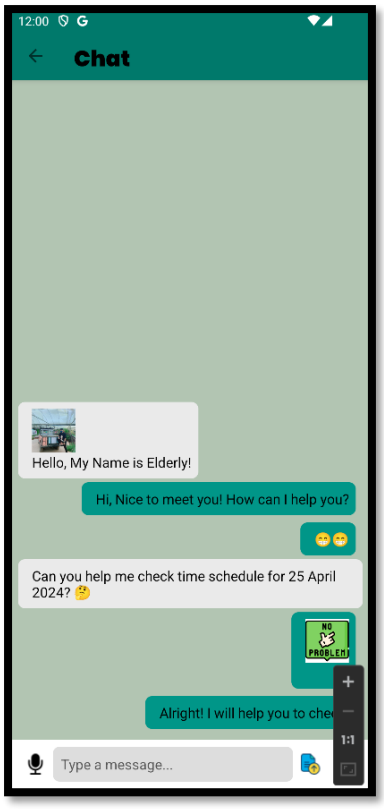


Figure 5.4.16 Chat and Message Page

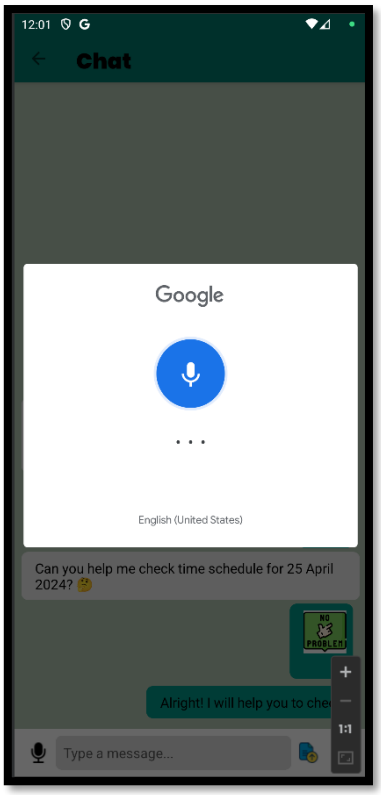


Figure 5.4.17 Voice Recognition Dialog

Figure 5.4.18 Zoomed in picture

On the contrary, chat function in the application will be given access to every user. Users will be categorized based on their roles (All users, Family, or Staff), facilitating streamlined access to desired user profiles, as illustrated in *Figure 5.4.15 User Selection Page*. Utilizing tabs located above, users can seamlessly navigate through different categories, enhancing efficiency in locating their intended target users. Shifting focus to the chat room interface depicted in *Figure 5.4.16 Chat and Message Page*, users initiate conversations by inputting messages directly into the text field provided. Elderly individuals also can use the additional option to utilize voice recognition functionality by selecting the microphone icon situated at the left side of the input field, activating Google Speech for converting the speech to text as shown in *Figure 5.4.17 Voice Recognition Dialog*. Expanding upon the chat functionality, users are now empowered to upload images directly within the conversation. Furthermore, an enhanced feature enables users to zoom in on uploaded images directly within the chat interface as shown in *Figure 5.4.18 Zoomed in Picture*, offering a seamless and comprehensive communication experience.

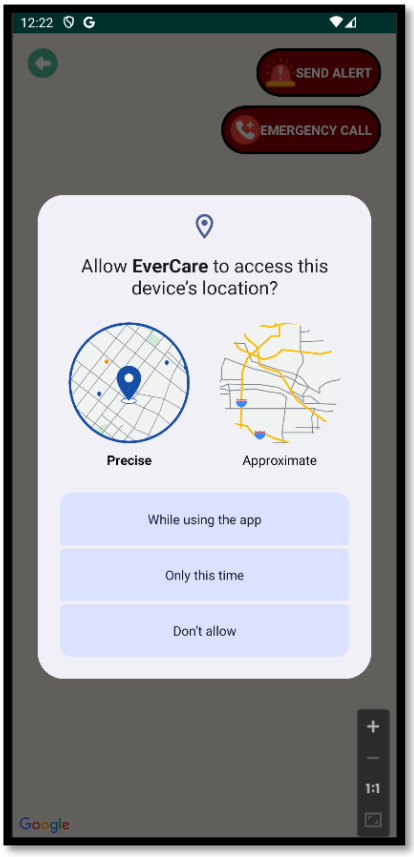


Figure 5.4.19 Location Permission

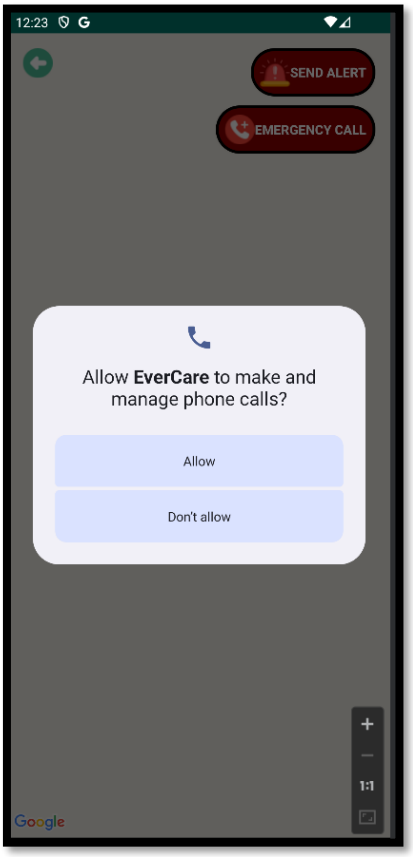


Figure 5.4.20 Phone Call Permission

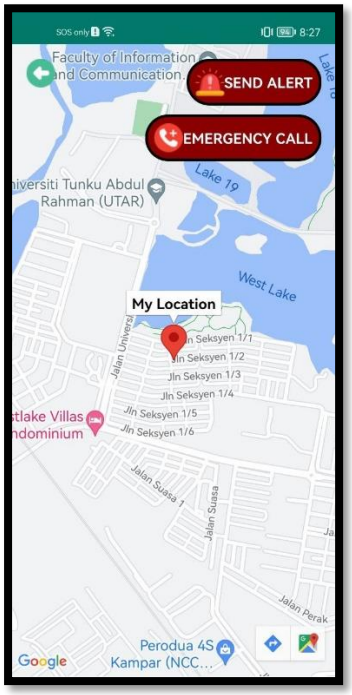


Figure 5.4.21 User Current Location

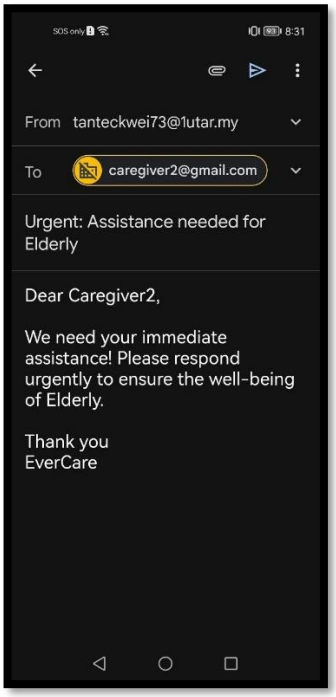


Figure 5.4.22 Send Alert Message

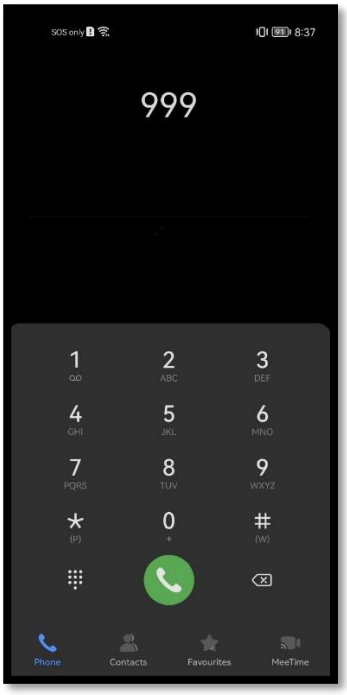


Figure 5.4.23 Emergency Call

Apart from that, Emergency Help function is vital addition to the application, specifically designed to assist elderly individuals in seeking urgent help from caregivers or hospitals when needed. Upon the initial use of this function, the application will prompt users to grant permission to access their device location and enable phone call capabilities as shown in *Figure 5.4.18 Location Permission and Figure 5.4.19 Phone Call Permission*. These permissions are crucial for accurately pinpointing the user's location in case of an emergency and enabling direct communication with caregivers for immediate assistance. After granting permission for location access, the app will identify the user's current location and display it with a marker, as illustrated in *Figured 5.4.21 User Current Location*. For elderly individuals in need of urgent assistance, they can utilize the "Send Alert" button located at the top right corner of the screen, as depicted in *Figure 5.4.22 Send Alert Message*. Additionally, there is an emergency call button positioned below the "Send Alert" button, enabling users to make an emergency call to the hospital. Upon clicking the emergency call button, the app will open the phone application on the

user's device, prompting them to confirm the call by clicking the call button. This streamlined process ensures quick and efficient access to emergency assistance.

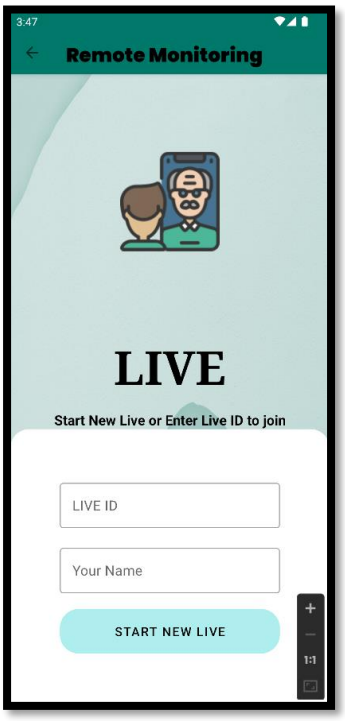


Figure 5.4.24 Remote Monitoring Page

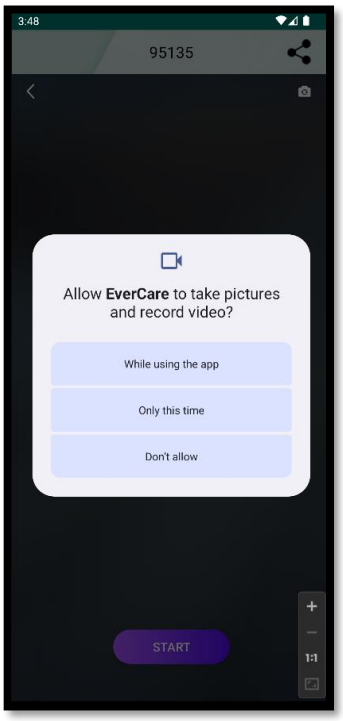


Figure 5.4.25 Camera Permission

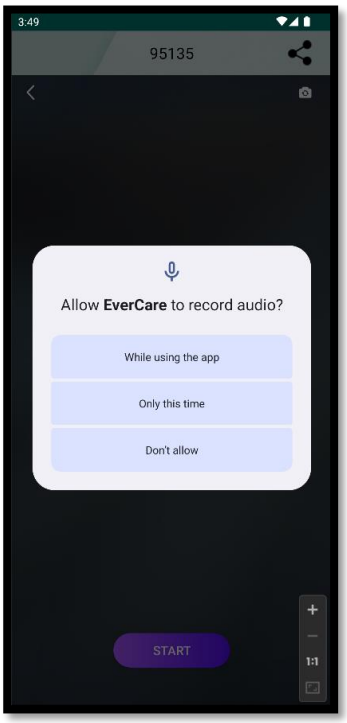


Figure 5.4.26 Microphone Permission

Another important innovation for this application is Remote Monitoring feature. Upon clicking the "Remote Monitoring" button on the Home Page as illustrated in *Figure 5.4.3 Home Page*, users will be seamlessly redirected to the Remote Monitoring Page, depicted in *Figure 5.4.24*. Here, they can initiate new live streams or join existing ones. If a user inputs their name without specifying a live ID, the system will automatically commence a new live stream. Conversely, if the user provides a live ID initiated by another user, they will gain access to that specific live stream. This intuitive system ensures a smooth and straightforward experience for users, facilitating both the initiation and participation in remote monitoring activities. Furthermore, as part of the setup process, users will be prompted to grant video and microphone permission to the application as shown in *Figure 5.4.25 Camera Permission* and *Figure 5.4.26 Microphone Permission*. These permissions are necessary to enable the app to utilize the device's camera and microphone for video streaming and communication purposes during remote monitoring sessions.

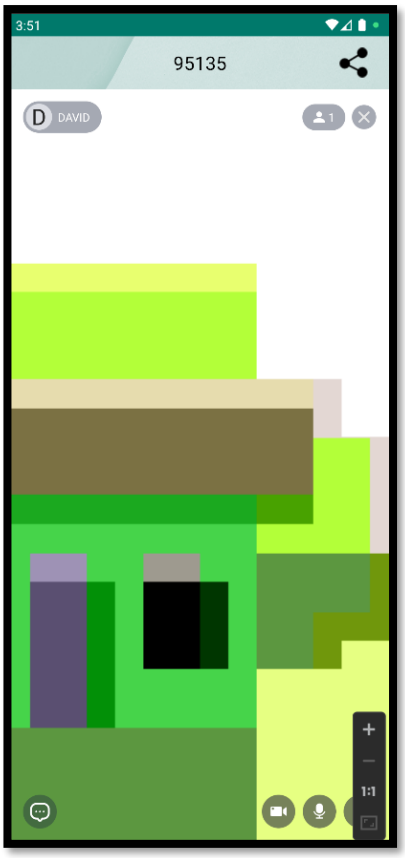


Figure 5.4.27 Live Streaming Page

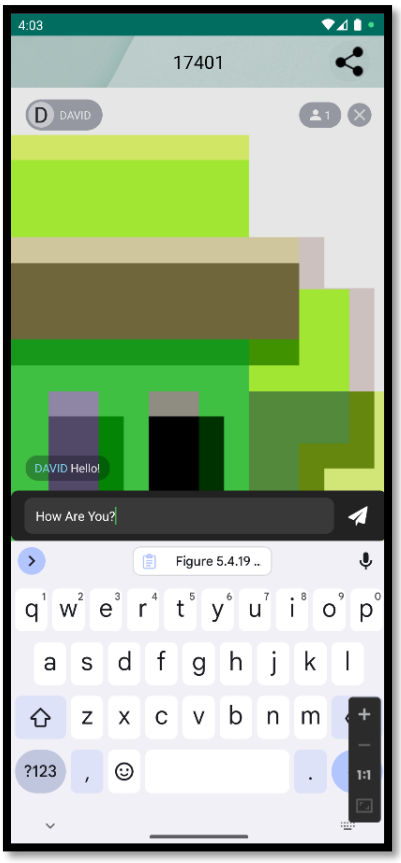


Figure 5.4.28 Chat in Live

Likewise, users can initiate live video streaming by activating their device's camera or microphone, as depicted in *Figure 5.4.27 Live Streaming Page*. Additionally, the application offers a chat room feature, enabling users to engage in text-based communication, as shown in *Figure 5.4.28 Chat in Live* during live sessions. This comprehensive approach facilitates real-time interaction and collaboration among participants, enhancing the overall user experience during live streaming sessions.

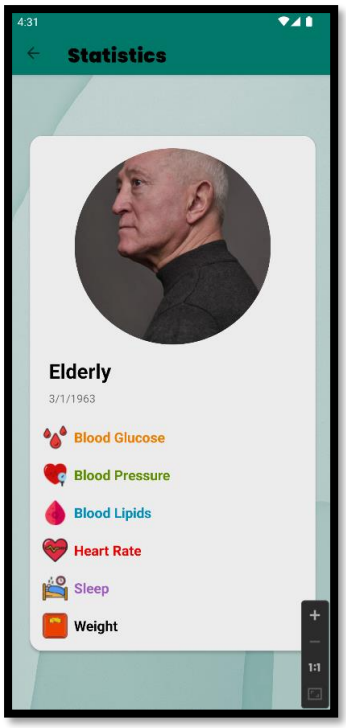


Figure 5.4.29 Statistics Page

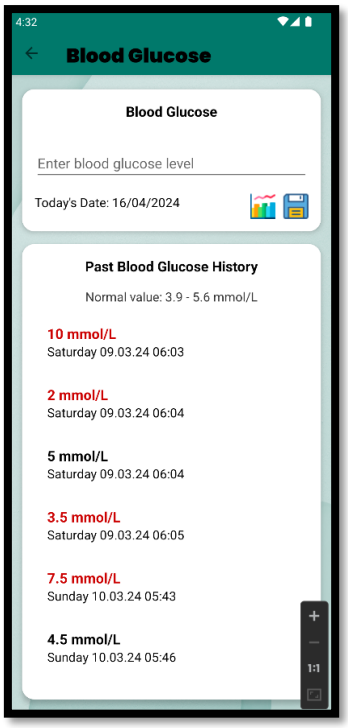


Figure 5.4.30 Add New and View Past Health Record

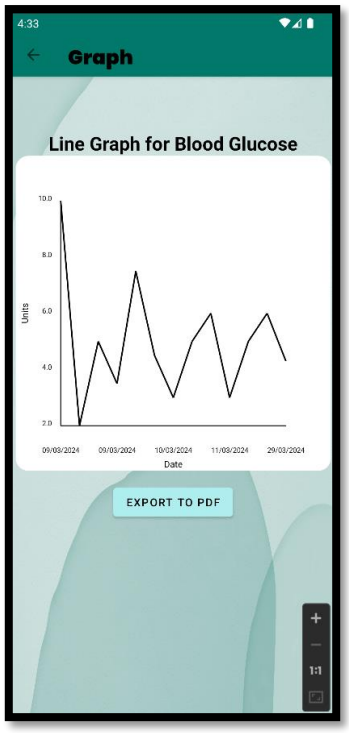


Figure 5.4.31 Graph Page

A key function added to this application is the Statistics function, designed to meticulously track the daily health records and conditions of elderly individuals. This feature encompasses 6 key health metrics namely Blood Glucose, Blood Pressure, Blood Lipids, Heart Rate, Sleep, and Weight as shown in *Figure 5.4.29 Statistics Page*. Staff and caregivers have the flexibility to select any of these health records and access the corresponding page to input new data. Notably, abnormal records are highlighted in red font as illustrated in *Figure 5.4.30 Add New and View Past Health Record*, drawing immediate attention to any abnormalities from normal values and prompting timely intervention or follow-up actions. Additionally, the application provides a line graph visualization feature, accessible when users input their daily health records, as demonstrated in *Figure 5.4.31 Graph Page*. This graph offers a visual representation of the recorded health metrics over time, empowering users to track trends identifying patterns, and monitor changes in their health status effectively. Moreover, users can conveniently export the graph as a PDF file by clicking on the "Export to PDF" button. This functionality enables users to save the graph directly to their device's downloads folder for easy access and future references.

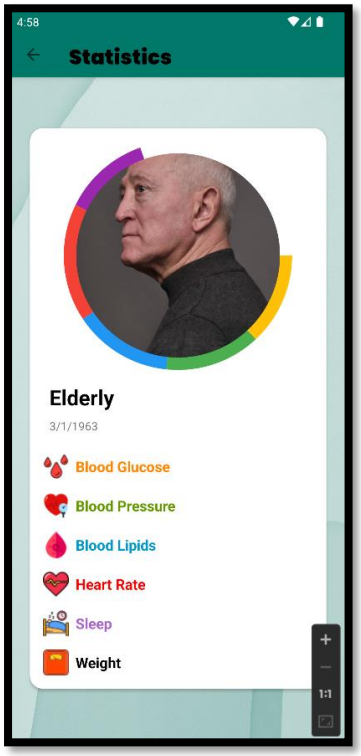


Figure 5.4.32 Health Percentage

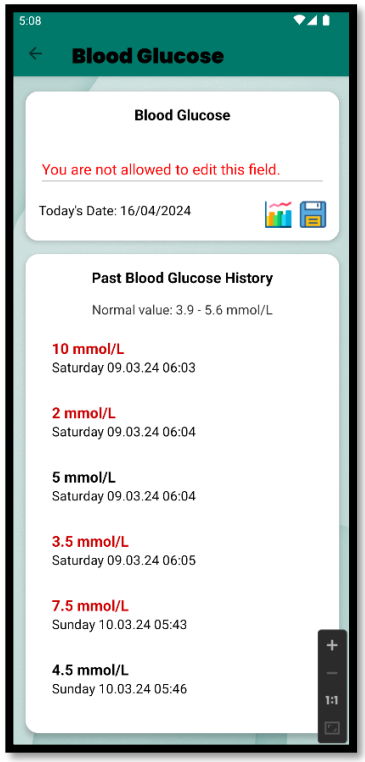


Figure 5.4.33 Function Restriction for Elderly User

It is crucial to note that once users have filled in the first five elements (Blood Glucose, Blood Pressure, Blood Lipids, Heart Rate, Sleep), the health percentage, depicted in a pie chart, will automatically appear around the elderly individual's profile picture as shown in *Figure 5.4.32 Health Percentage*. This streamlined process eliminates the need for users to re-enter statistics page after inputting these initial elements, providing a seamless and efficient user experience. The health percentage will be dynamically updated on a daily basis, recalculating based solely on today's health record values. This ensures accuracy and relevance by considering the most recent data. As users' health records align more closely with standard values, the corresponding percentage will increase accordingly. This real-time feedback mechanism motivates users to maintain health habits and monitor their well-being consistently. To prioritize safety and accuracy, only staff or caregivers are granted permission to input health details into the system. This ensure that the data entered is reliable and consistent. Conversely, elderly users are only allowed to view their past health records and graphs for different health metrics as shown in *Figure 5.4.33*

Function Restriction for Elderly User. This approach not only safeguards the integrity of the data but also empowers elderly users to monitor their health progress without the risk of inadvertent changes to their records. In addition, caregivers are authorized to edit the values for the elderly individuals they are linked to as parents only. This restricted access ensures that caregivers can responsibly manage and update the health records of their designated care recipients, maintaining confidentiality and accuracy within the system.

5.2 Implementation Issues and Challenges

Implementing the comprehensive functionality outlined for the elderly care application involves addressing various technical and operational challenges. One significant challenge pertains to ensuring seamless integration and compatibility across different devices and operating systems. Developing feature such as Chat and Message requires precise attention to detail to ensure that the images uploaded by the users are saved in a correct path and method, so that the images can be displayed correctly for different type of android devices.

Another critical aspect is data security and privacy. Safeguarding sensitive information, such as health records and personal details, against unauthorized access or breaches is paramount. Implementing encryption protocols and access controls are essential but complex tasks that require careful planning and implementation. For instance, implementing strict access controls ensures that only authorized staff or caregivers are granted permission to edit health records or personal information for elderly individuals.

Furthermore, designing user-friendly interface that caters to the needs of elderly individuals, caregivers and staff presents its own set of challenges. Balancing simplicity with functionality, especially for features like remote monitoring and health record management, requires extensive user testing and iterative design refinement to ensure accessibility and usability for all users, regardless of their technical proficiency. To give a case in point, the user interface incorporates various icons strategically placed to enhance user comprehension and navigation. This design choice improves

usability by providing intuitive visual cues, making it easier for users to interact with the application and access its features effortlessly.

Additionally, ensuring the reliability and responsiveness of features like real-time chat and remote monitoring involves overcoming technical problems such as network latency, bandwidth constraints, and device compatibility issues. Implementing efficient error handling mechanisms and fallback strategies to gracefully handle connectivity issues or system failures is crucial for maintaining a seamless user experience.

Moreover, integrating third-party services and APIs, such as Google Speech voice recognition and Firebase for real-time data synchronization, introduces potential dependencies and interoperability challenges. It required frequent testing and validation to mitigate risk associated with service disruptions or compatibility issues. As a case in point, it is imperative to ensure that any deletion or modification made to daily schedule tasks or medical records is accurately reflected in firebase. This ensures data integrity and consistency across the platform, allowing for seamless synchronization and access to updated information for caregivers and staff members.

Overall, addressing these implementation issues and challenges requires a multidisciplinary approach, encompassing technical expertise and user-centric design principles. By proactively identifying and mitigating these challenges, we can ensure that the successful implementation and deployment of a robust and reliable elderly care application that meets the needs for different type of users.

5.6 Concluding Remark

In conclusion, the development and implementation of an elderly care application encompass a wide area of features and functionalities aimed to enhance the quality of life, health monitoring, and support for elderly individuals and their caregivers. From remote monitoring and live streaming capabilities to real-time health tracking and communication tools, each component serves a vital role in facilitating

comprehensive and personalized care. However, this endeavour is not without its challenges, ranging from technical complexities and data security concerns to user accessibility and regulatory compliance. Nevertheless, by addressing these challenges with persistence, innovation, and a commitment to user-centric design principles, we can create a robust and reliable platform that empowers caregivers and supports the well-being of elderly individuals. With continuous refinement and adaptation to evolving needs and technologies, the elderly care application stands poised to make a meaningful impact in improving the lives of its users and promoting health and wellness in aging populations.

CHAPTER 6

System Evaluation and Discussion

6.1 System Testing and Performance Metrics

6.1.1 Functional Testing

Functional Testing is one of the testing's that used to ensure that each feature of the application performs as expected and meets the specified requirements. This includes verifying that users can successfully register, log in, input health records, view past data, initiate live steams etc. According to [12], functional testing is described in which the design of a program is used to generate functional test data.

Figure 6.1.1a Existing registered user in Firebase Authentication

Figure 6.1.1b Functional Testing

Log In Module

- It ensures that only allowed the user that have registered their account to log into the system.
- This indicates that the user registration function is functioning well as it will comparing the email entered by the user with the registered email in the Firebase Authentication.

6.1.2 Performance Testing

Apart from that, performance testing verify that the system application meets specific performance efficiency objectives [11]. It assesses the performance of the application under various conditions, such as different device types and network speeds. Measure response times for different operations, including data retrieval, live streaming, and communication, to identify any bottlenecks or areas for optimization.

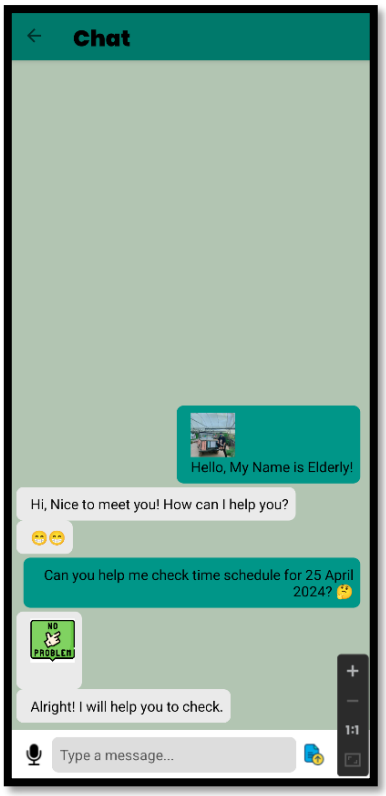


Figure 6.1.2a Chat Room in Android Studio Emulator

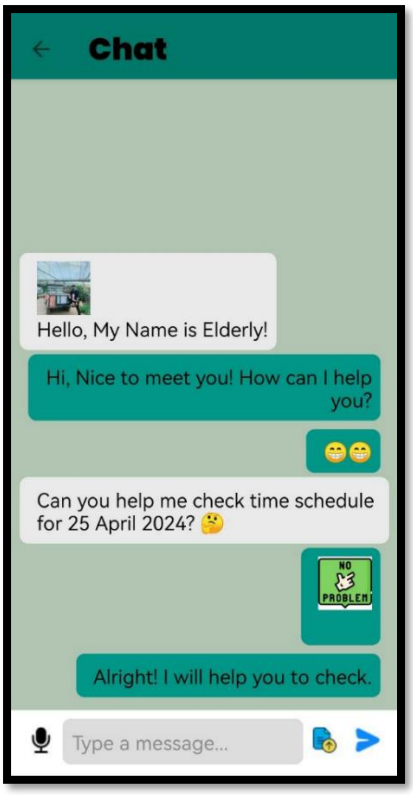


Figure 6.1.2b Chat Room in Android Device 1

By comparing both types of devices, users on either side can view images or pictures uploaded by the other party. This indicates that the way to store and retrieve the images is correct. Therefore, we can conclude that the function of uploading the graphics in chat is performing as expected.

6.1.3 Security Testing

On the other hand, security testing used to detect and discourse potential flaws that could compromise the confidentiality, integrity, or availability of user information. Based on [2], security testing aims to maintain the confidentiality of the data, to check against any information leakage and to maintain the functionality as intended.

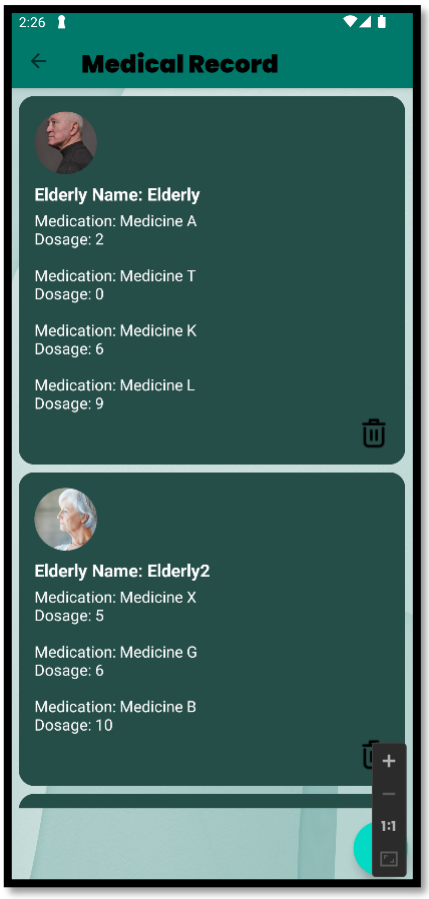


Figure 6.1.3a Staff Perspective and Authority on Medical Records

Figure 6.1.3b Caregiver Perspective and Authority on Medical Records

By comparing both type of user's authority in medical record function, we can analyze that staffs have the authority to view and add the new medical record for all the elderly individuals as shown in *Figure 6.1.3a Staff Perspective and Authority on Medical Records*. However, caregiver will only be able to edit their elderly parent which they linked during registration. The same concept will be applied to Pill Reminder function and Statistics as well.

6.1.4 Usability Testing

Once a product is created, feedback can be collected through usability testing, the ultimate aim of which is to test and evaluate the use case of the product from the user's perspective by identifying problems that may arise when users try to work with it and some level of satisfaction or lack thereof with its functionality. A common practice in usability testing is to obtain feedback from representative users on various

aspects such as layout and organization, navigation features, and general ease of use of the system. Based on [16], usability testing refers to a technique used to identify potential issues experienced by individuals while using a particular item. This technique is primarily aimed at ensuring that a target audience or user group can perform their tasks reliably, effectively, and satisfactorily without undue difficulties. The process starts by systematically observing the system's real users interact with the system and collecting information about specific features that they find easy or difficult to use. Usability testing provides valuable insights into user behaviour and preferences for developers, leading to iterative design enhancements that help deliver a better overall user experience.

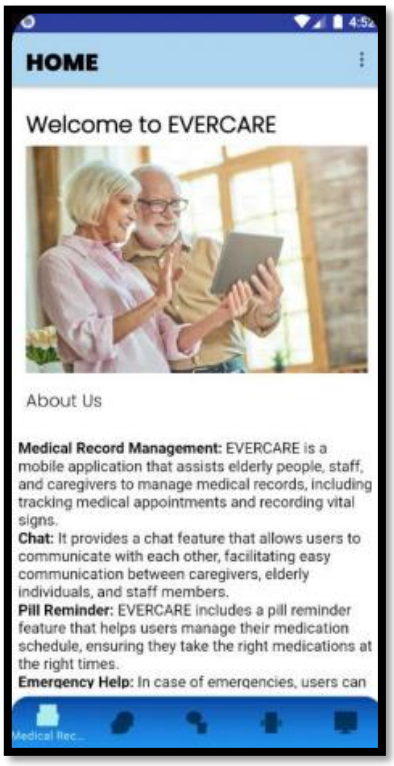


Figure 6.1.4a Old Home Page User Interface

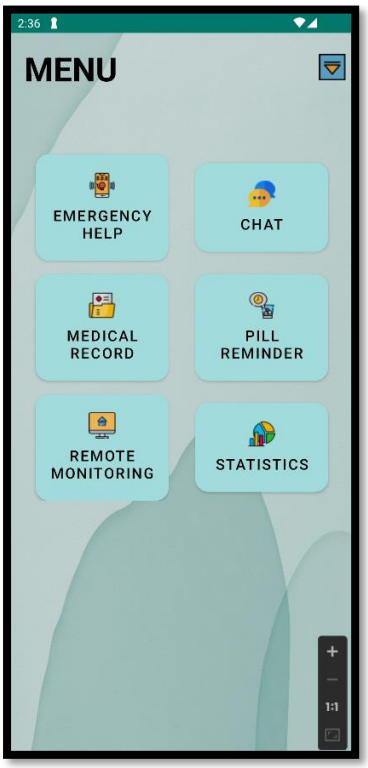


Figure 6.1.4a New Home Page User Interface

By contrasting both user interface design for old and new home page user interfaces, we observe that the buttons for navigating to different pages have been enlarged, likely to facilitate ease of use for elderly users. The navigation buttons have transitioned from the bottom navigation bar to a centralized block image button at the center of the screen.

6.1.5 Exception Handling

As mentioned in [4], one approach to ensure software robustness is by embedding fault tolerance mechanisms into code. Exception handling can be a good method since it guarantees that the program will continue working even if something goes wrong. Testing, however, takes place only at the level of verification and analysis, which explores how well an application deals with error conditions and handles unexpected errors or exceptions, avoiding the situation where an error is seen by a user. Such systematic testing would enable programmers to find probable bugs or failures within specific cases of erroneous input data and to eliminate them in order to make their programs more stable and reliable.

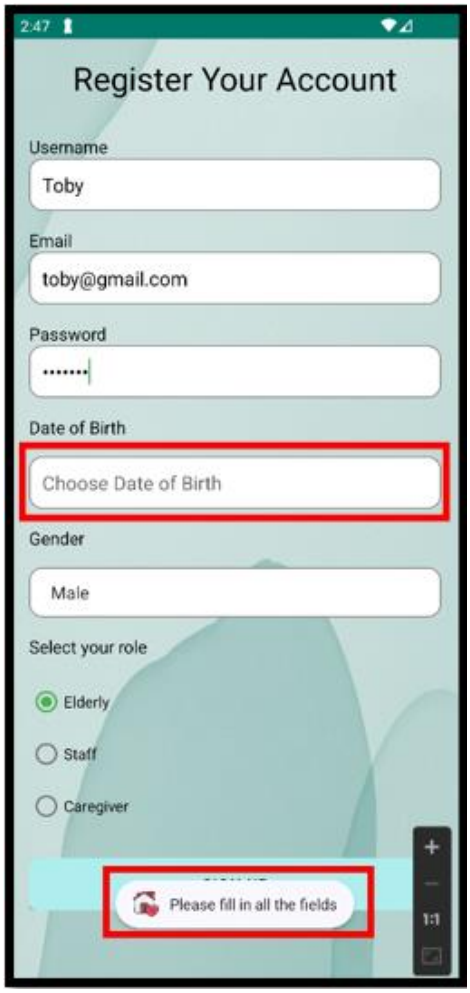


Figure 6.1.5a Error Handling for Sign Up Page

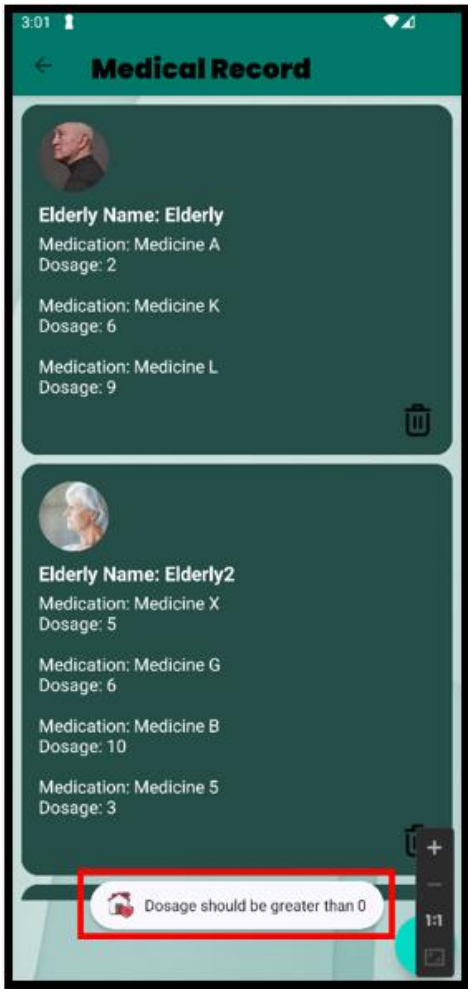
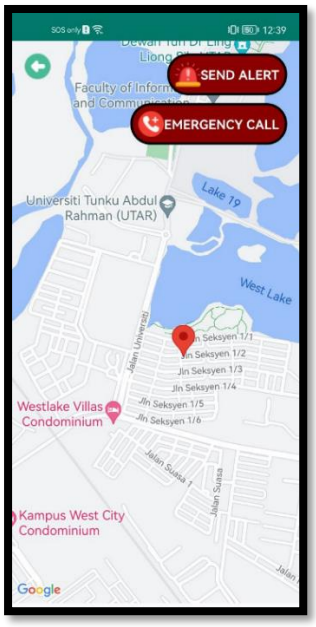


Figure 6.1.5b Error Handling for Medical Record Page

The functions implemented in the application are equipped with error handling mechanisms which will always restrict the users to enter null or invalid value. The implementation of these validations aims to preemptively prevent exception errors from occurring.

6.2 Testing Setup and Result

Remote Monitoring Module:  **Figure 6.2a** Remote Monitoring Testing	The *Figure 6.2a Remote Monitoring Testing* shown at the left side illustrated that the remote monitoring is functioning as expected. Users successfully streaming the live video for both type of android devices. The Android Device 1 is being used to capture the live video stream, while Android Device 2 is utilized to join and view the live streaming session.
Emergency Help Module:  **Figure 6.2b** Emergency Help Testing	The *Figure 6.2b Emergency Help Testing* shown at the left side demonstrated that the Google Maps is successfully being display on the user's screen. It able to get the user's current location after user granted the location permission to the application. It also able to put the red marker labeled with 'My Location' at the user's current location.

According to the *Table 6.2 Results for 5 types of Testing*, we can see that the mobile application developed passed majority types of testing which include functional testing, performance testing, security testing, usability testing and exception handling. Undeniable, the application still needs some improvement for the security testing because it will allow multiple user login to the application by using the same email and password at the same time. In other words, one email can be login by different users at the same time without forcibly log out a previous user.

Table 6.2: Results for 5 types of Testing

Testing Aspect	Result
Functional Testing	Passed
Performance Testing	Passed
Security Testing	To be Strengthened
Usability Testing	Passed
Exception Handling	Passed

6.3 Project Challenges

Developing software application can comes with various challenges. Among the most critical consideration are security vulnerabilities, user experience optimization and performance optimization. Developers need to find the solution to solve these challenges in order to fulfil and achieve larger market of users.

Security Vulnerabilities

Ensuring the security of the user's information is paramount. Due to the fact that, only the sensitive data of users are safeguarded, the user trust can only be maintained. A secure application will always protect the sensitive information from unauthorized access, prohibit the risk of data breaches, and ensures compliance with regulatory standards. However, the steps for implementing the security of the application can be complicated. For instances, implement strong authentication which required user to use strong passwords for their account is crucial so that the password will not easily

being cracked by others. In addition, data encryption could be another method that the developers need to be implemented in order to keep the sensitive data secured. Using the encryption algorithms ensures that even if unauthorized users gain the access to the data, but it remains unintelligible without the decryption key. Besides that, regular update application dependencies which include libraries, frameworks and plugins are essential. This ensures that the application can up to date to patch known vulnerabilities. In spite of that, this could be the big challenges for the developers since it requires frequent follow-up for the project.

User Experience Optimization

An easy-to-use and intuitive user experience is important for capture the attention and retaining users. By designing the user interface, improve workflows and incorporating user feedback, developers can foster an engaging and satisfying user experience. Even so, we have different type of users make use of application. Different kinds of users will have different requirements or perceptions for user interface design. Therefore, to satisfy all type of user's necessities, we need to gather the information and feedbacks from the users to improve the user interface design. As a result, the users can find that application easy to use and navigate. This is a challenge that the developers need to overcome so that the users are more likely to continue using the application and recommend to others. In consequences, expanding user base and increasing market reach.

Performance Optimization

Performance Optimization could be another challenge to make sure that our project is responsive and reliable application. One way to keep our application execute in efficient way is code optimization. Optimized code typically executes faster, consumes lesser processing power, and easier to maintain and debug. However, it is very challenging, since it covers from algorithmic efficiency to code refactoring. Developers will always need to select and design the algorithms that perform the desired function by using fewest resources and in shortest time possible. On the other hand, code refactoring involves restructuring existing code to improve its readability,

maintainability, and performance. In this case, it not only can improve the code design but ensuring that it is easier to optimize and maintain in long run. A high-performing application will also enhance user satisfaction, reduces frustration and cultivate positive perceptions of the software.

6.4 Objectives Evaluation

SMART objectives are a widely used framework for setting the project goals in monitoring and evaluation. SMART stands for specific, measurable, achievable, relevant, and timely.

- **Specific**
- Objectives should be clear, concise and focused.
- **Measurable**
- Objectives should be measurable and the progress to achieve it can be tracked.
- **Achievable**
- Objectives should be achievable by existing available resources and constraints.
- **Relevant**
- Objectives should be relevant to the overall goals of the project.
- **Timely**
- Objectives should be time-bound, with clear timeline for achieving them.

Table 6.4: Objectives Evaluation Table

No	Objectives	SMART				
		Specific	Measurable	Achievable	Relevant	Timely
1	To develop effective **Pill Reminder** and **Medical Record** features for improved medication management and medical history accessibility within the completion of FYP2.	√	×	√	√	√
2	To facilitate engaging **Chat and Message** features for real-time communication and daily activity sharing within the completion of FYP2.	√	×	√	√	√
3	To develop seamless **Emergency Help** and **Remote Monitoring** features for enhanced elderly care within the completion of FYP2.	√	×	√	√	√

By analysing the *Table 6.4 Objectives Evaluation Table*, we can observe that overall objectives are specific, achievable, relevant, and timely. However, they still lack of measurable which gauge the progress and success of each objective. Nevertheless, all objectives are successfully implemented in the application.

6.5 Concluding Remark

In conclusion, the evaluation and discussion presented in this chapter has been discussed through function, performance, security, usability, and exception handling testing. The application demonstrated robustness in various aspects, although some parts still needing some improvement, particularly in security measures.

The project challenges highlighted the important considerations of addressing security vulnerabilities, optimizing user experience, and enhancing performance. By identifying these project challenges, it is better for the developer to finding the solutions to ensure user trust, satisfaction, and the scalability of the application.

Expanding further, the SMART objectives framework is used to evaluate the objectives set for the project so that it is specific, measurable, achievable, relevant and timely. Although the objectives set may not lend themselves easily to measurable but they remain achievable.

Overall, this chapter underscores the iterative nature of software development, where continuous testing, refinement, and goal setting are crucial for delivering a comprehensive, user-centric, and high-performing application.

CHAPTER 7

Conclusion and Recommendations

7.1 Conclusion

In conclusion, this project has been driven by a clear and compassionate mission which is to enhance the quality of life for elderly individuals through the development of a specialized old age home mobile application. Our objectives were structured into 3 core modules, and each module is designed to address specific challenges faced by this demographic.

The first objective aimed to create an effective *Pill Reminder* feature, recognizing the critical importance of medication management for the elderly. This module ensures that elderly users remember to take their prescribed medications and allowing them to maintain their health. Similarly, the *Medical Record* module was developed to streamline the recording of medical data, this can be benefits for nurses and staff by providing a comprehensive overview of elderlies' medical histories. This not only facilitates better healthcare provision but also enhance overall understanding of individual health needs.

Besides that, the second objective focused on cultivating engagement and communication among elderly residents through *Chat and Message* feature. This module personates as a platform that allowing elderly to engage in real-time conversations, share daily activities, express concerns and etc. By promoting active communication within the elderly community, we aim to reduce feeling of loneliness, but promoting mental and emotional well-being.

Apart from that, the third objective involves the development of *Emergency Help* and *Remote Monitoring* feature. These features represent an important contribution in elderly care. The *Emergency Help* module will provide a lifeline in times of distress by effectively make call to the hospital or medical centre and also send alert email to the caregivers. While *Remote Monitoring* modules will act as a platform for family members and caregivers to actively track the well-being of their elderly relatives, offering and added layer of security and peace of mind.

The contributions of this project are both tangible and profound. Elderly individuals will benefit from improved health management, timely medication reminders, and the ability to stay socially connected. Furthermore, family members will find reassurance in the ability to monitor their elderly relatives' activities and well-being, even from a far distance. Simultaneously, nursing staff can more easily to manage medical record and help to enhance the quality of care provided.

7.2 Recommendations

Considering future development, recommendations for enhancing the application include integration the application with wearable devices like smartwatches or fitness trackers to dynamically monitor the elderly's vital signs, or health status. In this case, it not only can reduce the time that needed to input the health record manually into the system, but it can more accurately record the trends of individuals health. Additionally, in the situation where elderly individual experiencing a fall or encountering a dangerous, the smartwatch equipped with fall detection technology can automatically initiate an emergency call to the hospital.

Furthermore, it is possible to implement the voice-activated features, where used to assist elderly users with navigation, inputting data, and accessing information hands-free. Since elderly individuals have a poor eyesight, therefore it is necessary to implement voice-activated function as much as possible to ease the ways that elderly use of application. Although, existing system has the voice recognition function implemented in the chat and message function to convert the user's voice into text, however, it could be further enhanced if the chat and message able to implement the audio recording. This enhancement would allow the users can just listen to the audio messages spoken by other party, offering a more intuitive and convenient communication experience.

Last but not least, data privacy and security measure still be the potential for application improvement. It is better if the application can implement more end-to-end encryption to ensure that all the data transmitted between the application and the database is encrypted using enhanced encryption algorithms. Besides that, the sign-up

module for the application also can be strengthen by incorporating multi-factor authentication such as SMS verification or biometric authentication. Hence, the account registered by the users will not easily being hacked or cracked by third parties.

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Year 3 Trimester 1	**Study week no.: 4**
Student Name & ID: Tan Teck Wei 20ACB01862	
Supervisor: Dr Ramesh Kumar Ayyasamy	
Project Title: Old Age Home Mobile Application	

1. WORK DONE

- Improve the overall UI design for the application developed in FYP1.
- Plan and doing some research on how to implement the new two functions (Emergency Help and Remote Monitoring module)

2. WORK TO BE DONE

- **Function progress:**
  - **Medical Record module.**
    - Ensure that staff and caregiver have the access to add and delete the correct medications for elderly.
    - The changes should take effects on Firebase.
  - **Chat and Message module.**
    - Ensure that different type of users will be categorized under different tab to ease the way to search the target user.
  - **Pill Reminder module.**
    - Improve the UI design.
  - **Emergency Help module.**
    - Ensure the users can view their current locations on Google Maps
    - Implement the Send Alert and Emergency Call features.
  - **Remote Monitoring module.**
    - Ensure that all the users have the access to start and join the live streaming to see or chat with each other's.

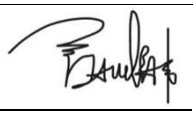
3. PROBLEMS ENCOUNTERED

- The coding proficiency is currently at an entry level, requiring more time to refine the system development.

4. SELF EVALUATION OF THE PROGRESS

- Insufficient proficiency in mobile application development skills.

Supervisor's signature



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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Year 3 Trimester 1	**Study week no.: 6**
Student Name & ID: Tan Teck Wei 20ACB01862	
Supervisor: Dr Ramesh Kumar Ayyasamy	
Project Title: Old Age Home Mobile Application	

1. WORK DONE

- Implemented the tab to categorize the different type of users (All, Family and Caregiver)
- Improve system design for the pill reminder module.

2. WORK TO BE DONE

- **Function progress:**
  - **Medical Record module.**
    - Ensure the correct existing elderly users are retrieved and put as the spinner items.
  - **Chat and Message module.**
    - Implement voice recognition to ease the way for message input.
  - **Emergency Help module.**
    - Ensure the users can view their current locations on Google Maps
    - Implement the Send Alert and Emergency Call features.
  - **Remote Monitoring module.**
    - Ensure that all the users have the access to start and join the live streaming to see or chat with each other's.

3. PROBLEMS ENCOUNTERED

- Can't plugin Google Places API due to the credit card restriction. Causing can't get the nearby medical center and put the markers.

4. SELF EVALUATION OF THE PROGRESS

- Require more research on alternatives methods to solve the existing problems.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Year 3 Trimester 1	**Study week no.: 8**
Student Name & ID: Tan Teck Wei 20ACB01862	
Supervisor: Dr Ramesh Kumar Ayyasamy	
Project Title: Old Age Home Mobile Application	

1. WORK DONE

- Implement the voice recognition and image upload function for chat and message module.
- Complete developed emergency help function.

2. WORK TO BE DONE

- Implement new module (Statistics) to help the staff and caregivers to record the health records of the elderly which include blood glucose, blood pressure, blood lipids, heart rate, sleep and weight.
- **Function progress:**
  - **Medical Record module.**
    - Fixing the bugs and errors occurred after deletion.
  - **Remote Monitoring module.**
    - Ensure that all the users have the access to start and join the live streaming to see or chat with each other's.

3. PROBLEMS ENCOUNTERED

- Chat module: Can't open the image send by different type of android devices.
- Unable to save the recording live video to firebase.

4. SELF EVALUATION OF THE PROGRESS

- Accelerate the progress since time is running short.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Year 3 Trimester 1	**Study week no.: 10**
Student Name & ID: Tan Teck Wei 20ACB01862	
Supervisor: Dr Ramesh Kumar Ayyasamy	
Project Title: Old Age Home Mobile Application	

1. WORK DONE

- Fixed the errors and bugs in the medical record module.
- Using ZEGOCLOUD as the platform to replace saving live video to firebase in the remote monitoring module.

2. WORK TO BE DONE

- Implement the different user restriction for statistics module.
- **Function progress:**
  - **Statistics module**
    - Ensure the health percentage can be displayed as the pie chart to show the elderly health status.
    - Ensure that the calculations for calculate the daily health records is correct.

3. PROBLEMS ENCOUNTERED

- There got many bugs and issues present within the functions.

4. SELF EVALUATION OF THE PROGRESS

- Left FYP2 report improvement and debugging the application.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Year 3 Trimester 1	**Study week no.: 12**
Student Name & ID: Tan Teck Wei 20ACB01862	
Supervisor: Dr Ramesh Kumar Ayyasamy	
Project Title: Old Age Home Mobile Application	

1. WORK DONE

- Fixed the bugs and errors for majority of the functions.

2. WORK TO BE DONE

- Improve the FYP2 report.
- Prepare for FYP2 presentation.

3. PROBLEMS ENCOUNTERED

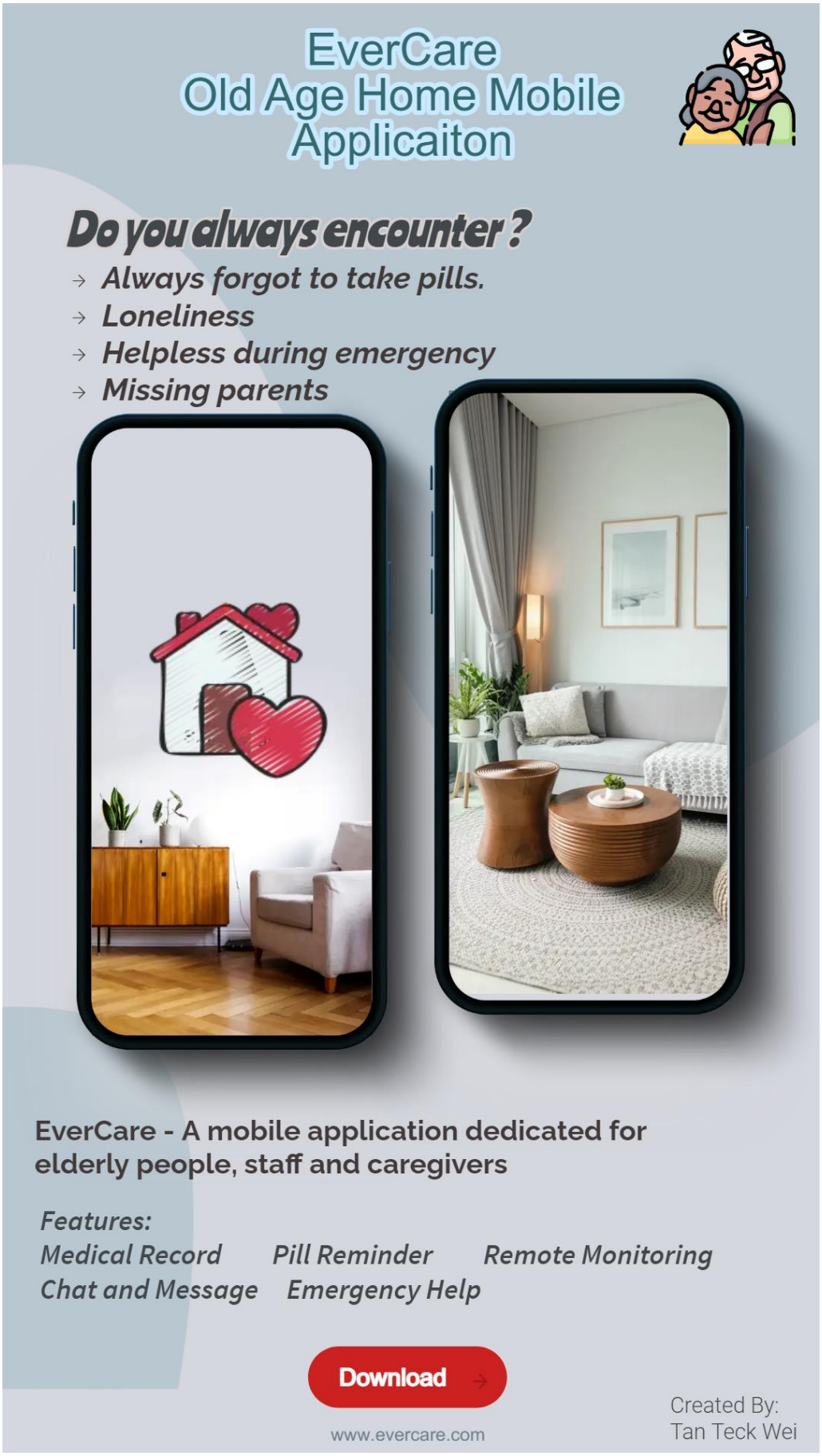
- Require more streamlined code as the current implementation lack efficiency.

4. SELF EVALUATION OF THE PROGRESS

- Ensure that the report and coding is complete and achieve the requirements.

Supervisor's signature

Student's signature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Do you always encounter ?
Always forgot to take pills.
Loneliness
Helpless during emergency
Missing parents
EverCare - A mobile application dedicated for elderly people, staff and caregivers
Features:
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Pill Reminder
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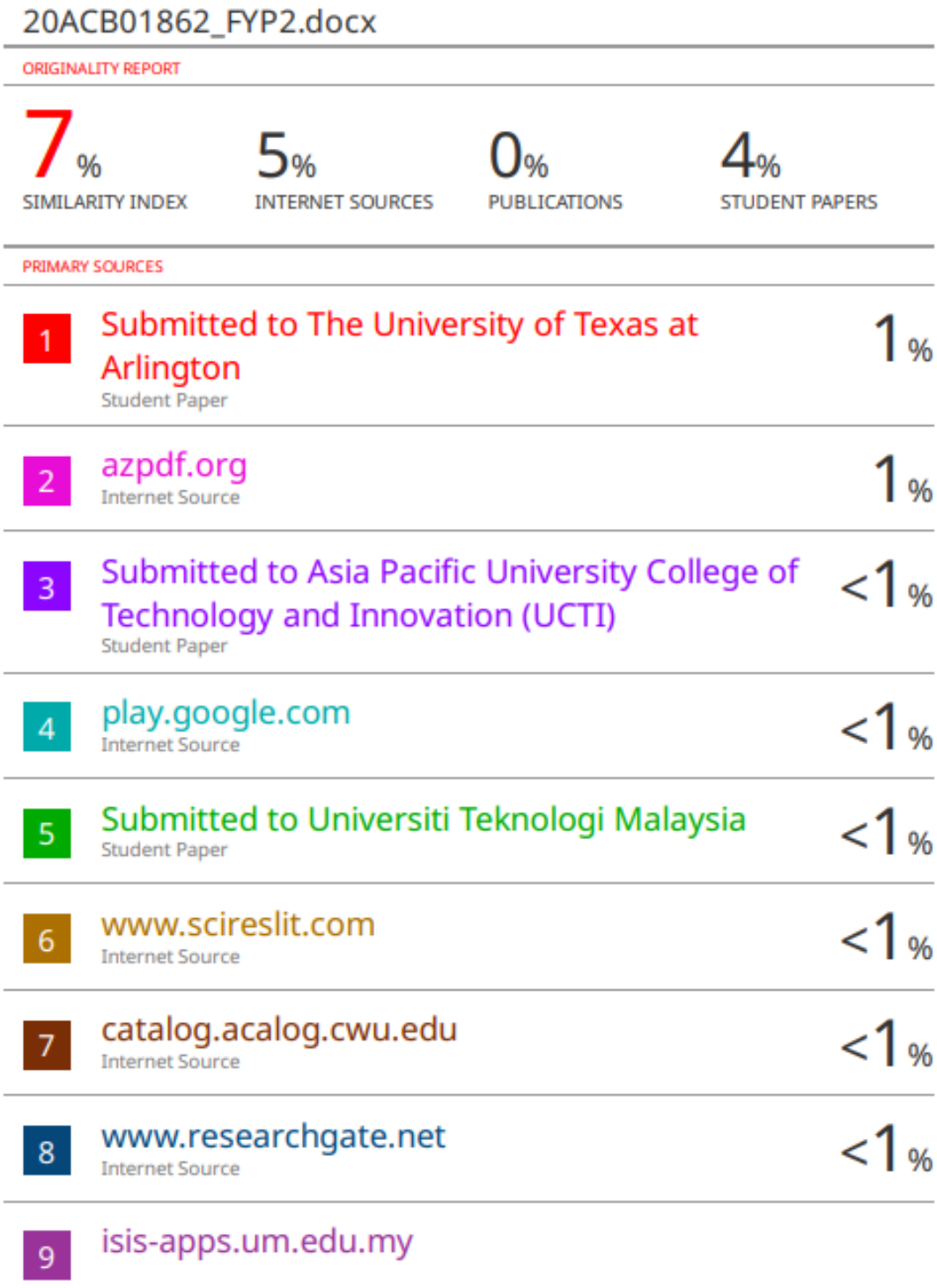

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Name: Dr Ramesh Kumar Ayyasamy

Date: 25 April 2024

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Name: _____

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