HEALTHBUDDY: YOUR PERSONAL HEALTH COMPANION

BY

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A REPORT

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ABSTRACT

HealthBuddy: Your Personal Health Buddy is a health mobile application for smart phones designed to respond to the growing demand for holistic and personalized healthcare management solutions. The project was initiated to address the fragmentation of healthcare monitoring technologies, which inevitably results in wastage and decreasing user engagement. The proposed solution integrates different aspects of health into a single simple-to-use interface. The design features a Health Dashboard for tracking such measurements as weight, height and summary of their health details from other features, Medication and Appointment Reminders, Hydration Checks, and a Nutrition Planner recommending food options by input designated calorie intake. A mental health support chatbot utilizing artificial intelligence is proposed to offer mood tracking and stress management functionality and giving unconditionally support by understanding user's requirement. Besides, Health and Fitness Challenges will be implemented to encourage user engagement through a reward system, and an Emergency Assistance is coded to provide immediate support in case of serious health events. Currently, the development is in prototyping of the features to determine their feasibility and user flow. By consolidating physical as well as mental well-being support under a single platform, HealthBuddy aims to provide the best possible service among the mobile health (mHealth) technologies.

Area of Study (Minimum 1 and Maximum 2): Mobile Health (mHealth), Artificial Intelligence

Keywords (Minimum 5 and Maximum 10): Mobile Health Application, Health Monitoring, Mental Health Support, Artificial Intelligence, Emergency Assistance, Health Dashboard, Fitness Challenges, Nutrition Planning, Hydration Monitoring, User Engagement

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
API	Application Programming Interface
BMI	Body Mass Index
IDE	Integrated Development Environment
SDLC	Software Development Life Cycle
UI	User Interface

CHAPTER 1

Project Background

This project will focus on developing one health mobile application by integrating various health management tools into a single user-friendly application to users that requires them to check and manage both physical and mental well-being.

1.1 Introduction

The healthcare industry has seen significant advancements in technology, leading to the development of various applications designed to improve personal health management. However, despite these technologies, many individuals still struggle to maintain their health effectively due to the absence of a comprehensive platform that consolidates all essential health management functionalities. In this society where lifestyles are increasingly fast-paced, people often find it challenging to keep track of their physical and mental health, leading to rise in chronic conditions, poor dietary habits and unmanaged accumulated stress levels.

HealthBuddy: Your Personal Health Companion is a mobile application developed to address these challenges by offering unified solution that integrates various health-related tools. This application aims to assist users in managing their health more efficiently by integrating various features such as Health Dashboard, Symptom Checker, Sleep Tracking, Medication and Appointment Reminder, Hydration Reminder, a Mental Health Support Chatbot, a Nutrition Planner, Health and Fitness Challenges and Emergency Assistance. The integration of these features into one platform offers a seamless and personalized health management experience.

In current society, health management is crucial not only for preventing diseases but also for promoting overall well-being, thus there is a need for tools that engage individuals to take control of their physical and mental health. HealthBuddy aims to fill this gap by providing platforms that caters to the diverse health needs of users, making it easier for them to monitor, improve their health and deal with health-related issues.

1.2 Problem Statement

Managing personal health in the current stage presents a significant challenge, particularly for individuals with busy life, the elderly, children and those seeking mental health support. This problem is further compounded by the fact that many existing health applications focus on specific aspects of health management, such as fitness tracking or medication reminders, without addressing the other needs of the user. The lack of a unified platform that consolidates various health management functions leads to often ineffective health routines [1]. As a result, users are left with installing multiple applications, each serving a different purpose, which can be overwhelming and size consuming. The need for a comprehensive solution that integrates all these functionalities into a single platform is evident.

There are also some individuals who may forget to take their medications, miss medical appointments, or neglect their mental health due to the absence of timely reminders and support. This may lead their sickness such as memory loss to get worse especially the elders with Alzheimer [2] thus it is better to prevent it from getting serious. No matter adults or children, they tend to easily forget and get stress as they need to memorize lot of things and dealing their daily life and it can easily overload them leading them to forget important things such as medication. These individuals need a solution that not only assists in tracking their health and health reminder but also provides personalized recommendations and support to manage their unique health needs.

In emergency situations, time is often critical, and the ability to respond effectively can be the difference between life and death. However, many individuals are unprepared for such scenarios due to a lack of knowledge and training. According to a study conducted in Germany [3], it was found that a significant portion of the public possesses only basic knowledge of emergency care, which is often inadequate when faced with real-life emergencies. This lack of preparedness in advanced can lead to delays in providing essential first aid or seeking appropriate medical assistance, ultimately worsening outcomes for those involved as time is the key. Therefore, emergency assistance is required to guide an individual in dealing such situations.

1.3 Motivation

The motivation behind the development of HealthBuddy stems from the growing recognition of the importance of health management in improving individual well- being. As the global population ages and chronic conditions become more prevalent, there is a critical need for tools that support individuals in managing their health proactively and detect possible symptoms as soon as possible. Moreover, the rise in mental health issues, particularly stress, anxiety, and depression, highlights the necessity of providing mental health support alongside physical health management.

Existing health management applications often fall short of providing a working solution that addresses the diverse needs of users. This gap in the market presents an opportunity to develop an application that not only tracks physical health but also offers support in mental health, nutrition, fitness, and guidance in emergency situations. By integrating these functionalities into one platform, HealthBuddy aims to motivate users to take a more active role in managing their health, thereby improving their quality of life, reducing the risk of having health conditions and assisting people with conditions.

The development of HealthBuddy is also motivated by the potential of AI technologies to enhance personal health management. AI can provide personalized health insights, analyze user data to offer meaningful recommendations, and improve the overall user experience by making health management more intuitive and effective especially in mental health support. With the help of AI, accurate analysis can be generated faster for users and provide recommendations based on the report generated.

1.4 Contribution

HealthBuddy contributes significantly to the field of personal health management by providing an integrated platform that addresses both physical and mental well-being. Unlike other health applications that mainly focus on physical health or mental health only, HealthBuddy offers all-in-one features, including a Health Dashboard, Symptom Checker, Sleep Tracking, Medication and Appointment Reminders, Hydration Reminders, a Nutrition Planner, Health and Fitness Challenges, and Emergency Assistance which simplifies health management for users, making it easier for them to navigate between physical and mental health.

A key contribution of HealthBuddy is implementation of AI technology for mental health support. The app includes a chatbot designed to accompany and assist users with mood tracking and stress management. The chatbot can provide personalized mental health insights, recommend coping strategies, and offer support in real-time, making mental health care more accessible and immediate for those users that require mental health support. This AI feature ensures that users receive timely and relevant advice tailored to their needs.

Moreover, HealthBuddy is designed to be inclusive that able to cover diverse range of users, including those with children, the elderly, and individuals seeking mental health support. By addressing the specific needs of these groups, the application ensures every relevant function to be integrated in one application making it a valuable tool for a wide range of users. These function integrations increase the app's potential to positively impact public health by reaching a larger community.

HealthBuddy also emphasizes different functions by encouraging users in managing their health. Through reminders, health challenges, and educational resources, the app motivates users to adopt healthier habits and stay consistent with their health routines. By integrating tools for both physical and mental health, HealthBuddy offers a balanced approach to health management in physical and mental, helping users to maintain a well-rounded lifestyle. These contributions able to improve individual health management and encourage engagement for individuals to actively value their health.

1.5 Project Scope

This project encapsulates the essence of the application as a comprehensive tool for personal health management and conveys the purpose of the project and the intended experience to users.

At the end of this project, the outcome is the development of a mobile application titled "HealthBuddy: Your Personal Health Companion". The proposed application is designed to address a wide range of health-related challenges by integrating multiple functionalities into a single user-friendly platform. The primary delivery is a fully functional mobile health app that provides users with dashboard, symptoms and sleep tracking, telehealth services such as medical and appointment reminder, hydration reminder, mental health support powered with AI, fitness challenges, and an emergency assistance feature. The application is tailored for users who seek an approach to managing their health, covering physical, mental, and emotional well-being.

The Health Dashboard will provide users with a centralized view of their essential health metrics such as weight, height, and Body Mass Index (BMI) and summaries from other features. This feature enables users to monitor their progress easily each time they open the application. The Symptom Checker will allow users to input their symptoms and generate possible conditions or health issues they might be experiencing. This function assists users in understanding their symptoms better and provides guidance on whether they should seek medical help.

The Sleep Tracking and Analysis feature will record the user's sleep patterns and provide feedback on sleep quality and duration. By analyzing this data, users can gain insights into their sleep habits and identify changes that need to be made. Alongside this, the Medication and Appointment Reminder function will ensure that users do not miss their medication doses or medical appointments after they have set the relevant details such as doses, time and others by sending timely reminders. This function will be crucial for individuals managing chronic conditions or those with frequent forget.

1.6 Project Objectives

The main objective in this project aims to develop a health mobile application that integrates various features at improving the user's overall health and well-being.

1. To create a user-friendly mobile application that supports users from each aspect.
2. To implement chatbot as mental health support feature to assist users based on their situation.
3. To design and integrate interactive tools such as fitness challenges and emergency assistance that ensure users receive continuous support for maintaining healthy lifestyle and responding effectively in emergency situations.

1.7 Report Organization

This report is organized in 7 chapters where the Chapter 1 Project Background, Chapter 2 Literature Review, Chapter 3 System Methodology, Chapter 4 System Design, Chapter 5 System Implementation, Chapter 6 System Evaluation and Discussion and Chapter 7 Conclusion and Recommendation. The first chapter is the background of this project which includes introduction, problem statement, motivations, project contributions, project scope, project objectives and report organization. The second chapter is the literature review carried out on several existing applications in the market to evaluate the strengths and weaknesses of each application. The third chapter discusses the overall system design of this project by briefly going through the planning process. The fourth chapter is regarding the details on how to implement the design of the system. Furthermore, the fifth chapter will be describing the implementation and setup of the system. Chapter 6 will show some test cases of the system by performing some testing to the system. Chapter 7 concludes the project with a summary of the system.

CHAPTER 2

Literature Review

2.1 Overview

The literature review explores existing health management applications and their contributions to personal health and well-being. This review focuses on three health mobile applications which are MyFitnessPal, Fitbit, and Headspace by evaluating their approaches to health management, identifying their strengths and weakness, and suggesting potential improvements.

2.2 Previous Works

2.2.1 MyFitnessPal

MyFitnessPal is an application designed primarily for tracking diet and exercise [4]. It allows users to log their food intake, view the food's nutritional information, and set fitness goals. The app offers a list of food items with the calories depend on the portion and integrates with various fitness trackers to provide users with a detailed view of their calorie consumption and physical activity. By offering tools for logging meals, tracking exercise, and setting health goals, MyFitnessPal aims to assist users in achieving and maintaining a healthy lifestyle through detailed data and progress tracking.

MyFitnessPal's strength lies in its extensive food database, which includes detailed nutritional information for various of food items as shown in Figure 2.3. This comprehensive database facilitates accurate tracking of dietary intake, helping users monitor their caloric consumption and nutritional balance effectively. The application's user-friendly interface simplifies the process of logging meals that enable user to choose the meal for breakfast, lunch, dinner or snacks. After logging, user can identify the calories consume in the home screen. Other strength also the application includes a diary that able to record meal calories as shown in Figure 2.4. In the Figure 2.2, the application is designed to keep users motivated and informed about their daily health journey. Users can track their progress over time and setting plan based on their preference.

MyFitnessPal has weakness where the application main focus is primarily on diet, exercise and constantly do calorie counting and weight, leaving out other aspects of health management, such as mental health support for people with eating disorder. Study [5] learns that there are 40 to 49% of university women suffer from eating disorder. For individuals with eating disorders or related mental health challenges, the application's focus on calorie counting and weight management might worsen their conditions, potentially discouraging them and negatively impacting their mental well- being.

To solve the weakness, MyFitnessPal can do incorporating features that address mental health and overall well-being. Integrating stress management tools, mood tracking, and educational resources about healthy eating behaviours could provide a more practical approach to health management. For instance, incorporating mindfulness exercises within the app could support users in managing stress and developing a healthier lifestyle with the help of food.

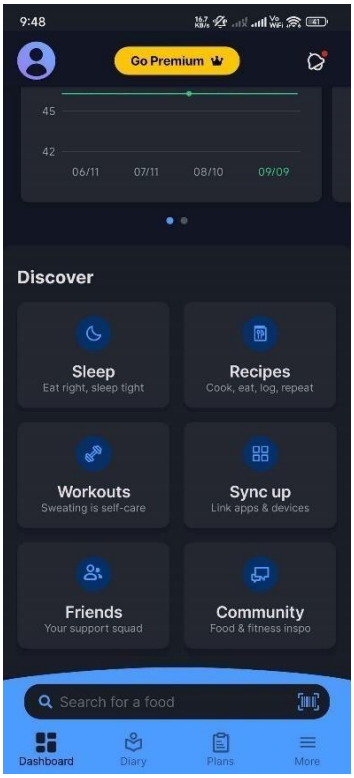

Figure 2.1: MyFitnessPal

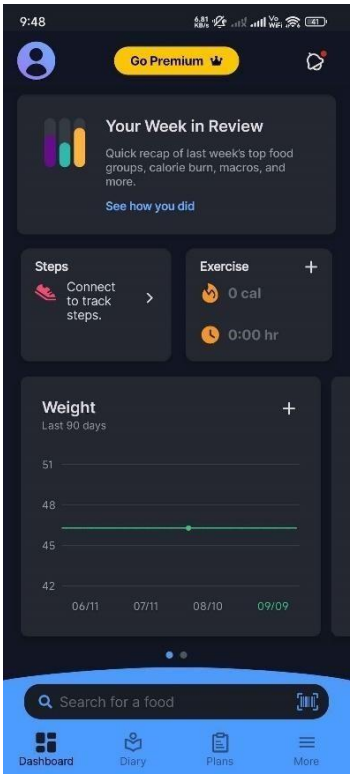

Figure 2.2: Health Track

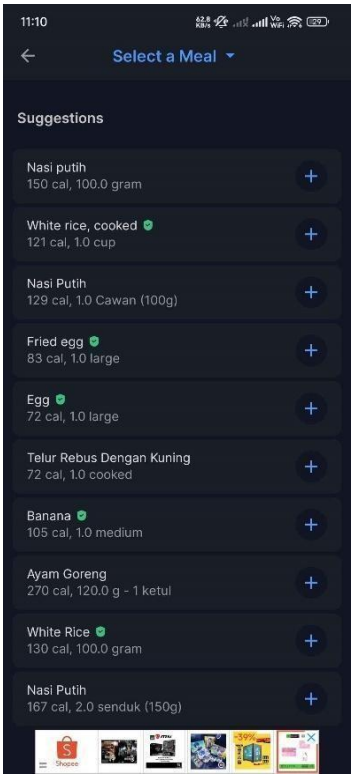

Figure 2.3: Food calories

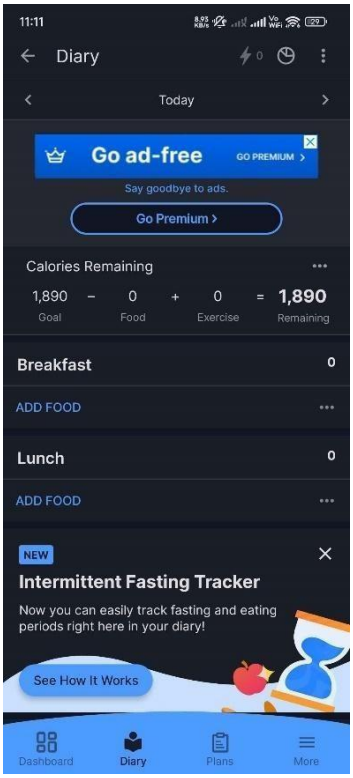

Figure 2.4: Diary

2.2.2 MyTherapy

MyTherapy is a health management application that is mainly designed to assist users with medication reminder, health tracking, and overall wellness [6]. It provides features such as medication reminders, symptom tracking and appointment reminder to help users manage their health conditions and time effectively. The application aims to support individuals in maintaining their medication schedules, monitoring their health status and achieve better health through consistent tracking and management.

One of the primary strengths of MyTherapy is its main feature which is medication management as shown in Figure 2.5. The application offers customizable medication reminders that ensure users arrange to their schedules, which is crucial for individuals managing chronic conditions or taking multiple medications. The ability to set reminders for different medications, including dosage and timing, helps reduce the risk of missed doses and medication errors. Additionally, MyTherapy's feature allows users to log various health metrics, such as symptoms, mood, and physical activity, providing a comprehensive view of their health status as shown in Figure 2.7.

The application's integration of health tracking with medication management is particularly valuable for individuals who need to monitor their health conditions. By providing a platform where users can record and review their health data, MyTherapy facilitates better communication between patients and healthcare providers. This approach supports more informed decision-making and can improve the quality of care by showing the chart and list option to user for monitoring their medication as shown in Figure 2.7 and Figure 2.8. Moreover, the application also offers appointment reminder to remind user in case they forget as shown in Figure 2.6.

Despite its strengths, MyTherapy has one notable weakness that is lack of comprehensive mental health support. While the application excels in medication management and health tracking, it does not address mental health needs, such as stress management or mood tracking, which are essential for overall well-being. When there is pandemic such as COVID-19, individuals have the impression that having medicine will cure the illness however lacking mental health support is one of the reasons that sickness cannot be cured. The mental health

problems among students during the pandemic has been increasing due to stress in academic and adaptability to the new norms [7]. The absence of mental health features limits the application ability to provide approach to health management, particularly for users who may experience mental health challenges alongside physical health conditions.

The limitations can be solved by integrating mental health support features, such as mood tracking, stress management tools, and access to mental health resources, would provide a more comprehensive approach to health management. This integration would allow users to monitor both their physical and mental well-being in one platform, addressing the interconnected nature of these aspects of health. Enhancing user engagement through features such as personalized health insights, tailored recommendations, and interactive support could improve the overall effectiveness for the application and enhance the user experience.

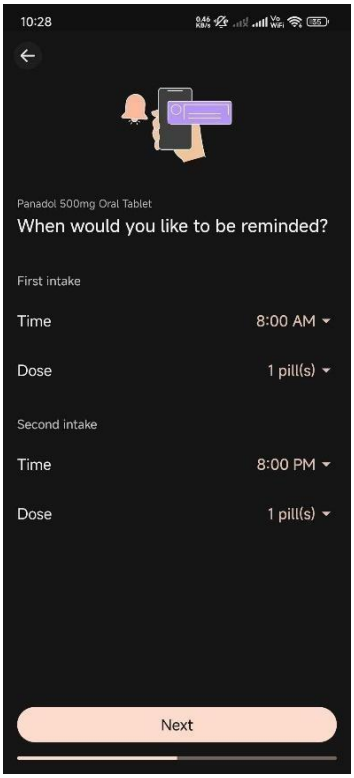

Figure 2.5: Medication Management

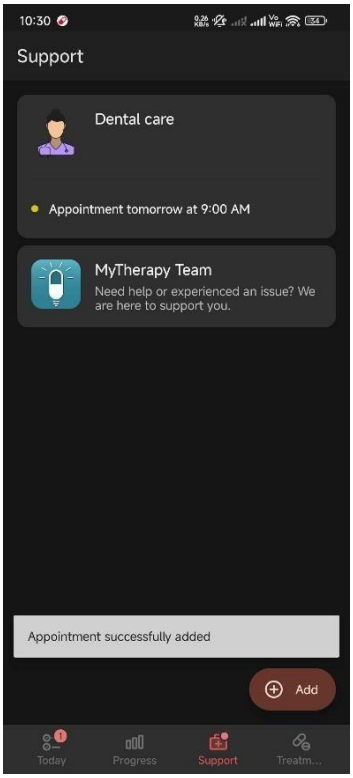

Figure 2.6: Appointment Management

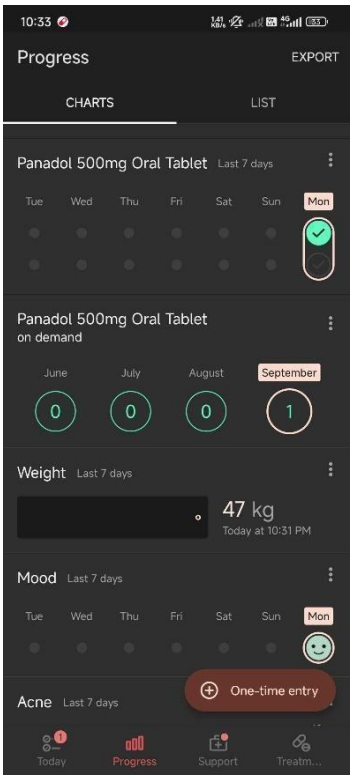

Figure 2.7: Medication Chart

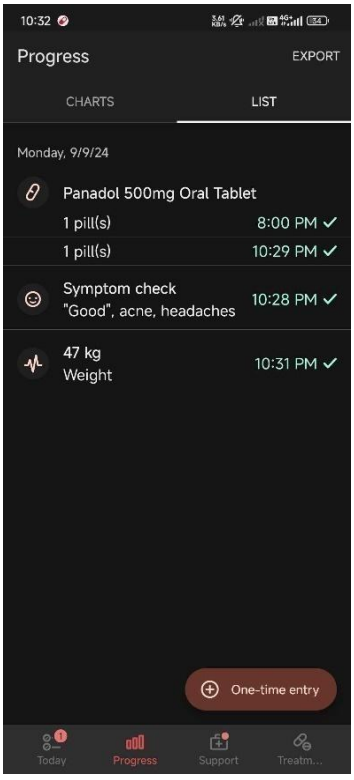

Figure 2.8: Medication List

2.2.3 Headspace

Headspace is a popular application that focused on handling mental health issue and solving negative feelings [8]. It offers guided meditation sessions, mindfulness exercises, and tools for managing stress and improving mental well-being. Headspace aims to help users develop healthier mental habits through structured meditation programs and personalized recommendations and how users want to start their day as shown in Figure 2.9. These meditation sessions are designed into few courses to let users experience different levels from basic to advanced. By offering a variety of meditation sessions and mental health resources, Headspace seeks to address the growing need for accessible and effective mental health support.

Headspace mainly targets its direction to mental health and mindfulness. One of its significant strengths is the various guided meditation sessions available which tailored to various needs and experience levels. The app offers programs designed to address specific issues, such as anxiety, sleep problems, and stress, making it a versatile tool for improving mental well-being. One of the sessions is meditation as shown in Figure 2.10 has been separated into different sections to fit users' preference. The structured nature of these programs, combined with user-friendly interfaces and engaging content, makes Headspace accessible and appealing to a broad audience.

The application emphasis on personalization is another notable strength. Headspace utilizes user data to tailor meditation recommendations and mindfulness exercises. In Figure 2.11, the personalization will be based on a check in method that will prompt 10 different questions and require user to answer 10 of them. This result obtained will allow users to receive guidance that is aligned with their current stress level, improving the effectiveness of the app in supporting mental health goals as shown in Figure 2.12.

The limitation in the application is the reliance on subscription-based access for premium content as shown in Figure 2.12. While Headspace offers a range of free features, many of its advanced meditation programs and tools are behind a paywall. This subscription model may limit access for users who cannot afford the premium version, potentially excluding part of population who could benefit from the application's full range of features. While Headspace

provides valuable mental health resources, it may not be sufficient for users with more severe mental health conditions or those requiring professional intervention. The content is mostly solving general mindfulness and stress problem by doing some meditation but not eradicating the root that generates stress. The focusing on mental health alone is not a balanced way for healthy lifestyles and physical health also need to be considered because study has shown exercise able to enhance mental health by reducing the stress tendencies [9].

To resolve the limitations, Headspace could consider expanding their focus to include aspects of physical health, integrating features that offers physical exercise, diet, and sleep tracking. By offering this approach to the application, it could provide users with a comprehensive view of their overall well-being and support a more balanced lifestyle. For users with more severe mental health conditions, Headspace could implement chatbot that has the characteristics of human to accompany those users by providing them mental health support. Providing a wider range of free resources and educational content could help those users who cannot afford the full subscription while still benefiting from the core features of the application.

Figure 2.9: Headspace

Figure 2.10: Courses

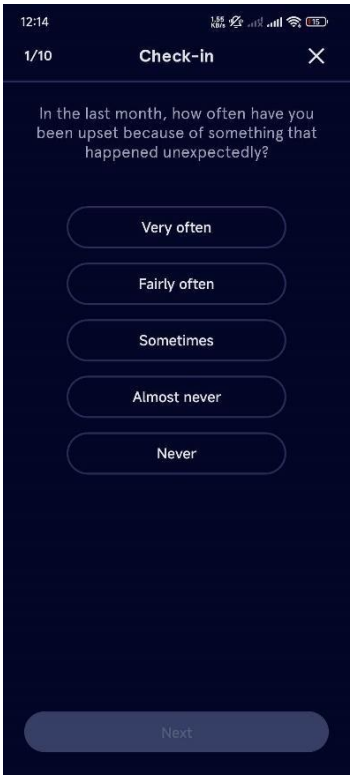

Figure 2.11 Check-in

Figure 2.12: Results

2.3 Summary

Table 2.1 shows the comparison of the functions and features between the applications that has been reviewed and proposed application which is HealthBuddy.

Functions and Features	Application			
	MyFitnessPal	MyTherapy	Headspace	HealthBuddy
Health Dashboard	✓	✓		✓
Symptom Checker		✓		✓
Sleep Tracking	✓			✓
Medication and Appointment Reminder		✓		✓
Hydration Reminder				✓
Mental Health Support			✓	✓
Nutrition Planner	✓			✓
Health and Fitness Challenge	✓		✓	✓
Emergency Assistance				✓

Table 2.1: Comparison of existing application and proposed application

CHAPTER 3

System Methodology/Approach

3.1 Proposed Method

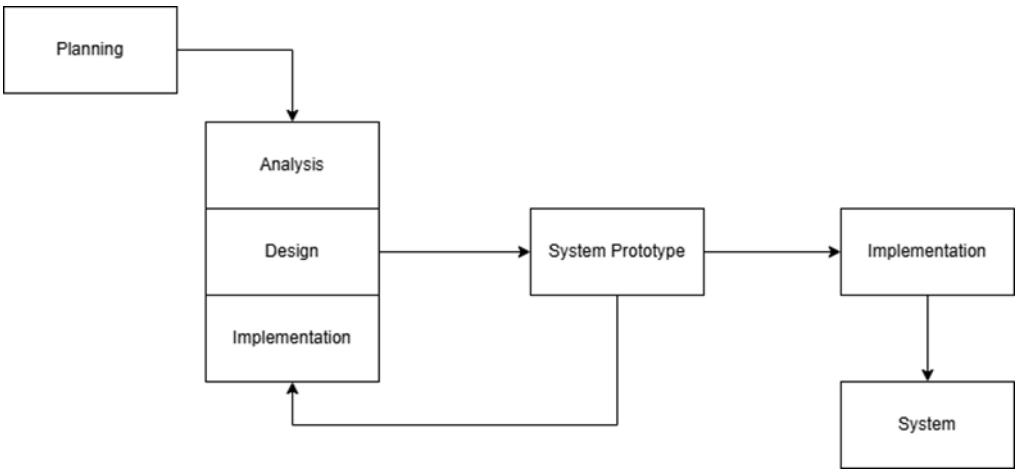

Figure 3.1: Prototype Model

Software development life cycle (SDLC) is a traditional methodology used to develop and deploy software. The process of SDLC consists of five phases which are Planning, Analysis, Design, Implementation and Maintenance. For the beginning of the phase Planning, it consists of two stages which are the project initiation that determines the scope, objectives and requirements needed for the system and project management that developing a project plan. Analysis phase will be gathering information from existing systems, determining who will benefit from the system and creating models such as use cases, user stories etc. Design phase will be based on the analysis phase and create diagrams like use case diagram and activity diagram. After completing the design phase, the implementation phase will start by developing the system according to the design specifications. The implementation phase is where the actual coding and integration of various components take place. After the system is built, the Maintenance phase will begin, where the software is deployed, monitored, and updated as needed to ensure its continued functionality and performance.

Based on the paper [10], the prototype model offers a more flexible and iterative approach to the health mobile application development. This method involves creating a working model or prototype of the system early in the development process. The prototype serves as a preliminary version of the system that can be evaluated, tested, and refined based on the system's behavior and the design. Unlike the other models such as the waterfall model, agile model and more, prototype model allows for iterative improvements and refinements as the project progresses until the final prototype.

The prototype model is a particular advantage for projects where requirements may evolve over time and need to be fine-tuned to meet expected results as fast as possible. By creating a prototype, developers can identify potential issues early, experiment with different design options and adjust the function accordingly without the need to build fully developed system. This approach ultimately leads to a more user-centered and adaptable final product with every function that is working.

While the SDLC models provide different advantages and disadvantages approach to software development, the prototype model offers flexibility and responsiveness to change, making it a more suitable choice for current project where iterative feedback and refinement are essential to ensure the functions work as intended.

3.2 System Requirements

3.2.1 Hardware Requirements

The hardware involved in this project is computer and android mobile device. A computer is used to develop the health mobile application. A mobile device is used for testing and deploying this health mobile application.

Description	**Specifications**
Processor	AMD Ryzen 5 5600X
Operating System	Windows 11
Graphic	NVIDIA GeForce RTX4070
Memory	32GB DDR4 RAM
Storage	1.5TB SSD

Table 3.1: Specifications of desktop

Description	**Specifications**
Model	Xiaomi Poco F4 GT
Processor	Snapdragon 8 Gen 1
Operating System	Android 14
Memory	12GB RAM
Storage	256GB

Table 3.2: Specifications of mobile

3.2.2 Software Requirements

Several software has been implemented in the whole project for developing the health mobile application.

i. Visual Studio Code (VSCode)

Visual Studio Code (VSCode) is a code editor developed by Microsoft, designed to support a wide range of programming languages and frameworks. In this project, VSCode will be used as the Integrated Development Environment (IDE) for writing, editing, and debugging the Dart code used in the development of the HealthBuddy application. The flexibility and customizability of VSCode such as various extensions make it an ideal choice for developing mobile applications, allowing for efficient coding workflows.

ii. Flutter

Flutter is an open-source UI software development toolkit created by Google, which enables developers to build applications for mobile, web, and desktop from a single codebase and which supports cross platform [11]. For this project, Flutter will be used to design and develop the user interface and overall structure of the HealthBuddy application. Its ability to create highly responsive and aesthetically pleasing user interfaces, combined with its fast development cycle. Most importantly, it supports Google Services that will bring ease of operation for later development process.

iii. Firebase

Firebase is a comprehensive app development platform developed by Google, offering a suite of cloud-based tools and services designed to help developers build, improve, and scale their applications [12]. In this project, Firebase will be utilized for its robust backend services, including real-time database, authentication, cloud storage, and hosting capabilities. The integration of Firebase will enable secure user authentication, efficient data storage and retrieval, and real-time updates within the HealthBuddy application. The integration of Firebase with the Flutter application will make a perfect combination as both supported by Google.

3.3 Timeline

3.3.1 Project Timeline for FYP1

Project Task	Week												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Prototype													
Analysis													
Design													
Implementation													
Evaluation													
Prototype													
Analysis													
Design													
Implementation													
Evaluation													

Table 3.3: Project Timeline for FYP1

In the timeline for FYP1, prototypes of features are developed separately after planning phase has been completed. In the first 7 weeks, prototypes of symptom checker, hydration reminder and chatbot feature are set as a preliminary work. Gemini API key for the chatbot is obtained and used to connect the application with the API. Since the connection of API key is performed, similar design is implemented in the symptom checker to analyse the symptoms faced by user. The feature of hydration reminder is also completed with an alarm that can reminds user to hydrate themselves. It is expected to add notification to make sure user is reminded. Since,

there is other features that are going to implement notification thus the notification feature is expected to be placed during FYP2. The following weeks prototypes such as nutrition planner, sleep tracker and medication reminder are also developed. Feature for sleep tracker has been partially finished with the manual record sleeping data and system generate a weekly sleep pattern. Spoonacular API is obtained and used to search for recipes for nutrition planner feature. A simple medication reminder feature is also partially developed with incomplete feature in storage. During FYP1, no database and notification being implemented as the feature is still under research with trials and errors. Features for health fitness challenge, dashboard, user profile and emergency assistance are planned to be developed in FYP2. For those features developed in FYP1 will be fully completed by the end of FYP2 due to time restriction in FYP1. Presentation and demonstration on the preliminary work will be conducted on the week assigned to showcase the outcome of FYP1.

3.3.2 Project Timeline for FYP2

Project Task	Week												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Prototype													
Analysis													
Design													
Implementation													
Evaluation													
Deployment													
Testing													
Documentation													

Table 3.4: Project Timeline for FYP2

The main task to be completed in FYP2 is make a connection between the application and Firebase for data storage and retrieval. User authentication and profile are developed and intended to test the user data to be saved in Firebase. After database is set up, user authentication and profile are tested in Firebase to ensure the connection and data is saved. Once the data is confirmed to be saved, the storage for the features done in FYP1 is connected to database for each user. The prototypes of features planned in FYP2 are developed and tested the features. Emergency assistance feature will perform a similar design as Symptom Checker that utilizes AI to generate step by step guidance to aid user. Fitness challenge feature will be having preset activities and quiz that has been coded in the application that will be generated for user each day with a point reward system. Dashboard with a navigation bar is also developed to have a better visualization and navigation for the application. Notification feature has also been tested and applied to several features. Features are deployed and tested

thoroughly and made modification as well as the user interface to obtain a better performance and visual from week 8 to week 11. Documentation for the application done in week 12 and week 13. Finally, presentation and demonstration for the application are performed to showcase a final product that has been developed throughout FYP1 and FYP2.

CHAPTER 4

System Design

4.1 System Architecture Diagram

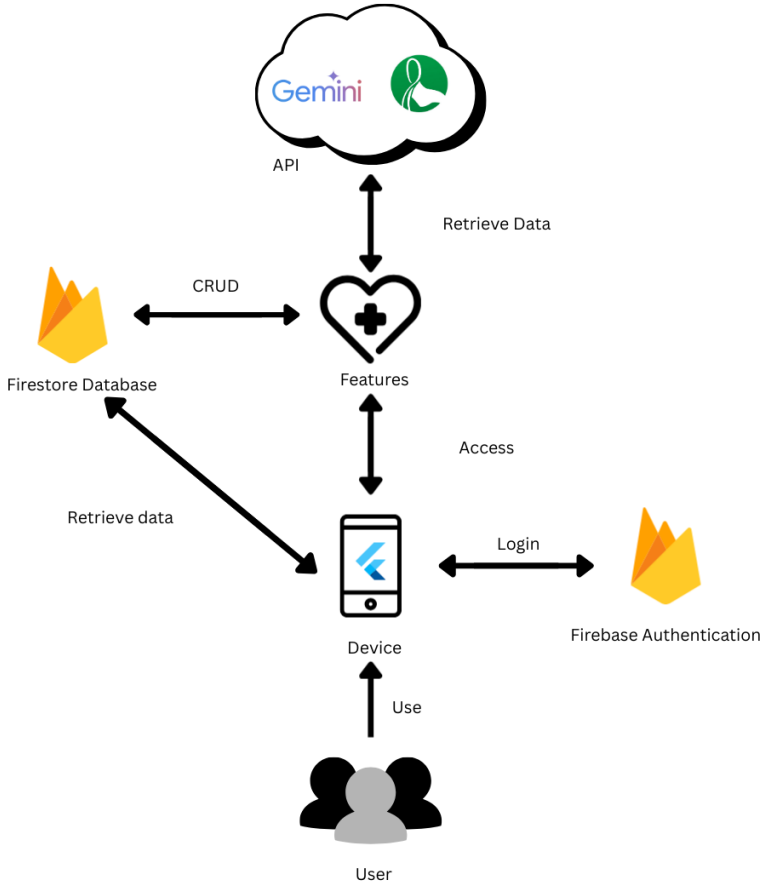

Figure 4.1: Architecture Diagram

In the architecture diagram, the system implemented online services from Firebase and API to bring a better performance for the application. Firebase Authentication is used to create user authenticate profile and also authenticate the real identity of user to prevent unauthorized user to log in to the application. The sign in method in the project is email and password which will be used to authenticate user before they access to the application. Firestore Database is used to store the data and ease to retrieve the data done by user throughout the process of using the application. The API used which are Gemini API and Spooncular API will be used to retrieve the data needed by the user to solve their problems.

4.2 Use Case Diagram

The use case diagram shows the details of user for the system and their interaction with the HealthBuddy system.

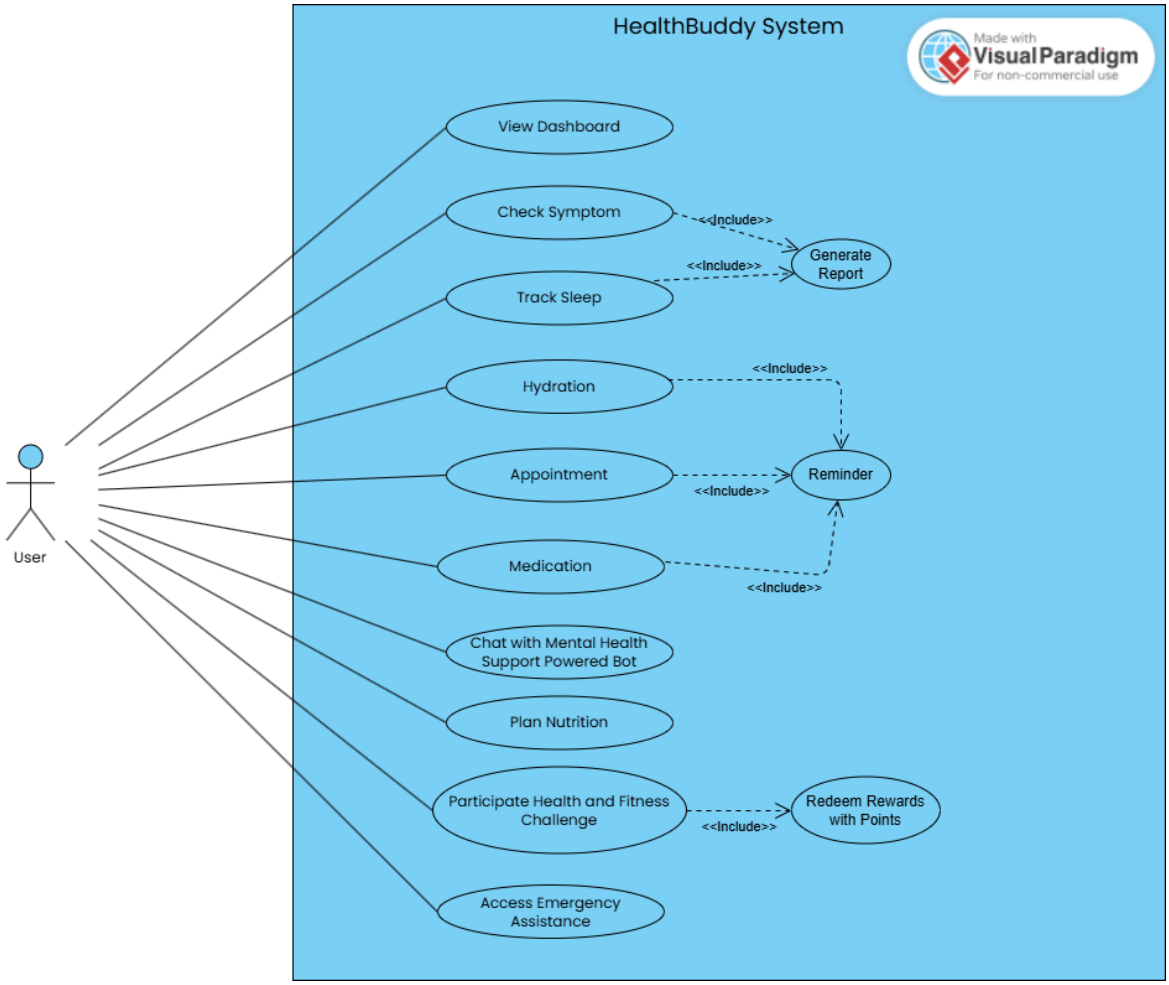

Figure 4.2: Use Case Diagram

4.3 Use Case Description

4.3.1 View Dashboard

Use Case Name: View Dashboard	**ID:** 1	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User - Wants to access a consolidated view of health data and insights and access to the features provided from the system.		
Brief Description: User able to view the main dashboard with health summaries and features provided after completing the registration and log in to the application.		
Trigger: Each time user starts up the application and selected the home button in the application. **Precondition:** User completed the registration and log in or logged in with existing account.		
Normal Flow of Events: 1. User logs in to the application with their details filled. 2. The system displays the main dashboard health metrics based on the details filled during registration. 3. User able to access different features provided by the application. 4. User can also update personal details through the dashboard.		
Sub Flows: Not applicable		

4.3.2 Check Symptom

Use Case Name: Check Symptom	**ID:** 2	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User – Facing symptoms of sickness and wanted to check the condition of the symptoms experiencing.		
Brief Description: User able to check their symptom through the application and system generates detailed report on symptoms facing and recommendations needed to prevent symptoms worsen.		
Trigger: User selects Check Symptom in dashboard. **Precondition:** User is accessing dashboard.		
Normal Flow of Events: 1. User accesses the symptom checker in dashboard. 2. Some preset common symptom options are provided for allowing user to choose from. 3. User can either use the options or briefly describe the conditions or implement both options to describe self-conditions. 4. System will generate responses as a report after user clicks “Analyse Symptom”. 5. The generated response for user will be included with the possible conditions of the symptoms and a care recommendation will be provided 6. The report with generated response and symptoms entered previously will be saved into database.		
Sub Flows: 1. User can choose to proceed History to view the history of conditions analysed. 2. User can choose to delete history or all history.		

4.3.3 Track Sleep

Use Case Name: Track Sleep	**ID:** 3	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User – Have trouble in managing sleeping habit and wants a structured sleeping habit.		
Brief Description: User able to record their sleep duration each day and set a notification to notify user rest for the day for sleep and also an alarm to wake user up at the time set by user.		
Trigger: User selects Sleep Track in dashboard. **Precondition:** User is accessing dashboard.		
Normal Flow of Events: 1. User accesses the Sleep Track in dashboard. 2. User set the time to sleep and time to wake up. 3. Countdown timer will be displayed to ensure user aware of the time. 4. Once the time to sleep match with the real time, a notification will be popped three times to notify user to sleep with a 10 second interval. 5. An alarm will ring at the time set by user to wake user up. 6. User needs to access the feature to stop the alarm else user will keep ring by the application. 7. A weekly sleep pattern is generated depends on the time set in step 2 and saved to database.		
Sub Flows: 1. User can manually update the time in weekly sleep pattern. 2. User can choose to turn on or off the reminder from the toggle in the feature.		

4.3.4 Medication

Use Case Name: Medication	**ID:** 4	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User – Have trouble in having proper time to take medication and record the medication.		
Brief Description: User able to add, edit or delete the medication and record medication taken by user. User can also set reminder to remind user.		
Trigger: User selects Medication Reminder from navigation bar or dashboard.		
Normal Flow of Events: 1. User accesses Medication Reminder. 2. User by default access to Medication tab and able to add medication from the icon at right corner. 3. User fills in details to add medication and set frequency and duration for each medication. 4. By default, a reminder will be set to remind user to take medication based on the frequency set. 5. A countdown timer is displayed and once times up, notification and alarm will be triggered to remind user take medication. 6. User requires to click the tick button to indicate medication is taken else the alarm will not stop. 7. User can choose to edit or delete the medication.		
Sub Flows: 1. User can choose to turn on or off the reminder from the toggle in the feature.		

4.3.5 Appointment

Use Case Name: Appointment	**ID:** 5	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User – Expect to puncture in meeting the appointment agreed with the hospital or clinic.		
Brief Description: User able to add, edit or delete the appointment and set reminder to remind user.		
Trigger: User selects Medication Reminder from navigation bar or dashboard.		
Normal Flow of Events: 1. User accesses Medication Reminder and by default access to medication tab. 2. User accesses appointment tab and add appointment icon is at the bottom corner for user to add appointment. 3. User fills in details to add appointment and there is option for user to set a reminder from the toggle. 4. User turns on the reminder from toggle and a real time countdown timer will count for the upcoming appointment. 5. Once the timer times up, notification and alarm will be triggered to remind user go for the appointment. 6. User requires to click the tick button to indicate appointment is meet else the alarm will not stop. 7. User can choose to edit or delete the appointment.		
Sub Flows: 1. User can choose to turn on or off the reminder from the toggle in the feature. 2. For past appointments that did not attend, edit date option is disabled and require user to reschedule. 3. History tab is provided for user to track the appointments attended previously.		

4.3.6 Hydration

Use Case Name: Hydration	**ID:** 6	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User – Constantly forget to drink water and wants to remind themselves to hydrate for maintain the balance hydration for their body		
Brief Description: User able to log their water intake or set a goal to achieve.		
Trigger: User selects Hydration from navigation bar or dashboard.		
Normal Flow of Events: 1. User accesses Hydration and default 7 glasses of water intake are required user to achieve. 2. User choose the reminder interval required from the presets and turn on the reminder to start. 3. When the reminder interval times up, user will get a notification and alarm to remind user rehydrate in case they are not watching their phone. 4. User requires to access the Hydration and click add glass or the bottom right corner glass of water icon to stop the alarm and increment the count of water intake.		
Sub Flows: 1. User can choose to turn on or off the reminder from the toggle in the feature. 2. User can set daily water goal and click Update to update the water intake. 3. User can click remove a glass of water if they misclicked. 4. User can reset today's progress manually if they want to achieve the goal again.		

4.3.7 Chat with Mental Health Support Powered Bot

Use Case Name: Chat with Mental Health Support Powered Bot	**ID:** 7	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User – Have trouble in face-to-face conversation with real life friend or person that able to provide mental health support and listen to them.		
Brief Description: User can chat with the mental health chatbot for emotional support and release their stress by talking their difficulties to the chatbot.		
Trigger: User selects Chatbot from floating chatbot or dashboard.		
Normal Flow of Events: 1. User accesses Chatbot and a welcome message will be sent to user for each fresh conversation. 2. User chats with the chatbot and express their feeling. 3. Chatbot will generate a warm, passionate and considerate response to user ensuring user has a sense of belonging. 4. User can choose to click the speaker button at each chat from chatbot to obtain text to speech feature.		
Sub Flows: 1. User can choose to switch the voice settings like pitch and speech rate for the chatbot to speak. 2. User can choose to clear all the conversation by clicking the first button at the top right corner.		

4.3.8 Plan Nutrition

Use Case Name: Plan Nutrition	**ID:** 8	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User – Wants to plan meals and maintain a balanced diet.		
Brief Description: User able to set a daily target calorie, search ingredients and also have a random meal plan for the day.		
Trigger: User selects Nutrition from navigation bar or dashboard.		
Normal Flow of Events: 1. User accesses Nutriton and a drop-down button at the bar is able to click for perform searching meal. 2. User can choose to set the meal for daily target of calorie or ingredient or both together to search desired meal. 3. Application will return list of meals with the nutrition value and the option to view the recipe details. 4. User clicks the view recipe details and will be prompt to a page with overview, instructions, ingredients and nutrition value of the recipe. 5. User needs to click back button on top left corner to go back for another search. 6. User that wants some random meal can click Generate Meal Plan that will generate 3 meals for user to take. 7. Further details required user to click view recipe details for a detailed information.		
Sub Flows: 1. User can choose to favourite the meal plan they happy or interest with.		

4.3.9 Health and Fitness Challenge

Use Case Name: Health and Fitness Challenge	**ID:** 9	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User – Wants some challenge in fitness or knowledge of health related.		
Brief Description: User able to participate in four daily activities that is randomized from set of activity lists and random one quiz from the pool.		
Trigger: User selects Health Challenge from dashboard.		
Normal Flow of Events: 1. User accesses Health Challenge and simple daily progress with current points and level is displayed. 2. 4 daily activities and 1 quiz is generated for user to achieve as a simple challenge for engaging exercise among users. 3. User click on the interested activities and the activity will direct user to a screen for challenge 4. Details of the activity and instruction is provided to guide user and a timer is provided for user to start the activity. 5. User needs to complete the activity by start the timer else the activity will not be completed. 6. Once user completed the activity, user obtained points and can proceed to take quiz. 7. User needs to answered quiz and correct answer will reward points while wrong answer will provide an explanation and reward points as participation.		

4.3.10 Emergency Assistance

Use Case Name: Emergency Assistance	**ID:** 10	**Importance Level:** High
Primary Actor: User		
Stakeholders and Interests: User – Facing an emergency situation and lack of basic first aid knowledge.		
Brief Description: User able to access the first aid required to provide assistance to patient.		
Trigger: User selects Emergency from navigation bar or dashboard.		
Normal Flow of Events: 1. User accesses Emergency and preset options with description is required for user to describe the emergency. 2. The preset options in Health Background, description and photos is optional and user require to at least use one for system work. 3. User fills in the emergency facing by the patient. 4. System will generate a step-by-step response and extra tips if there is for user to perform assistance. 5. User can choose to turn on the toggle and play the speech of the step that will play automatically. 6. User can aid without the need to keep monitoring the steps in the device. 7. Queried done by user will be save inside history for user to track.		
Sub Flows: 1. User can also to choose attach photos for application analyse the emergency. 2. User can adjust the speech rate after the system generated the response. 3. History tab is provided for user to track the emergency faced previously.		

4.4 Database Design

Entity	Description
users	Main user account information and authentication data
profile	User's personal profile details
healthData	Aggregated health statistics and baseline data
Medications	User's medication reminders and schedules
appointments	User's medical appointments and schedules
sleepData	Daily sleep tracking records
chatHistory	Chatbot conversation history for each user
healthStats	Daily health statistics and metrics
emergency_guides	Global emergency response guides and first aid information

4.4.1 users

Field Name	Data Type	Null	PK/FK	Description
uid	string	No	PK	Firebase Auth generated user ID
email	string	No	-	User's email address
createdAt	timestamp	No	-	Account creation time (server)
lastLoginAt	timestamp	No	-	Last login time (server)
profile	map	No	-	Embedded profile object
healthData	map	No	-	Aggregated health statistics

4.4.2 profile

Field Name	Data Type	Null	PK/FK	Description
uid	string	No	PK, FK	References users.uid
firstName	string	No	-	User's first name
lastName	string	No	-	User's last name
age	number (int)	No	-	User's age (1-120)
gender	string	No	-	Gender (Male/Female/Other)
height	number (double)	No	-	Height in centimeters
weight	number (double)	No	-	Weight in kilograms
activityLevel	string	No	-	Activity level (5 options)
bmi	number (double)	No	-	Calculated BMI value
createdAt	timestamp	No	-	Profile creation time (server)
updatedAt	timestamp	No	-	Last profile update time (server)

4.4.3 healthData

Field Name	Data Type	Null	PK/FK	Description
uid	string	No	PK, FK	References users.uid
totalPoints	number (int)	No	-	Total health points earned
currentLevel	number (int)	No	-	Current user level
achievements	array<object>	No	-	List of achievements
completedChallenges	array<object>	No	-	List of completed challenges
waterIntake	number (int)	No	-	Daily water intake (legacy)
sleepHours	number (int)	No	-	Daily sleep hours (legacy)
medicationReminders	array<object>	No	-	Medication reminders (legacy)
updatedAt	timestamp	No	-	Last health data update (server)

waterIntakeDate	string	No	-	Date for water intake reset (yyyy-MM-dd)

4.4.4 medications

Field Name	Data Type	Null	PK/FK	Description
medicationId	string	No	PK	Auto-generated document ID
uid	string	No	FK	References users.uid
medicationName	string	No	-	Name of medication
dosage	string	No	-	Dosage information
times	array<string>	No	-	Reminder times (HH:mm format)
isActive	boolean	No	-	Whether reminder is active
createdAt	timestamp	No	-	Creation time (server)
updatedAt	timestamp	Yes	-	Last update time (server)

4.4.5 appointments

Field Name	Data Type	Null	PK/FK	Description
appointmentId	string	No	PK	Auto-generated document ID
uid	string	No	FK	References users.uid
purpose	string	No	-	Appointment purpose/type
dateTime	timestamp/string	No	-	Appointment date and time
notes	string	Yes	-	Additional notes
createdAt	timestamp	No	-	Creation time (server)
updatedAt	timestamp	Yes	-	Last update time (server)

4.4.6 sleepData

Field Name	Data Type	Null	PK/FK	Description
sleepDataId	string	No	PK	Date key (yyyy-MM-dd)
uid	string	No	FK	References users.uid
sleepHours	number (double)	No	-	Hours of sleep
sleepTime	timestamp	No	-	Sleep start time
wakeTime	timestamp	No	-	Wake up time
sleepQuality	string	No	-	Sleep quality rating
date	string	No	-	Date key (yyyy-MM-dd)
createdAt	timestamp	No	-	Creation time (server)

4.4.7 chatHistory

Field Name	Data Type	Null	PK/FK	Description
chatId	string	No	PK	Auto-generated document ID
uid	string	No	FK	References users.uid
isUser	boolean	No	-	True if user sent message
message	string	No	-	Chat message content
timestamp	timestamp	No	-	Message timestamp
createdAt	timestamp	No	-	Creation time (server)

4.4.8 healthStats

Field Name	Data Type	Null	PK/FK	Description
healthStatId	string	No	PK	Date key (yyyy-MM-dd)
uid	string	No	FK	References users.uid
type	string	No	-	Type of health statistic
data	map	No	-	Flexible data payload
date	string	No	-	Date key (yyyy-MM-dd)
createdAt	timestamp	No	-	Creation time (server)

4.4.9 emergency_guides

Field Name	Data Type	Null	PK/FK	Description
guideId	string	No	PK	Auto-generated document ID
conditionKey	string	No	-	Query key for condition
topicKey	string	No	-	Query key for topic
conditions	array<string>	No	-	List of conditions
description	string	No	-	Guide description
guidance	string	No	-	Guidance instructions
imagesCount	number (int)	No	-	Number of images
notes	string	Yes	-	Additional notes
createdAt	timestamp	No	-	Creation time (server)
createdBy	string	No	FK	References users.uid

CHAPTER 5

System Implementation

5.1 Setting and Configuration

Since Firebase offers a lot of services and one of them is Firestore Database which is a NoSQL database which allow users to save their data each time they interact with the application and enable easy management with data. It is easy to use as it does not require any programming in the firebase backend infrastructure which brings a faster development for the application. The other service which is Firebase Authentication helps in authenticate the user's information. These services held online save a lot of resources for both developers and users. The Firebase plan in this project will be using only Spark plan which is free compared to Blaze plan which is pay as you go.

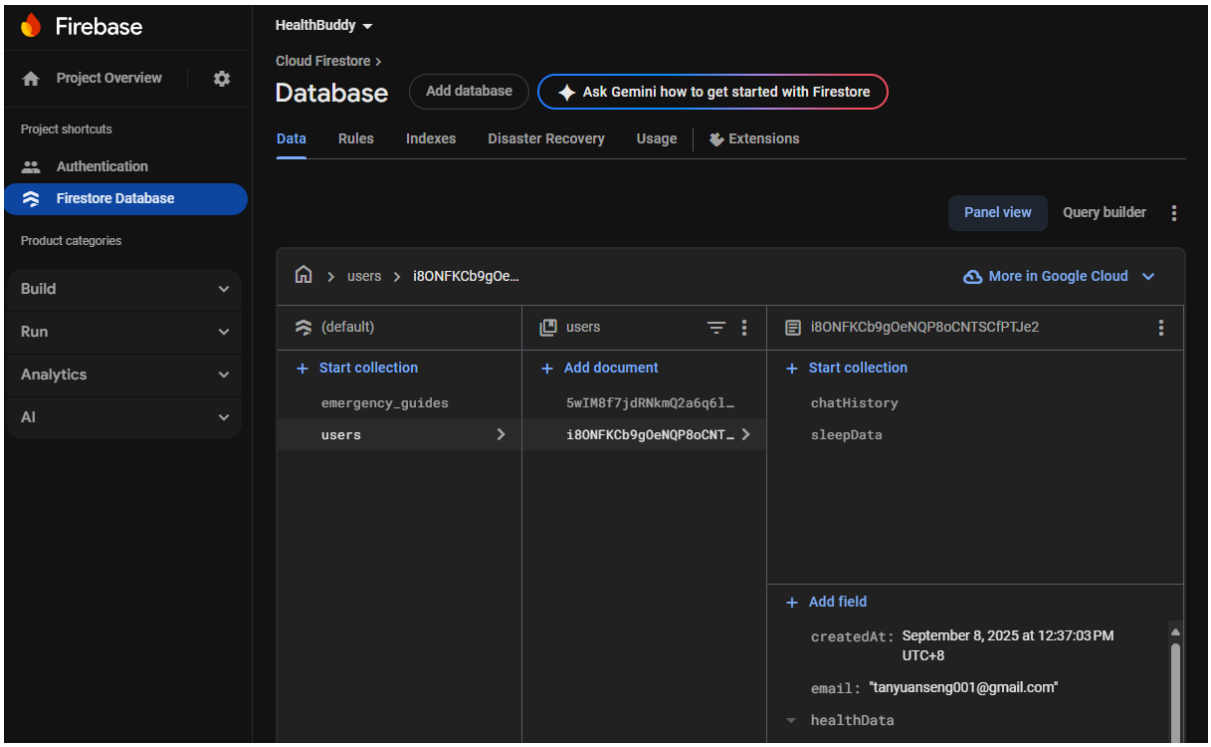

Figure 5.1.1: Overview of services used in Firebase

Before using the services, a project needed to be created in Visual Studio Code which is the coding environment and the code language will be Dart from Flutter.

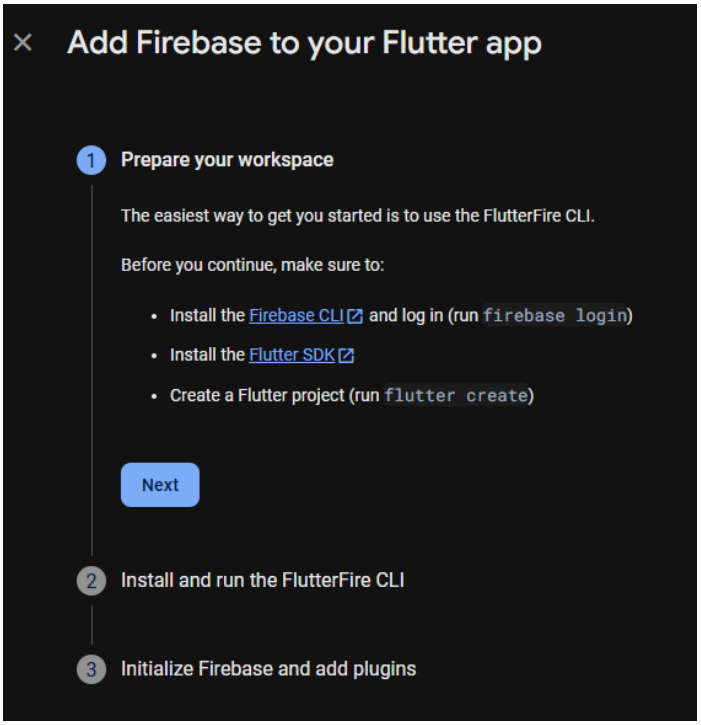

Figure 5.1.2: Connection between application and Firebase

Once the project is created, a connection is needed to make between the application and Firebase. After following the steps mentioned above, a firebase_options.dart file will be automatically generated with the contents are the configuration settings of Firebase. The figure below is the file generated. Inside the file, there are a lot of that will be required to access the Firebase from different operating systems.

```dart
class DefaultFirebaseOptions {
  static FirebaseOptions get currentPlatform {
    if (kIsWeb) {
      return web;
    }
    switch (defaultTargetPlatform) {
      case TargetPlatform.android:
        return android;
      case TargetPlatform.iOS:
        return ios;
      case TargetPlatform.macOS:
        return macos;
      case TargetPlatform.windows:
        return windows;
      case TargetPlatform.linux:
        throw UnsupportedError(
          'DefaultFirebaseOptions have not been configured for linux - '
          'you can reconfigure this by running the FlutterFire CLI again.',
        );
      default:
        throw UnsupportedError(
          'DefaultFirebaseOptions are not supported for this platform.',
        );
    }
  }
```

Figure 5.1.3: Generated configuration setting file by Firebase

From Figure 5.1, there are two databases which are users and emergency_guides that will be utilized throughout the application. Every user's data is stored in the user's collection and unique ID will be generated to be assigned to users to be identified. Thus, there is no need to create new field for specifying the user ID. The part where the user ID generated is unique is because Firebase Authentication generating the ID in the process of registration the account as seen in the figure below.

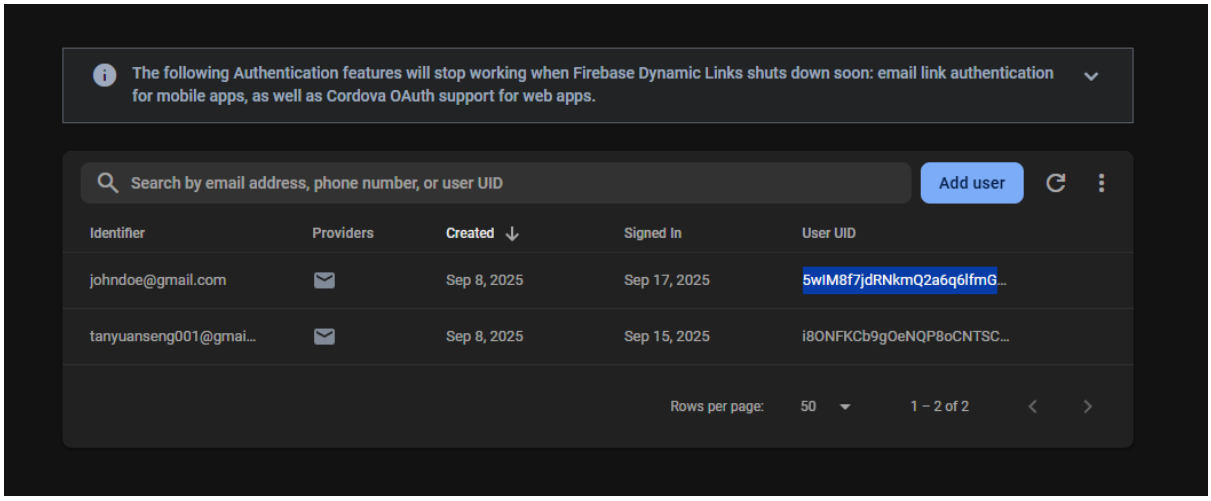

Figure 5.1.4: Content in Firebase Authentication

5.2 System Operation

5.2.1 Register

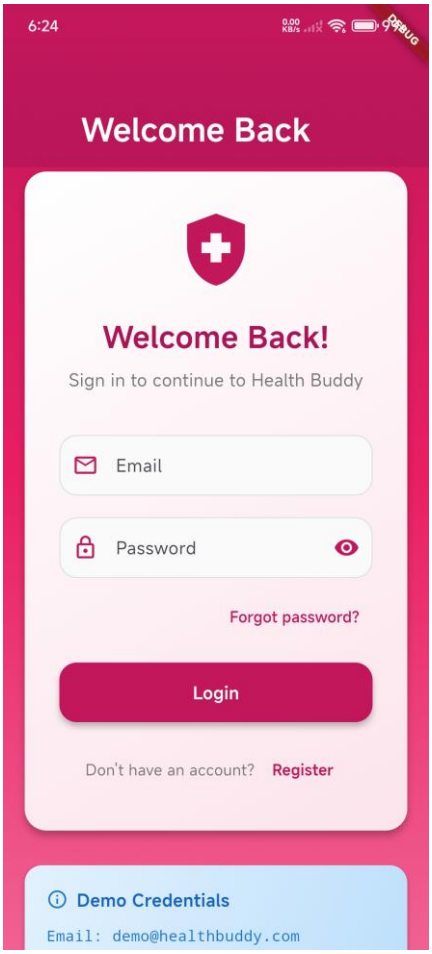

Figure 5.2.1: Login Page

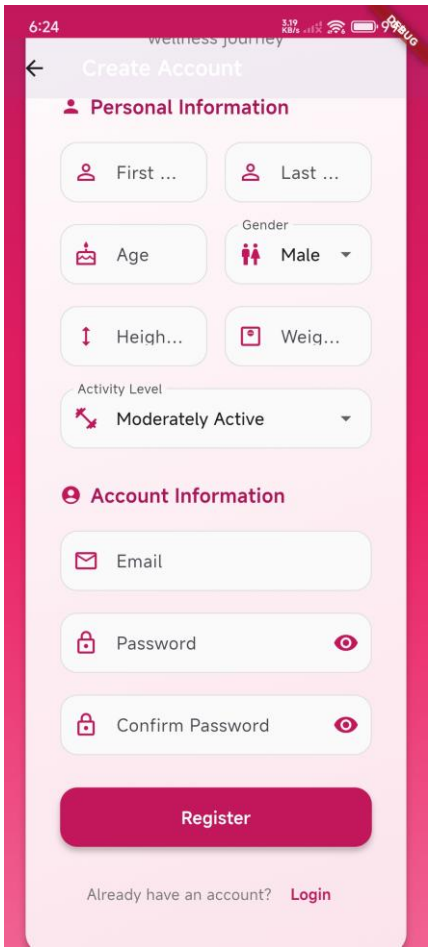

Figure 5.2.2: Register Page

For first time user using the application, user requires to register an account as shown in Figure 5.2.2 by filling in the first name, last name, age, gender with drop down option, height in cm, weight in kg and activity level with drop down option. Weight and height are required due to calculation of BMI in the dashboard. The email and password will also be required to create an account for authentication purpose when user trying to access the application. All field is required to be filled out, email must be in the format of email and password length must be more than or equal to 6. Once user done registration, user can proceed to the Login Page as shown in Figure 5.2.1.

5.2.2 Dashboard

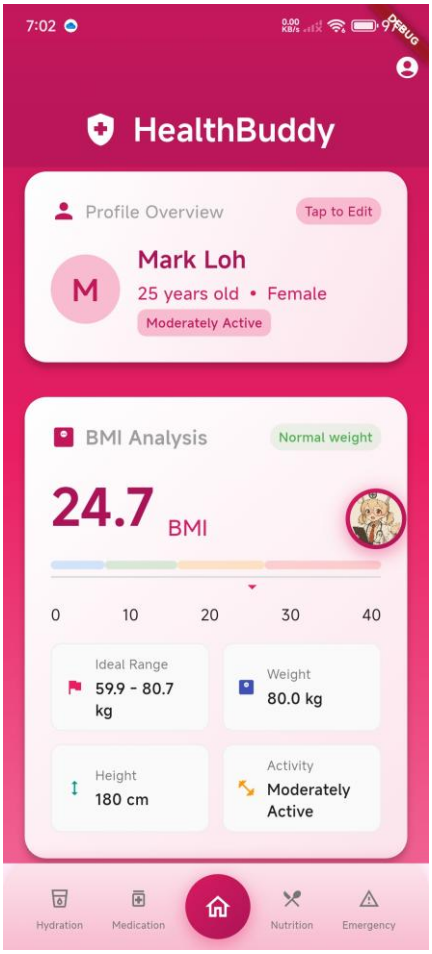

Figure 5.2.3: Dashboard Top

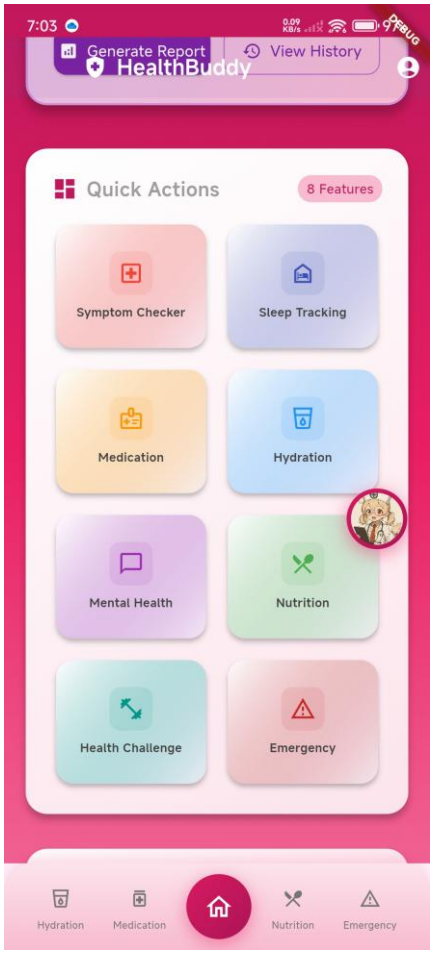

Figure 5.2.4: Dashboard Bottom

Once user has done perform the log in process, user will be redirected to the dashboard which is the main screen of the application. The details filled previously will be generating BMI as seen in Figure 5.2.3. Users can navigate to their profile by tapping on the profile overview in the dashboard. There is also navigation bar to quick access preset features in the application with the order of Hydration Reminder, Medication and Appointment Reminder, Dashboard, Nutrition Planner and Emergency Assistance feature. Other features can be found at the bottom side of the dashboard as shown in Figure 5.2.4. A floating chatbot window is also provided for user to quickly access to the feature. There is an icon at the top right corner that allows users to log out if they want to.

5.2.3 Profile

Figure 5.2.5: Viewing Profile

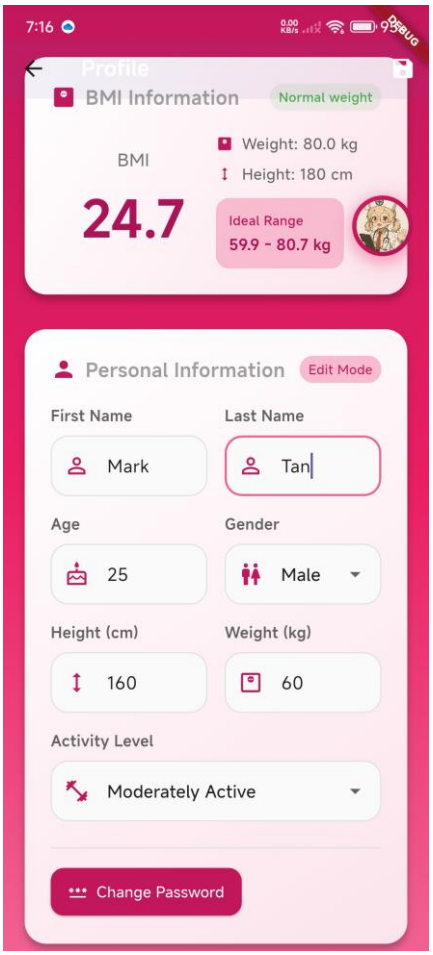

Figure 5.2.6: Editing Profile

When user proceed to view the profile, previously filled profile data will be shown in the profile screen as shown in Figure 5.4.1 and user can choose to edit the profile by proceed to the top left corner of the profile screen with a pencil icon and update the profile. Once user choose to edit the profile, user will be able to make changes in the user personal information. In edit mode, user can upload their image as their profile image. User can also choose to change password if they want to. Once user done editing user can proceed to the top right corner with save icon to save the information changes.

5.2.4 Sleep Tracker

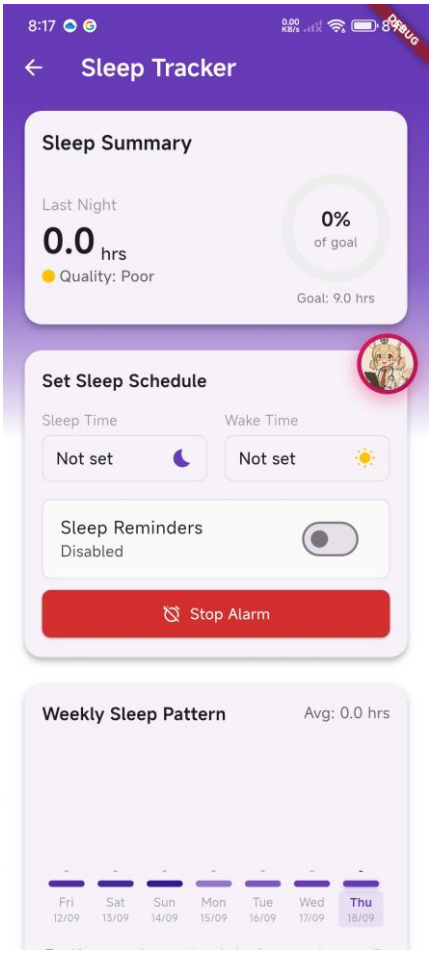

Figure 5.2.7: Sleep Tracker Screen

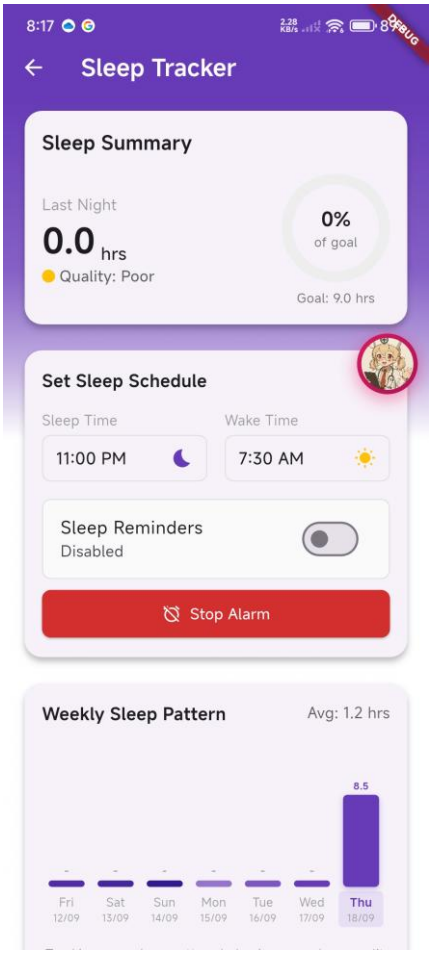

Figure 5.2.8: Set Sleep Time And Wake Time

When user choose the Sleep Tracker feature, they will be redirected to Sleep Tracker Screen as shown in Figure 5.2.7. For new user, the screen will be empty because no previous data loaded to the application. User can set sleep schedule by setting a sleep time and wake time and the relevant calculation will be done to become the daily sleep pattern as shown in Figure 5.2.8.

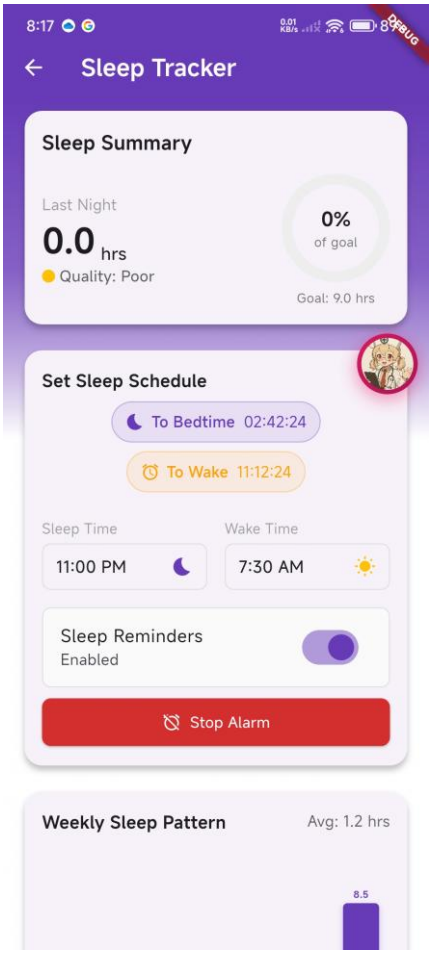

Figure 5.2.9: Sleep Reminder

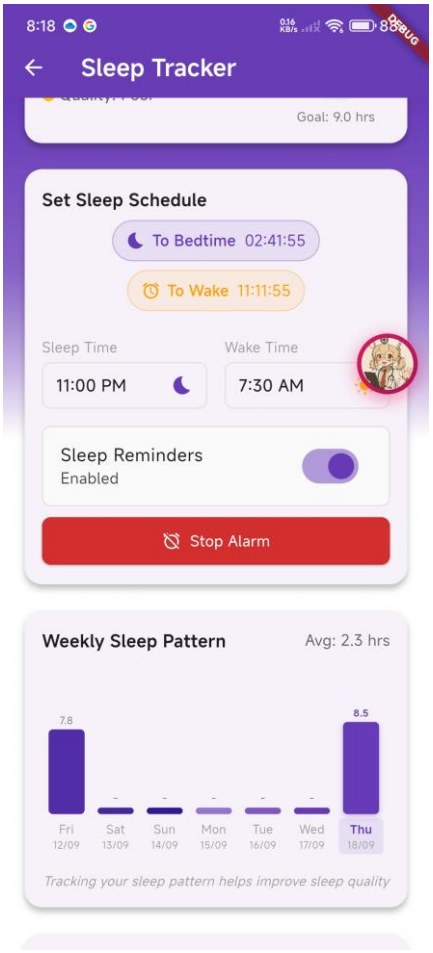

Figure 5.2.10: Update Sleep Pattern

User can choose to turn on or off for the reminder by switching the toggle button. If user choose to turn on, they will get notification reminder depends on their sleep time set and alarm at the wake time set. User needs to click the Stop Alarm button to stop the alarm else the alarm will keep ringing. For user that forgot to record or new user with no sleep pattern, they can manually record the sleep duration that day by themselves. When user has sufficient amount of sleep records, a sleep summary will be shown.

5.2.5 Symptom Checker

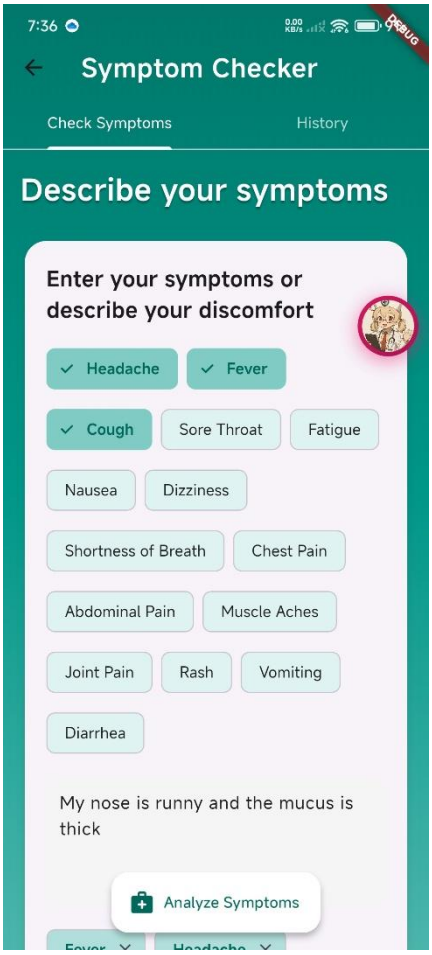

Figure 5.2.11: Symptom Checker

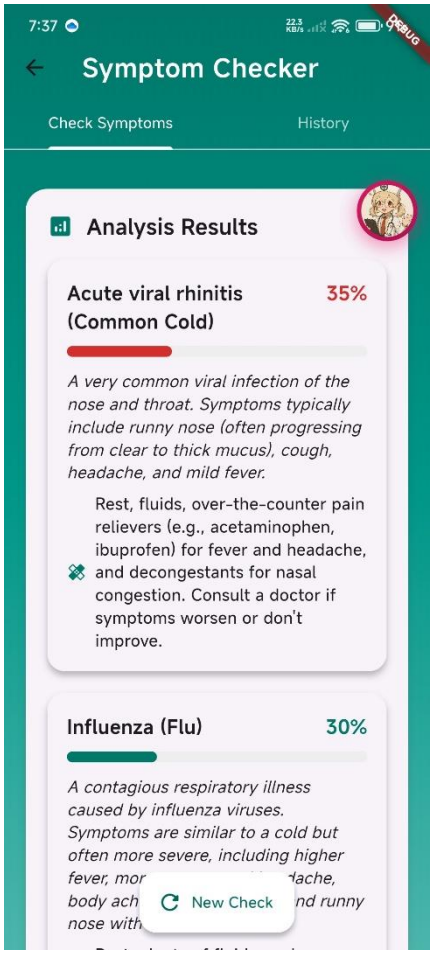

Figure 5.2.12: Analysed Result

When user click the Symptom Checker feature, user will be having a page as shown in Figure 5.2.11 with preset symptoms and a text box for user to input symptoms. After user done inserting their symptoms, they can click Analyze Symptoms for an analysis result on their possible conditions. After waiting for the results to be generated, an analysis result with possible conditions with percentage, details and recommendation needed to consider for user. Once the result is analysed, user can track back the result in the history tab. User can also have a new check if they have other conditions.

5.2.6 Hydration Tracker/ Reminder

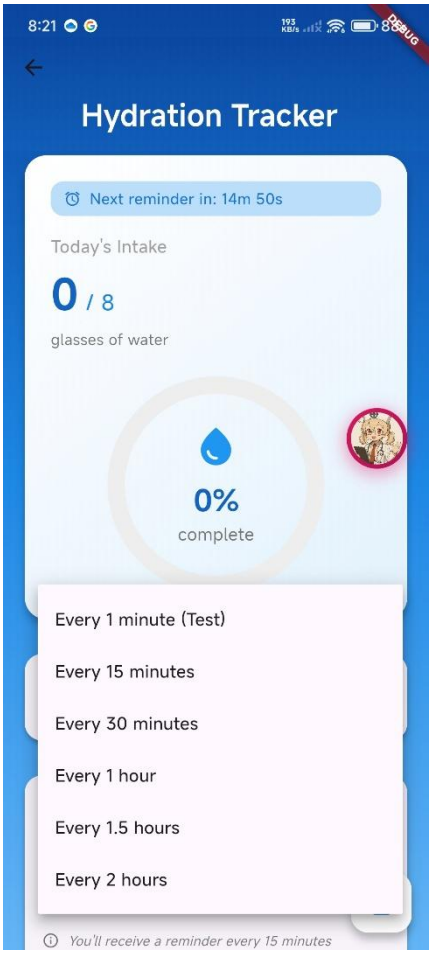

Figure 5.2.13: Hydration Tracker

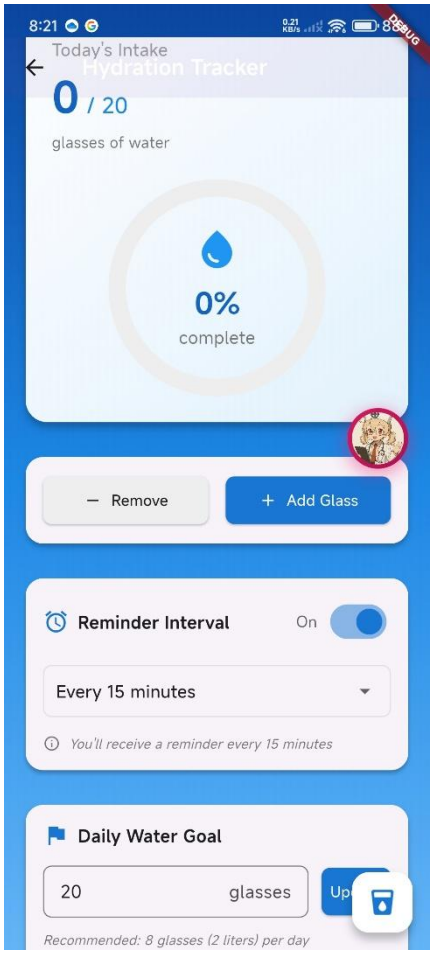

Figure 5.2.14: Update Water Goal

Hydration Tracker feature is a feature that enable user to track their water intake daily and also serve as a reminder that implements an alarm feature to remind user hydrate. User by default will have 8 glasses of water needed to intake each day and for the reminder to works, user need to select a time interval for each intake of water. Once user set a time interval, user need to turn on the reminder from the toggle and a countdown timer will be displayed as shown in Figure 5.2.13. To stop the alarm, user is required to click “Add Glass” or click the bottom right corner glass icon button. User can also choose to update their daily water goal as shown in Figure 2.14 to maintain hydrate.

5.2.7 Medication and Appointment Reminder

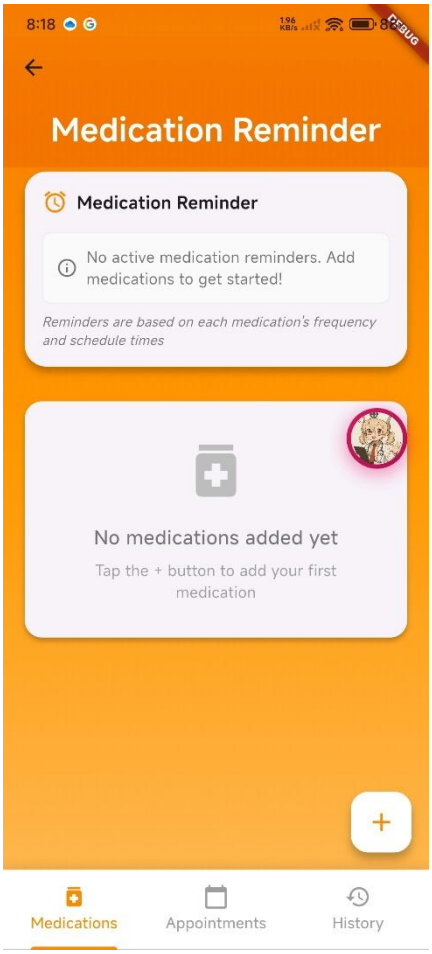

Figure 5.2.15: Medication Reminder

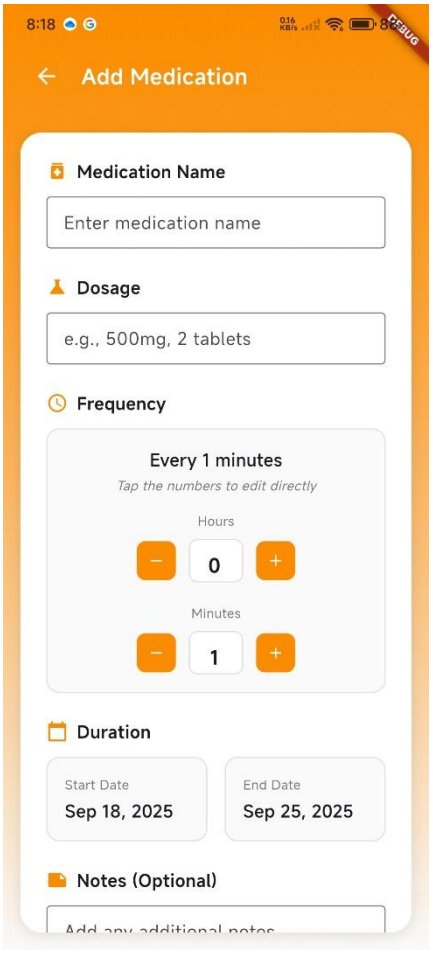

Figure 5.2.16: Add Medication

Medication Reminder is a feature that allows user to have a reminder system on reminding user to take medication at a range of time. In Figure 5.2.15, since the user is new to the app the medication is empty and user need to navigate to the add button at the bottom right corner to add medication. Once user click the button, user will getting add medication screen as shown in Figure 5.2.16 to fill in the details of the medication information.

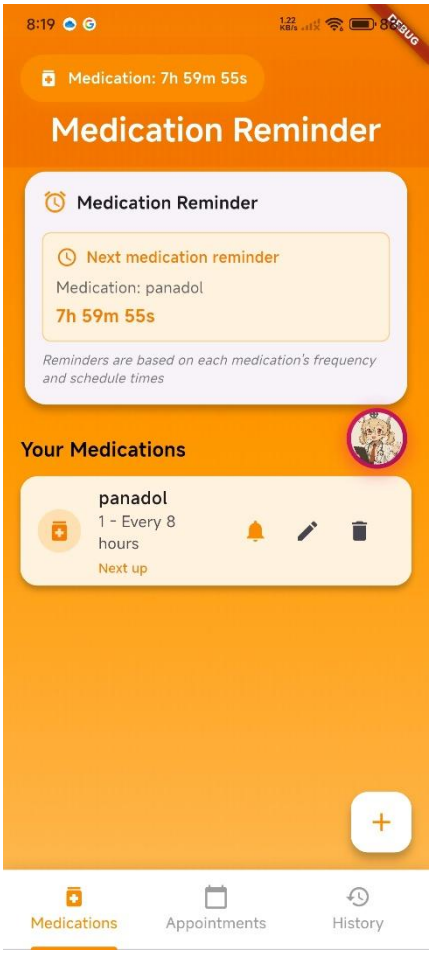

Figure 5.2.17: Reminder Timer

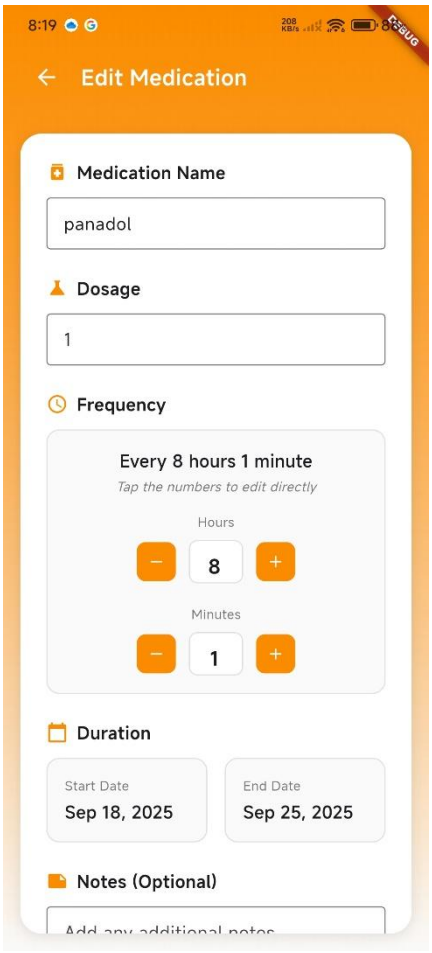

Figure 5.2.18: Edit Medication

Once user done filling the information, the medication reminder timer will automatically start at the frequency set by user and notification with alarm will be received by user when the times up. User is required to click the button that will be showed up when the alarm rings to stop the alarm as an action to tell system medication is taken. User can also edit the medication to update their medication or delete the medication.

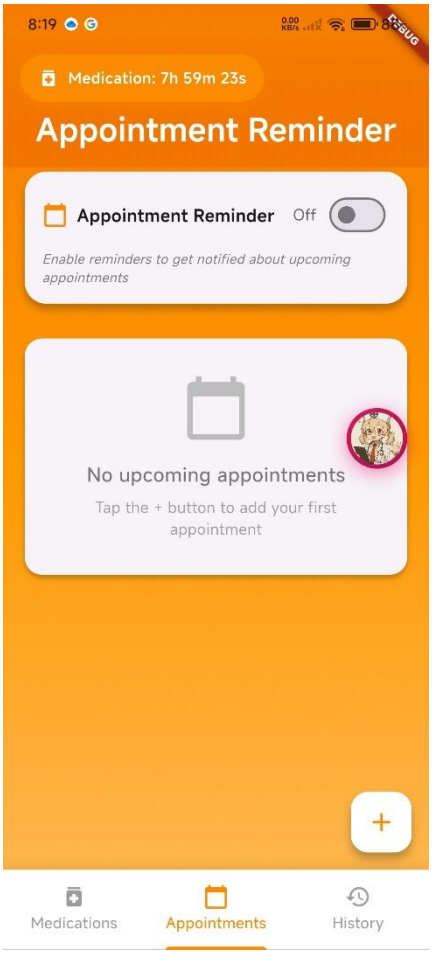

Figure 5.2.19: Appointment Reminder

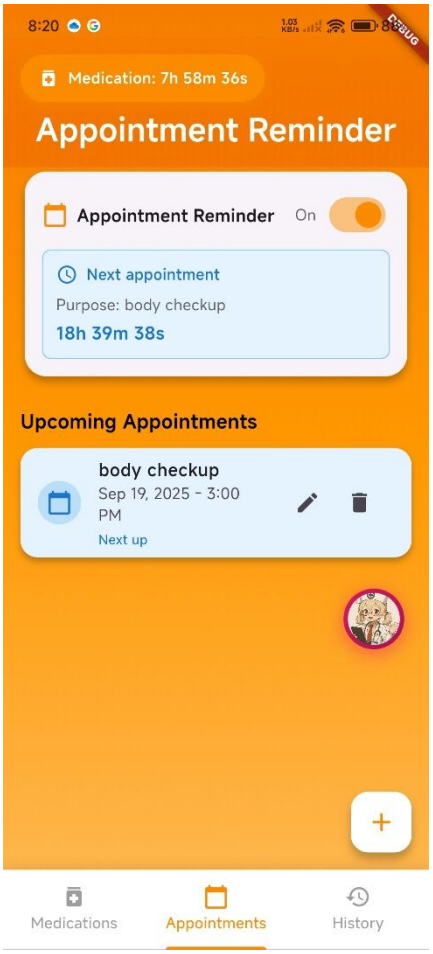

Figure 5.2.20: Appointment Timer

In the tab, user can choose Appointments to note their upcoming appointments made with medical team. User will have a similar add screen as Figure 5.2.16 and require user to fill in the details for the appointment. Once user complete filling up the form, user is also required to toggle on the Appointment Reminder for reminder. A countdown timer will display to user to identify the upcoming appointment. Once the time is up, user will receive notification as well as alarm reminder. User will need to click the tick button in the card to tell system to stop alarming.

5.2.8 Chatbot

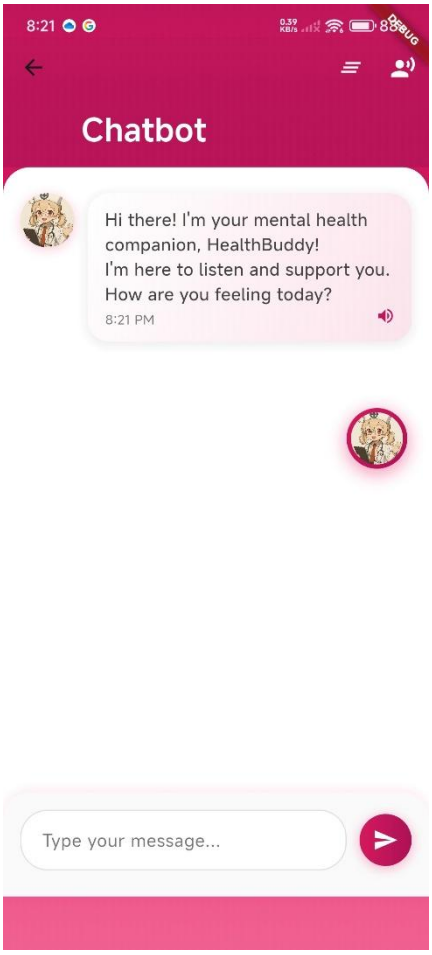

Figure 5.2.21: Chatbot Screen

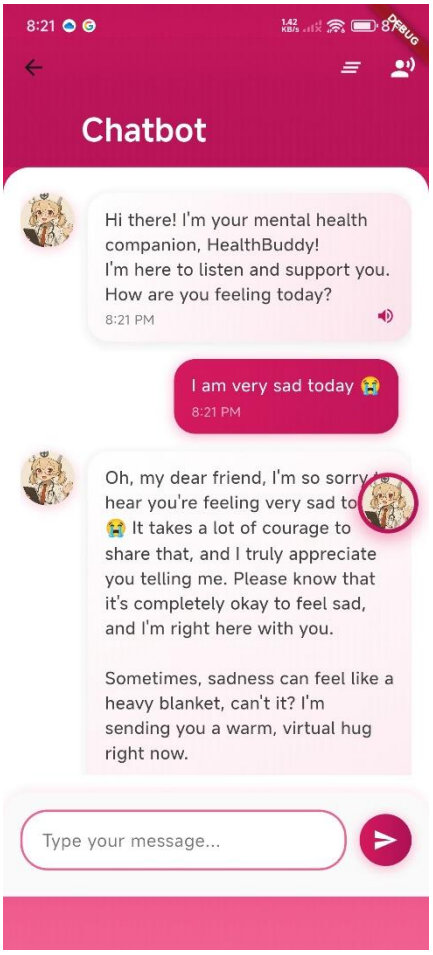

Figure 5.2.22: Chatbot Response

User with emotional issue and require mental support can access the chatbot feature provided by the application. User will be welcomed with a warm message from the chatbot and user is ready to chat with the chatbot. Chatbot will respond user with a compassionate and warm response to provide best experience to user and release their stress from the conversation as shown in Figure 5.2.22. User has the option to change the speech rate and pitch to personalize their chatbot. The speech will be a little bit not natural as it implements the user's device speech system. User can also choose to delete the conversation from the first button at the top right corner.

5.2.9 Nutrition Planner

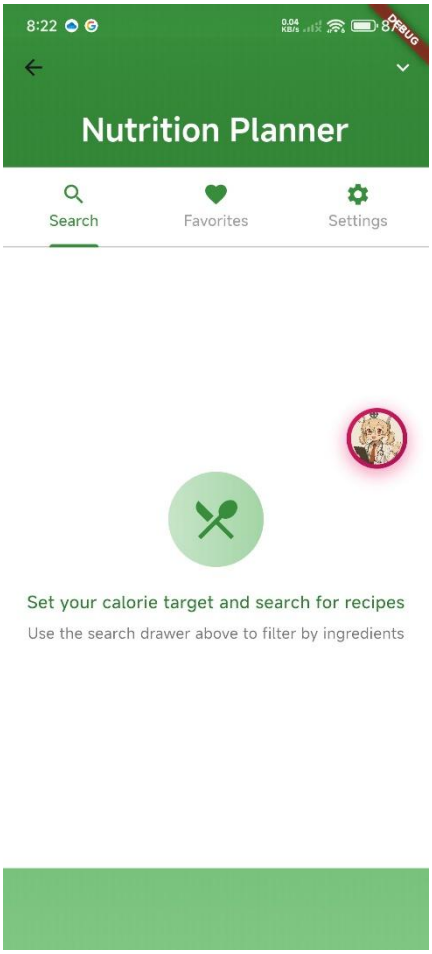

Figure 5.2.23: Nutrition Planner

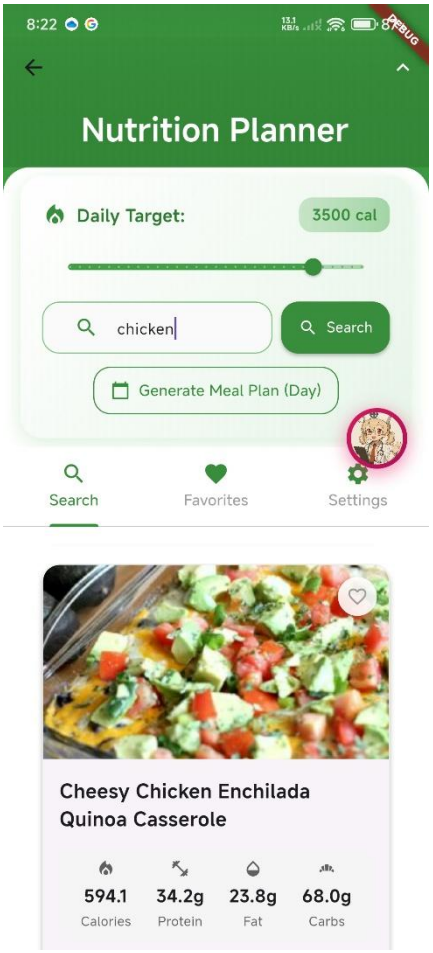

Figure 5.2.24: Recipe Searched

User that prefers to have a healthy and balanced diet will access the feature Nutrition Plsnner that allows user to set a daily target calorie and option to insert ingredient. Once user done inserting the search query, the system will direct the query through the Spoonacular API and retrieve relevant information of the recipes as shown in Figure 5.2.24. The recipe is included with some nutritional insights of the recipe as well as the image of the recipe.

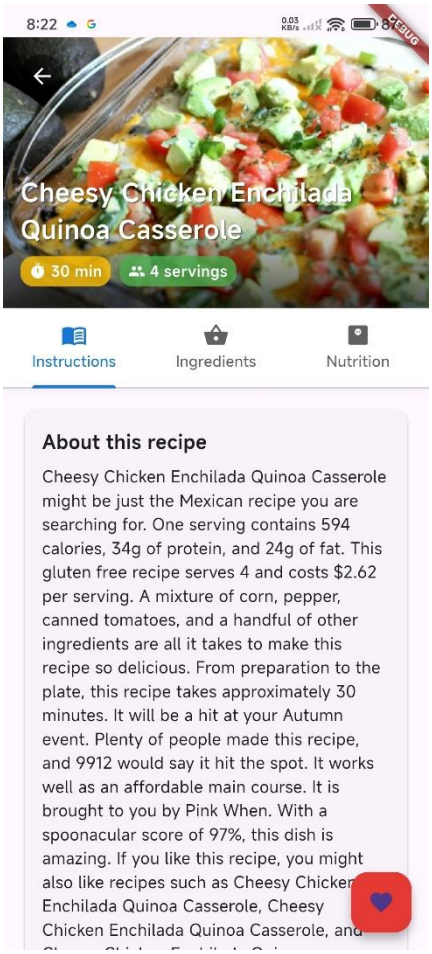

Figure 5.2.25: View Recipe

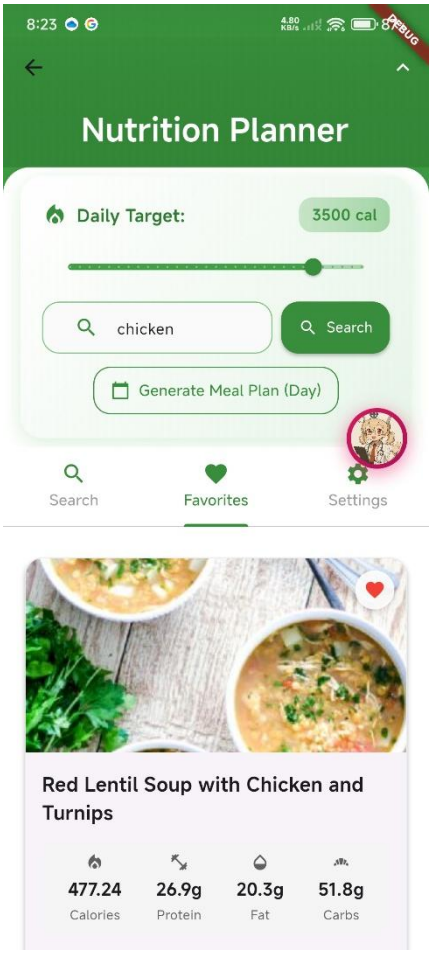

Figure 5.2.26: Favourite Recipe

Once user is prompted with recipes, user can choose to view the recipe to look up for the recipe instructions, ingredients and nutrition. User will be redirected to a screen as shown in Figure 5.2.25 that allows user to analyse the nutritional value of the recipe as well as learn the cooking recipe. User can also favourite the recipe to enable future self to look back for the recipe.

5.2.10 Fitness and Health Challenges

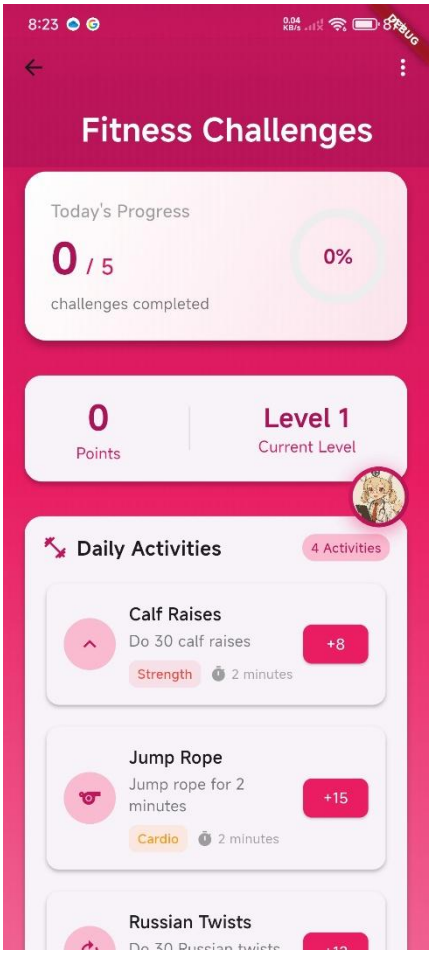

Figure 5.2.27: Fitness Challenge

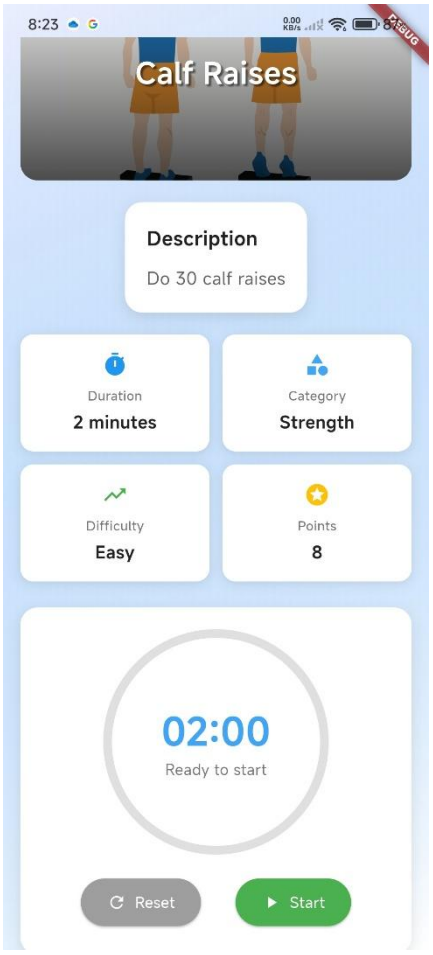

Figure 5.2.28: Activity Screen

For user that is looking for some challenges or merely want an activity, the Health and Fitness challenge is provided for them to challenge as shown in Figure 5.2.27. The feature will reset daily to engage user participate every day with random 4 activities and 1 quiz question related to health. It is encouraged for user to complete all the activities to earn points for level up and get achievement for it. To earn points, user require to click for the activity and user will be redirected to activity screen with some challenge information as shown in Figure 5.2.28. Once user understand the requirement of the challenge, they can begin by clicking the start button for the timer to countdown.

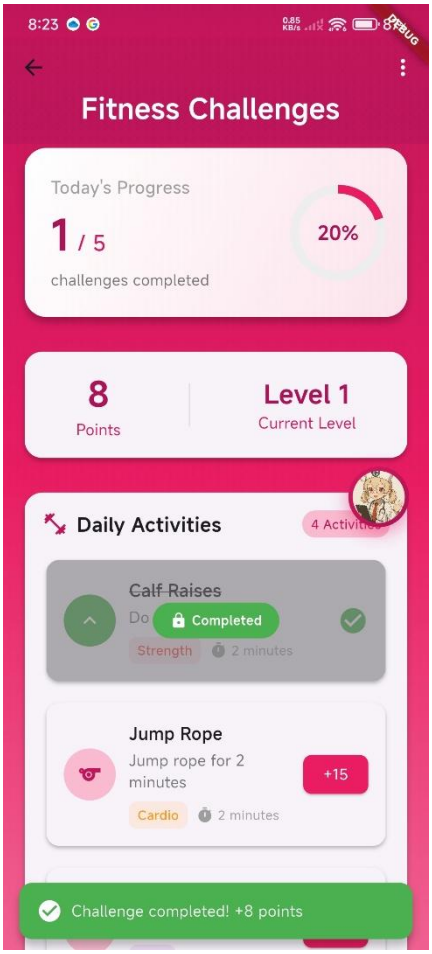

Figure 5.2.29: Completed Activity

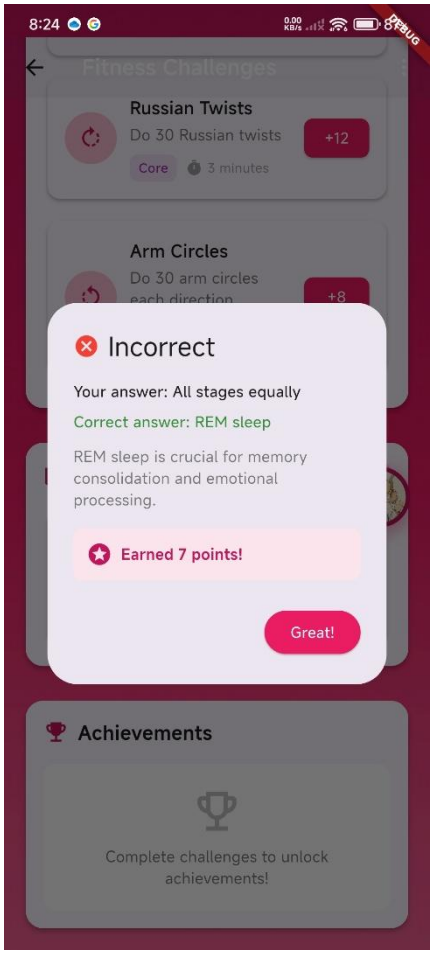

Figure 5.2.30: Quiz Answered

After completing the activity, user will earn points as shown in Figure 5.2.29 and user can proceed to continue with other activities including the quiz. When answering the quiz question, user will have 4 answers to select from. When user answered with an incorrect answer, the system will provide the correct answer to let user learn from the mistake and also providing points to reward user for challenge.

5.2.11 Emergency Assistance

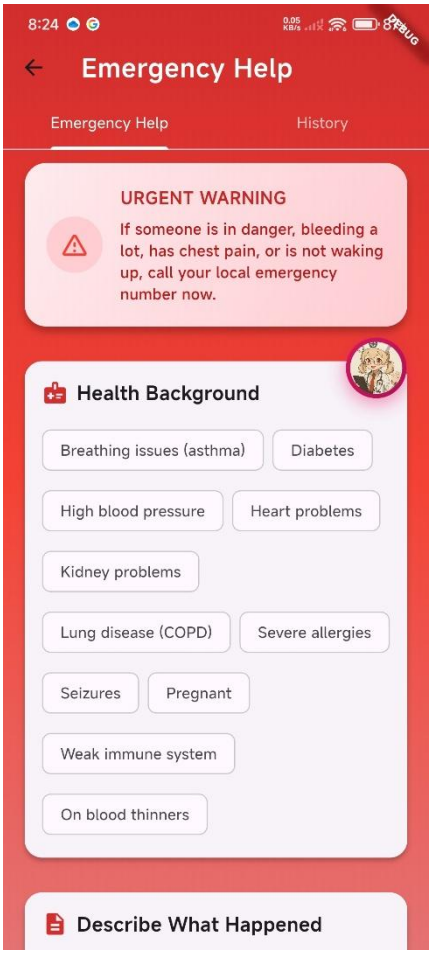

Figure 5.2.31: Emergency Assistance

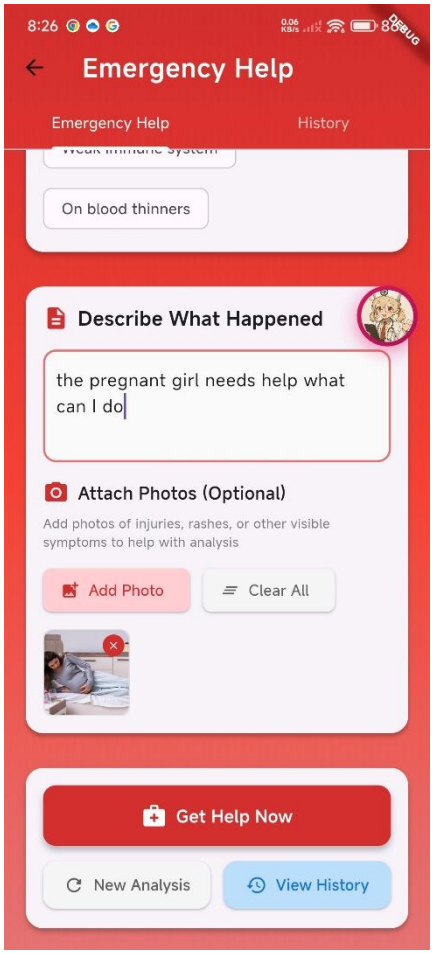

Figure 5.2.32: User prompt

User that encountered an emergency anywhere with no first aid or related knowledge can rely on the application which provide useful feature which is the Emergency Assistance. This feature aims to provide a step by step first aid to user in assisting patient with conditions. When user entering the feature, user can select the health background which is preset of conditions faced by user or just directly describe the emergency is the text box as shown in Figure 5.2.32. User can also include a photo to further describe for a better prompt to the application. Once user done describing the emergency, user can just simply click the Get Help Now button to analyse the condition and get step-by-step assistance from the application.

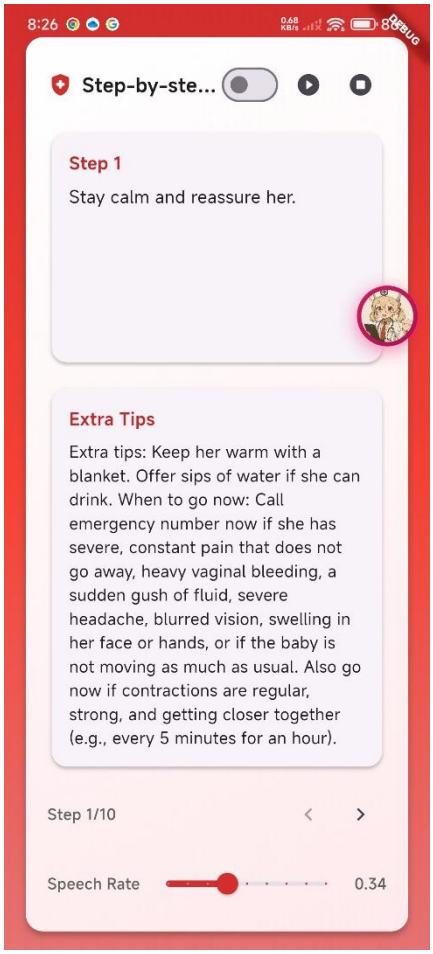

Figure 5.2.33: Emergency Steps

Once the application response with the step-by-step assistance, user can turn on the toggle for an automatic slide to next card to help user focusing on the patient. This feature is recommended to use with the play button shown in Figure 5.2.23 as it will turn the text into speech. Speech rate is also provided to let user adjust the speed of the speech. Extra Tips provided for user to take note of when providing the relevant assistance. The emergency with no images will be saved to a collection in Firestore Database named emergency_guides. This measure is to let another user to access faster for similar emergency quickly in the database compared to waiting for prompt. Emergency with image might have different conditions depend on the situation, thus the guide will only save on user side instead of database.

5.3 Implementation Issues and Challenges

During the development and implementation of the project, several issues and challenges have been encountered such as the integration of multiple features and performance considerations. The integration of Firebase to the application faced a problem which shows incompatibility and require some modification on the configuration to ensure successful builds and initialization of Firebase. Several research has been done online to figure out the possible causes that causing the issue. Feature such as Text to Speech is also limited with voice options that is not natural as what have been expected. This is due to Flutter plugin for the relevant feature is rely on the device voices which provided limited voice options causing the speech to become robotic instead of human-like. The solution for having a more natural sound requires to use third party services from cloud which requires to perform billing. Therefore, the application sticks with the Flutter plugin which leads to robotic response from the chatbot. There is also issue in searching for APIs that are suitable for the project as some of them requires additional cost which might bring some billing issues when trying to test for the project. Some free cost APIs are managed to be found and implemented in the application while the performance may not be too good compared to the billing APIs but it is sufficient to be used for the project. At the end of the project, user interface of the application is one of the problematic challenges needed to face as it requires a unified and standard interface among the application. There are some features that does not really fit such as the horizontal slidable navigation bar which is not user friendly to user. A normal navigation bar with 5 features is used to simplify the navigation feature for user to navigate the important features and other features that are not included in the navigation bar will be placed in the dashboard.

5.4 Concluding Remark

This chapter provides configuration and the operation of the system during the process of development and implementation of the system. A process of connecting the Firebase and utilizing the service of Firebase is explained as well as the explanation of the operation in the application. The chapter shows all the implemented user interfaces and the features used in the project with screenshots and the motive of the having the features integrated. There also some challenges encountered during the development progress and relevant measures has been done to mitigate the issues.

CHAPTER 6

SYSTEM EVALUATION AND DISCUSSION

6.1 System Testing and Performance Metrics

The system will be tested to evaluate the system's performance by using case testing which is a testing technique to identifying how the system works. A table with expected results and actual results will be shown in following subchapter.

6.2 Testing Setup and Result

6.2.1 Register Testing

Case Name: User Registration		**Case ID: T001**		
Purpose: Verify user registration functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Empty first name	System requires user to fill in first name	System requires user to fill in first name	Passed
2	Empty last name	System requires user to fill in last name	System requires user to fill in last name	Passed
3	Empty age	System requires user to fill in age	System requires user to fill in age	Passed
4	Invalid age (<1 or >120 or non-numeric)	System requires age in the range of 0 to 121	System requires age in the range of 0 to 121	Passed
5	Empty height	System requires user to fill in the height	System requires user to fill in the height	Passed

6	Invalid height (<50 or >250 or non-numeric)	System requires user to fill in height in range of 49 to 251	System requires user to fill in height in range of 49 to 251	Passed
7	Empty weight	System requires user to fill in the weight	System requires user to fill in the weight	Passed
8	Invalid weight (<20 or >300 or non-numeric)	System requires user to fill in weight in the range of 19 to 301	System requires user to fill in weight in the range of 19 to 301	Passed
9	Empty email	System requires user to fill in the email	System requires user to fill in the email	Passed
10	Email invalid format	System requires user to provide a valid email	System requires user to provide a valid email	Passed
11	Empty password	System requires user to fill in the password	System requires user to fill in the password	Passed
12	Short password (<6)	System requires user to enter at least 6 characters password	System requires user to enter at least 6 characters password	Passed
13	Confirm password empty	System requires user to repeat the password entered	System requires user to repeat the password entered	Passed
14	Confirm password mismatch	System requires user to match the password	System requires user to match the password	Passed
15	All fields valid	System successfully registers user account	System successfully registers user account	Passed

6.2.2 Login Testing

Case Name: User Login		**Case ID: T002**		
Purpose: Verify user login functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Email empty	System requires user to fill in the email	System requires user to fill in the email	Passed
2	Invalid email format	System requires user to fill in valid email	System requires user to fill in valid email	Passed
3	Empty password	System requires user to fill in password	System requires user to fill in password	Passed
4	Valid email and password	System shows validation successful	System shows validation successful	Passed
5	Invalid credentials	System shows invalid email or password	System shows invalid email or password	Passed

6.2.3 Reset Password Testing

Case Name: Reset Password		**Case ID: T003**		
Purpose: Verify reset password functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Email empty	System closes reset window	System closes reset window	Passed
2	Invalid email format	System shows invalid email format	System shows invalid email format	Passed
3	Valid email	System sends reset email to user email	System sends reset email to user email	Passed
4	Invalid email	System does not send the reset email	System does not send the reset email	Passed

6.2.4 Log Out Testing

Case Name: Log Out		**Case ID: T004**		
Purpose: Verify log out account functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Log Out	System directs user to login screen	System directs user to login screen	Passed

6.2.5 Edit Profile Testing

Case Name: Edit Profile		**Case ID: T005**		
Purpose: Verify edit profile functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Upload profile picture	System successfully uploaded profile picture	System successfully uploaded profile picture	Passed
2	Remove profile picture	System successfully removes profile picture	System successfully removes profile picture	Passed
3	Empty first name	System requires user to fill in first name	System requires user to fill in first name	Passed
4	Empty last name	System requires user to fill in last name	System requires user to fill in last name	Passed
5	Empty age	System requires user to fill in age	System requires user to fill in age	Passed
6	Invalid age (<1 or >120 or non-numeric)	System requires age in the range of 0 to 121	System requires age in the range of 0 to 121	Passed
7	Empty height	System requires user to fill in the height	System requires user to fill in the height	Passed
8	Invalid height (<50 or >250 or non-numeric)	System requires user to fill in height in range of 49 to 251	System requires user to fill in height in range of 49 to 251	Passed
9	Empty weight	System requires user to fill in the weight	System requires user to fill in the weight	Passed

10	Invalid weight (<20 or >300 or non-numeric)	System requires user to fill in weight in the range of 19 to 301	System requires user to fill in weight in the range of 19 to 301	Passed

6.2.6 Symptom Checker Testing

Case Name: Symptom Checker		**Case ID: T006**		
Purpose: Verify symptom checker functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Use preset symptoms only	System successfully shows the possible conditions	System successfully shows the possible conditions	Passed
2	Describe the symptoms	System successfully shows the possible conditions	System successfully shows the possible conditions	Passed
3	Use preset symptoms and describe	System successfully shows the possible conditions	System successfully shows the possible conditions	Passed
4	Click new check	System redirects back to Symptom Checker screen	System redirects back to Symptom Checker screen	Passed
5	Check history	System shows the analysed history	System shows the analysed history	Passed
6	Delete history	System successfully deletes the history	System successfully deletes the history	Passed

6.2.7 Sleep Tracker Testing

Case Name: Sleep Tracker		**Case ID: T007**		
Purpose: Verify sleep tracker functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Set sleep time	System successfully set the sleep time and update today's sleep pattern	System successfully set the sleep time and update today's sleep pattern	Passed
2	Set wake time	System successfully set the wake time and update today's sleep pattern	System successfully set the wake time and update today's sleep pattern	Passed
3	Turn on sleep reminder	System shows countdown timer to sleep and timer to wake up and turn on reminder service	System shows countdown timer to sleep and timer to wake up and turn on reminder service	Passed
4	Turn off sleep reminder	System hides countdown timer to sleep and timer to wake up and turn off reminder service	System hides countdown timer to sleep and timer to wake up and turn off reminder service	Passed
5	Sleep time times up	System sends notification	System sends notification	Passed
6	Wake time times up	System ring alarm	System ring alarm	Passed

7	Stops alarm when alarm rings	The system alarm stops	The system alarm stops	Passed
8	Change the weekly pattern	The system updates the weekly pattern with average sleep time	The system updates the weekly pattern with average sleep time	Passed
9	Change sleep time for day before today in weekly sleep pattern	System updates sleep summary and weekly sleep pattern	System updates sleep summary and weekly sleep pattern	Passed

6.2.8 Medication Reminder Testing

Case Name: Medication Reminder		**Case ID: T008**		
Purpose: Verify medication reminder functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Add medication from button	System shows the add medication screen	System shows the add medication screen	Passed
2	Medication name empty	System requires user to fill in medication name	System requires user to fill in medication name	Passed
3	Dosage empty	System requires user to fill in dosage	System requires user to fill in dosage	Passed
4	Frequency hour more than 24	System only accepts minimum of 0 and maximum of 23	System only accepts minimum of 0 and maximum of 23	Passed
5	Frequency minutes less than 0 or more than 60	System only accepts minimum 0 and maximum of 59	System only accepts minimum 0 and maximum of 59	Passed
6	Select future start date	System sets service on the future date and no reminder services	System sets service on the future date and no reminder services	Passed
7	Select passed end date	System accepts but no reminder services	System accepts but no reminder services	Passed
8	Add Medication	System successfully add medication and redirect user to medication screen	System successfully add medication and redirect user to medication screen with	

		with countdown timer starts counting	countdown timer starts counting	
8	Countdown timer times up	System sends notification and rings alarm	System sends notification and rings alarm	Passed
9	Tick the medication	System stops the reminder services and resets the countdown timer	System stops the reminder services and resets the countdown timer	Passed
10	Turn off reminder	System stops the reminder and hides countdown timer	System stops the reminder and hides countdown timer	Passed
11	Edit medication	System directs user to edit medication screen with same validation of add medication screen and update the countdown timer	System directs user to edit medication screen with same validation of add medication screen and update the countdown timer	Passed
12	Delete medication	System deletes the selected medication	System deletes the selected medication	Passed

6.2.9 Appointment Reminder Testing

Case Name: Appointment Reminder		**Case ID: T009**		
Purpose: Verify appointment reminder functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Add appointment from button	System shows the add appointment screen	System shows the add appointment screen	Passed
2	Doctor name empty	System requires user to fill in doctor name	System requires user to fill in doctor name	Passed
3	Purpose of visit empty	System requires user to fill in purpose of visit	System requires user to fill in purpose of visit	Passed
4	Location empty	System requires user to fill in location	System requires user to fill in location	Passed
5	Add the appointment	System successfully add appointment and redirect user to appointment screen	System successfully add appointment and redirect user to appointment screen	Passed
6	Turn on the toggle for appointment reminder	System turns on reminder services and shows the appointment with closest time	System turns on reminder services and shows the appointment with closest time	Passed
7	Countdown timer times up	System sends notification and rings alarm	System sends notification and rings alarm	Passed

8	Tick the appointment	System stops the reminder services, resets the countdown timer for upcoming appointment and update attendance to history	System stops the reminder services, resets the countdown timer for upcoming appointment and update attendance to history	Passed
9	View history	Attended appointment shown in history	Attended appointment shown in history	Passed
10	Delete history	System deletes selected appointment history	System deletes selected appointment history	Passed
10	Turn off reminder	System stops the reminder and hides countdown timer	System stops the reminder and hides countdown timer	Passed
11	Edit appointment	System directs user to edit appointment screen with same validation of add appointment screen and resets the countdown timer	System directs user to edit appointment screen with same validation of add appointment screen and resets the countdown timer	Passed
12	Delete appointment	System deletes the selected appointment	System deletes the selected appointment	Passed

6.2.10 Hydration Reminder Testing

Case Name: Hydration Reminder		**Case ID: T010**		
Purpose: Verify symptom checker functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Add glass of water	System adds one glass of water and resets interval timer	System adds one glass of water and resets interval timer	Passed
2	Remove glass of water	System removes one glass of water	System removes one glass of water	Passed
3	Set reminder interval from preset options	System successfully sets interval from user selection	System successfully sets interval from user selection	Passed
4	Turn on reminder interval from toggle	Countdown timer starts based on interval set by user and trigger reminder services when time is up	Countdown timer starts based on interval set by user and trigger reminder services when time is up	Passed
5	Countdown timer times up	System triggers the reminder services	System triggers the reminder services	Passed
6	Add glass of water	Stops the reminder services and resets countdown timer	Stops the reminder services and resets countdown timer	Passed
7	Turn off reminder interval from toggle	Stops the reminder services and hides the countdown timer	Stops the reminder services and hides the countdown timer	Passed

8	Set the daily water goal	System updates the daily water goal	System updates the daily water goal	Passed
9	Set 0 daily water goal	System not accepting 0 glass of water	System not accepting 0 glass of water	Passed

6.2.11 Chatbot Testing

Case Name: Chatbot		**Case ID: T011**		
Purpose: Verify chatbot functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Insert message	System successfully responds with user input	System successfully responds with user input	Passed
2	Speaker option of chatbot	Text to speech feature is successfully performed by system	Text to speech feature is successfully performed by system	Passed
3	Change the voice pitch	System successfully changes the voice pitch	System successfully changes the voice pitch	Passed
4	Change the speech rate	System successfully changes the speech rate	System successfully changes the speech rate	Passed
5	Delete conversation	System successfully deletes all conversation	System successfully deletes all conversation	Passed

6.2.12 Nutrition Planner Testing

Case Name: Nutrition Planner		**Case ID: T012**		
Purpose: Verify nutrition planner functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Set daily target calorie	System successfully shows the recipes	System successfully shows the recipes	Passed
2	Click search again	System successfully shows different recipes	System successfully shows different recipes	Passed
3	Search recipe with calorie and ingredient	System successfully shows recipe with ingredient queried	System successfully shows recipe with ingredient queried	Passed
4	Generate meal plan	System generates a random meal plan for the breakfast, lunch and dinner	System generates a random meal plan for the breakfast, lunch and dinner	Passed
5	Click generate meal plan again	System generates a different random meal plan for the breakfast, lunch and dinner	System generates a different random meal plan for the breakfast, lunch and dinner	Passed
6	View Recipe Detail	System shows the recipe details	System shows the recipe details	Passed
7	Favourite the recipe	System saved the favourite recipe into favourite tab	System saved the favourite recipe into favourite tab	Passed

6.2.13 Health and Fitness Challenge Testing

Case Name: Health and Fitness Challenge		**Case ID: T013**		
Purpose: Verify health and fitness challenge functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Click an activity	System successfully directs user to activity screen	System successfully directs user to activity screen	Passed
2	Click start on the activity screen	System displays countdown timer depends on the challenge duration and starts counting	System displays countdown timer depends on the challenge duration and starts counting	Passed
3	Pause after click start	Countdown timer is pause	Countdown timer is pause	Passed
4	Reset timer	System resets the countdown timer	System resets the countdown timer	Passed
5	Countdown timer ends	System shows user activity is completed and points rewarded	System shows user activity is completed and points rewarded	Passed
6	Take quiz	System prompts a daily quiz for user answer	System prompts a daily quiz for user answer	Passed
7	Answer correctly	System prompts the explanation and reward points	System prompts the explanation and reward points	Passed

8	Answer incorrectly	System prompts the explanation and lesser reward points	System prompts the explanation and lesser reward points	Passed

6.2.14 Emergency Assistance Testing

Case Name: Emergency Assistance		**Case ID: T014**		
Purpose: Verify emergency assistance functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Use preset health backgrounds only	System successfully generates the guidance.	System successfully generates the guidance.	Passed
2	Only describe the emergency	System successfully generates the guidance	System successfully generates the guidance	Passed
3	Only upload the picture	System successfully generates the guidance depends on the patient situation in the picture	System successfully generates the guidance depends on the patient situation in the picture	Passed
4	Click the play button	System reads the steps	System reads the steps	Passed
5	Click the stop button	System stops the speech.	System stops the speech.	Passed
6	Turn on the toggle	System read the steps automatically and proceed to next step and continue read	System read the steps automatically and proceed to next step and continue read	Passed
7	Change speech rate	System successfully changes the speech rate	System successfully changes the speech rate	Passed

8	Click new analysis	System clears the input in the screen for new analysis	System clears the input in the screen for new analysis	Passed
9	View history	System directs user to the history tab with previous assistance requested	System directs user to the history tab with previous assistance requested	Passed

6.2.15 Generate Report Testing

Case Name: Generate Report		**Case ID: T015**		
Purpose: Verify generate report functionality				
No.	**Tests**	**Expected Results**	**Actual Results**	**Test Results**
1	Click generate report	System opens a window and successfully generates a detailed report summary and save it to history	System opens a window and successfully generates a detailed report summary and save it to history	Passed
2	Click close	System closes the generated report window	System closes the generated report window	Passed
3	Click view history	System successfully shows list of generated daily reports done by user	System successfully shows list of generated daily reports done by user	Passed
4	Click report from history	System shows window with report summary generated previously	System shows window with report summary generated previously	Passed

6.3 Project Challenges

In this project, technical challenges such as ensuring the state management for the features without race conditions. This is to ensure each feature can work on their own instead of causing deadlocks in the system. User interface of the application is one challenge that requires dynamic and continuously reusing the layout. It is a must to make sure that the interface is set up properly so that each feature has a similar design. The reminder service is also one of the challenges that requires deep understanding for the service runs in the background without any error. Trials and errors have been made throughout the project timeline to obtain the expected performance. The next challenge is Firebase connection that is required to deal with structuring the collection for data made by user. The response from AI by default is kind of robotic response and required some prompt to generate a response which is much more suitable for the application. Research have been made to find the best parameters for the response and much more work done in the prompt that will be sent along with user's message to provide a more human and desired response.

6.4 Objectives Evaluation

This project aims to build a comprehensive user-friendly mobile application that integrates various features at improving the user's overall health and well-being. The first objective is to create a health mobile application that can supports user from both physical and mental health. Several features have been developed which integrates various features such as dashboard, symptom checker, sleep tracker, medication, appointment and hydration reminders, chatbot, nutrition planner, health and fitness challenge and emergency assistance into a single application. User interface was designed to ensure user has a different theme for different feature with same user interface design. The second objective which is implementing chatbot as a mental health support feature is also achieved. The chatbot was successfully implemented using AI integration which able to provide empathetic responses and conversational support for user. Text to speech feature is also included for user to interact with instead of reading at the text. Third objective specify interactive tools that can let user have continuous support which is health and fitness challenge feature is developed to let suer maintain healthy lifestyle. Daily reset ensures that user checks the challenge generated daily for points redemption. Quiz is also included to increase users' knowledge in maintaining healthy lifestyle. Another interactive tools which is emergency assistance feature is also developed successfully to

respond effectively to user when facing emergency situations. A step-by-step guidance with a text to speech option enables user to make the correct decision at the right time.

6.5 Concluding Remark

Evaluation on the system has been performed in this chapter which is an assessment that provides insights of the developed final output. Chapter 6 covered the testing setup with their results and being recorded to evaluate the performance of the system. The testing cases is performed and evaluated the functionalities of what the application capable to do. The test results expected and the actual results obtained is similar as what have been stated in test result showing the application passed the test. The objective evaluation also indicates that the application is being developed successfully and summarized as success of the project.

CHAPTER 7
CONCLUSION AND RECOMENDATION

7.1 Conclusion

In this fast-paced society, health has become a serious matter that everyone should take a look of and consider on in their life. Lot of health problems faced by people every day and it is hard for them to maintain their health without a proper tool that is specifically designed to meet the expectations. Having multiple applications is an issue for some people as tracking their health from different applications not only making them feel annoyed and also consuming their device space. Therefore, HealthBuddy is developed to play a role in catering the health of their user by having multiple features integrated into one application instead of multiple applications. There are a lot of applications that could not integrate as much features as HealthBuddy which aims to provide health insights for user in both physical or mental aspect.

The features in HealthBuddy include Symptom Checker which enables user to analyse their symptoms for possible conditions they going to face. This feature can help them to make a preventive measure to make the condition worse. The Sleep Tracker helps to record user's sleeping behaviour and ensuring user to have an organized sleeping pattern. Reminders also been made to ensure user take a sleep and wake up on the time that have been set. Medication and appointment reminders feature help user to manage their medication and appointment which acts as a notebook for them to jot down. Reminder services is also available in the feature for reminding user to take medication or attend the appointment on time. Hydration Reminder ensures user to hydrate at a time interval with a reminder service that can notify user.

Chatbot feature acts as a mental health companion that can provide an unconditional support to user which seriously need support. User can also go through the Nutrition Planner feature to plan for their meal and check the nutrition values for a balanced diet. Engagement activities towards health and fitness is also developed which require user to spend some time performing activities as well as gaining some health knowledge for answering the quiz. Emergency assistance in this feature also acts as a guidance for user to provide on the patients when they faced some emergency situations that require first aid. In addition, a report with recommendation can also be generated to provide daily health insights of user.

7.2 Recommendation

There are a lot of features and services can be used to refine the application by reusing the codes in the future. An enhanced personalization can be implemented within the application by leveraging machine learning models that can analyse user behaviour and provide a custom recommendation according to user. Text to speech feature from third party cloud services is also recommended to be applied for a more natural and humanlike voices that fits well to the application HealthBuddy. Wearable devices can also be used to connect with the application for synchronization of health data such as heart rate, activity levels and sleep patterns. This approach improves the health analysis and enables application to provide much more precise recommendations depends on user's behaviour. The current health and fitness challenge is a simple fitness challenge with only 4 activities and 1 daily quiz that will reset daily. Expansion of the feature by making it online service that enable user to compete with their friends in leaderboard is one approach that can provide much more challenges and achievement badges to motivate user. This will ensure long term engagement for user and making the application more enjoyable. Emergency assistance feature can be enhanced by including a real time location with sharing service to communicate with local authorities, medical services or emergency contacts. The feature can also include triggers for patients that will automatically send alert messages to their families so they can notice the patients earlier. Multi language support is also recommended to be included into the application to globalize the application to all people in the world with their own mother language.

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POSTER

HealthBuddy: Your Personal Health Companion

Overview

Aimed at integrating physical and mental health tools into a single, user-friendly platform.

Problem Statement

Current health apps often focus on one function and lack integration which leads inefficiency

Physical Health Checker

Checking your symptom for possible conditions

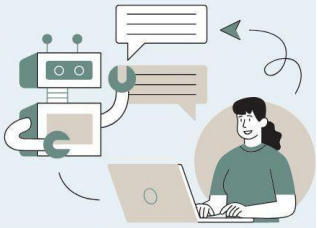
Tracking your sleep to provide a better sleep quality

Hydration tracker to remind you rehydrate

Mental Health Chatbot

Gemini powered AI chatbot that provides caring and empathy responses

Ready to listen to your worries and troubles



Nutrition Planner

Plan daily meal according to requested calories for you

Emergency Assistance

Use speech to request for assistance in emergency situation

Provide the response in audio to let you focus on assisting the patient

Health Challenge

Provide a random challenge for you to actively engage for healthy lifestyle

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