



An-Najah National University

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Safe aging



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we thank our friends and family.

Those who gave us their undivided attention and believed in our ability.”

Disclaimer

Mohammad Alkhateeb and Ahmad Hawwarie have written this report as requirements for a Bachelor's degree in Computer Engineering Department. No one modifies or corrects it because it will be evaluated by professors at An-Najah National University. It is worth mentioning that An-Najah National University does not have any responsibility for any word in this report.

Abstract

In this era of technological advancements, applications and software have become essential in people's lives, facilitating the fulfillment of their needs and addressing various matters.

Our focus has been directed toward the elderly, considering the challenges they face in frequent mobility and the necessity of monitoring their health conditions regularly with specialized doctors.

Therefore, we developed this project aimed at tracking the health status of senior citizens by enabling their communication with doctors through our dedicated application.

Each patient can connect with one or more doctors as needed , monitor their medical reports , manage their prescribed medications and schedules, and facilitate communication during emergencies .

The application also allows patients to schedule follow-up appointments, access information about hospitals and doctors, and provides a comprehensive directory of healthcare providers.

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Chapter 1

Introduction

With the rapid advancement of technology, mobile applications have become essential tools for improving accessibility and simplifying daily tasks. This project focuses on supporting the elderly, a group often facing challenges in mobility and continuous health monitoring. Our application enables seamless communication with specialized doctors, access to medical reports, medication management, emergency support, and appointment scheduling. By offering a comprehensive directory of healthcare providers, the app empowers senior citizens to manage their health effectively and enhances their quality of life through accessible and user-friendly solutions.

1.1 General background

In the current era, healthcare monitoring and accessibility are crucial, especially for elderly individuals who face challenges in mobility and frequent health checkups. Despite the growing adoption of technology, there are limited platforms that specifically cater to the healthcare needs of the elderly in a convenient and user-friendly manner. To address this issue, we developed a mobile application that connects senior citizens with specialized doctors allowing them to monitor their health and manage their care effectively.

1.2 Objectives

The primary objective of this project is to create a platform where elderly individuals can communicate with doctors, view their medical reports, manage medications, schedule appointments, and receive emergency assistance, all in one application. The app aims to improve healthcare accessibility and simplify interactions for the elderly.

1.3 Scope of the work

1. **Create Accounts:** Users can sign up and manage their profiles.
2. **Doctor Communication:** Users can connect with one or more doctors as needed.
3. **Medical Reports:** Users can view and track their health reports within the app.
4. **Medication Management:** The app provides reminders and schedules for medications.
5. **Appointment Scheduling:** Users can book appointments with doctors directly.
6. **Emergency Support:** A dedicated feature allows users to request help during emergencies.

7. **Notifications:** Users receive updates about new features, medical advice, or scheduled reminders.
8. **Healthcare Directory:** The app offers a list of doctors and hospitals for easy access.

1.4 Significance

This project provides a comprehensive healthcare solution tailored for the elderly, enabling them to manage their health with ease and efficiency. By leveraging technology, the application bridges the gap between patients and healthcare providers, enhancing the quality of life for senior citizens.

Chapter 2

Theoretical Background

Theoretical Background of the project

It is an application and a website to facilitate the elderly who need care, where the elderly can, through this project, see the people who are able to provide care and participate with them, and the caregiver communicates via chat with the elderly or otherwise and can write medications for the elderly and can also come immediately if the elderly requests the caregiver in an emergency.

Chapter 3

Methodology

3.0.0 . Constraints

3.0.1 Economic

Budget Restrictions: A well-planned budget is necessary when creating a mobile application for managing the healthcare of the elderly. App development, server hosting, recurring upgrades, and user support are among the costs.

Maintenance Costs: To match customer expectations, regular maintenance entails correcting problems, adding features, and making sure the program runs smoothly.

3.0.2 Society Information Security:

To protect sensitive user data, such as medical reports and private health information, strong security measures are put in place.

3.0.3 The Political

Inclusivity: Regardless of gender, race, or financial status, the application welcomes a diverse user base.
Regulatory Compliance: The application complies with all applicable national and international laws pertaining to data sharing and telemedicine.

3.0.4 Ethics

Health and Safety: By include features like user-friendly interfaces and limiting extended screen time, the software is made to be safe for senior citizens.

Respecting Intellectual Property: The app complies with copyright and intellectual property regulations in all of its designs, algorithms, and content.

3.0.5 Safety and Health

Emergency Readiness: To protect user welfare in urgent situations, the emergency support function guarantees prompt responses.

3.0.6 Production Capability

Scalable Design: The application was developed with scalability in mind, making it simple to incorporate future features like sophisticated health monitoring systems or teleconsultations.

3.0.7 Sustainability

Future upgrades: To ensure long-term usability, the app architecture allows for frequent upgrades that take into account user feedback and technical developments.

3.0.8 . Used Technologies

3.0.9 Flutter

A single codebase can be used to create natively built desktop, web, and mobile applications with Google's Flutter open-source framework.

Why Flutter?

Write a single codebase for several platforms to save time and effort during development.

Hot Reload: Increase productivity by seeing changes to your code immediately.

For creating beautiful user interfaces, Rich UI Components offers a large selection of customisable widgets.

High Performance: Makes use of a rendering engine that has been fine-tuned to produce fluid animations and quick application response times.

3.0.10 Node.js

An open-source, universal JavaScript runtime environment called Node.js was created to create server-side apps that are effective and scalable.

Why use Node.js?

Event-driven and asynchronous: manages several client requests at once without causing the server to lag.

Fast Execution: based on the V8 engine of Google Chrome, which allows JavaScript to run quickly.

Scalable: It is very scalable for applications with many concurrent users because it employs a single-threaded event loop paradigm.

3.0.11 XAMPP with PHPMyAdmin

XAMPP is used alongside with PHPMyAdmin, a free and open-source web interface for MySQL and MariaDB database management, to facilitate local development.

Why use PHPMyAdmin?

Ease of Use: An easy-to-use online interface makes database administration simpler.

Broad Support: Manages tables, optimises databases, and handles sophisticated queries.

Connectivity to XAMPP: provides a ready-made configuration for a smooth local development environment.

3.0.12 Firebase (for notifications)

Google created Firebase, a platform for creating online and mobile apps with built-in analytics, database, and alerting features.

Why use Firebase?

Real-Time Database: Facilitates instantaneous data synchronisation amongst linked clients.

User authentication is made safe and easy with authentication.

Push Notifications: Integrated functionality for informing users.

Scalable hosting: Adapts automatically to the usage and traffic of the application.

3.0.13 Additional Resources & Technologies

Visual Studio Code , also commonly referred to as VS Code, is a source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. [vscode]

Postman is an API platform for building and using APIs.

Postman simplifies each step of the API lifecycle and streamlines collaboration so you can create better APIs— faster. [Postman]

GitHub, is an Internet hosting service for software development and version control using Git. It provides the distributed version control of Git plus access control, bug tracking, software feature requests, task management, continuous integration, and wikis for every project [github]

android Studio: Android Studio is ideal for developing native Android apps with advanced coding, debugging, and testing tools, along with a feature-rich emulator and performance monitoring. [androidStudio]

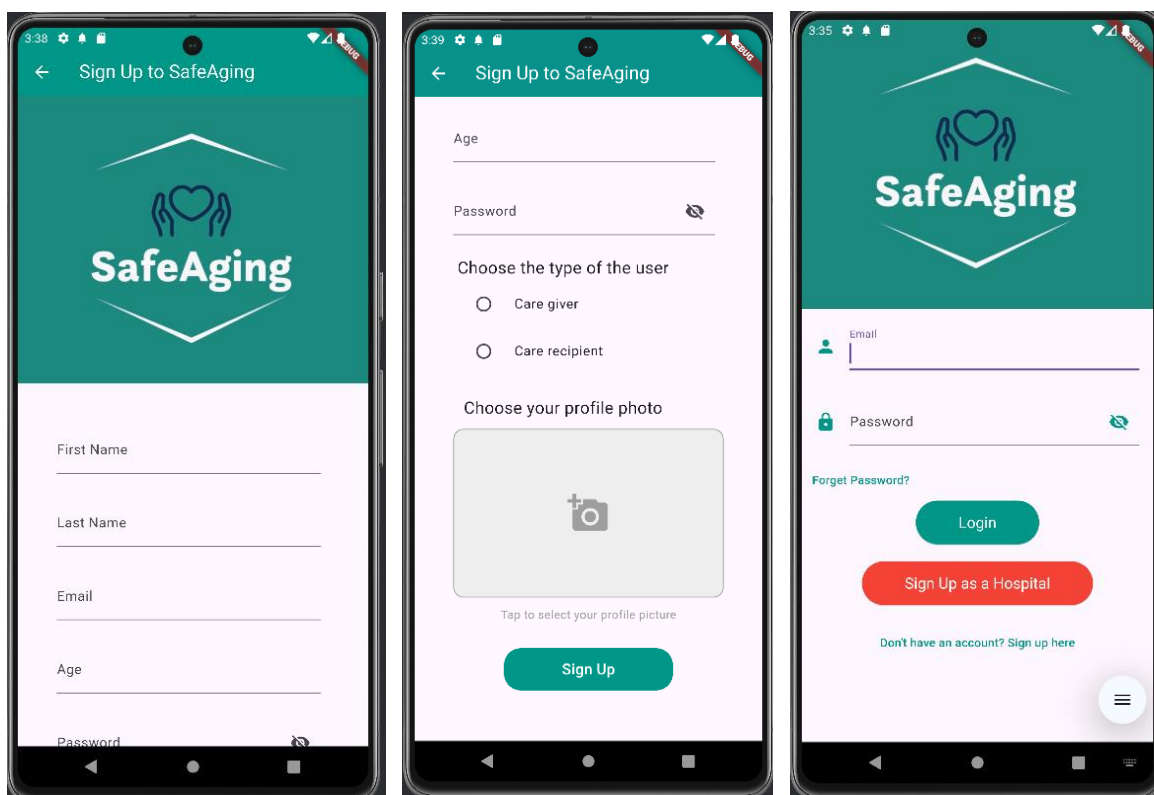
1.1 Safe Aging as a Website & Mobile application

1. Authentication and Validation

Since Safe aging is an intermediary between doctors and the elderly, each user must register on the platform to identify themselves and access all the features available to them. The user needs to register their name, email and password.

Signup

In order to login to the website, you have to enter your valid email address and a valid password. As seen in Figure 3.2 and 3.1a website and application respectively.



(a) Mobile Sign Up Form

(b) Login page

Figure 3.1

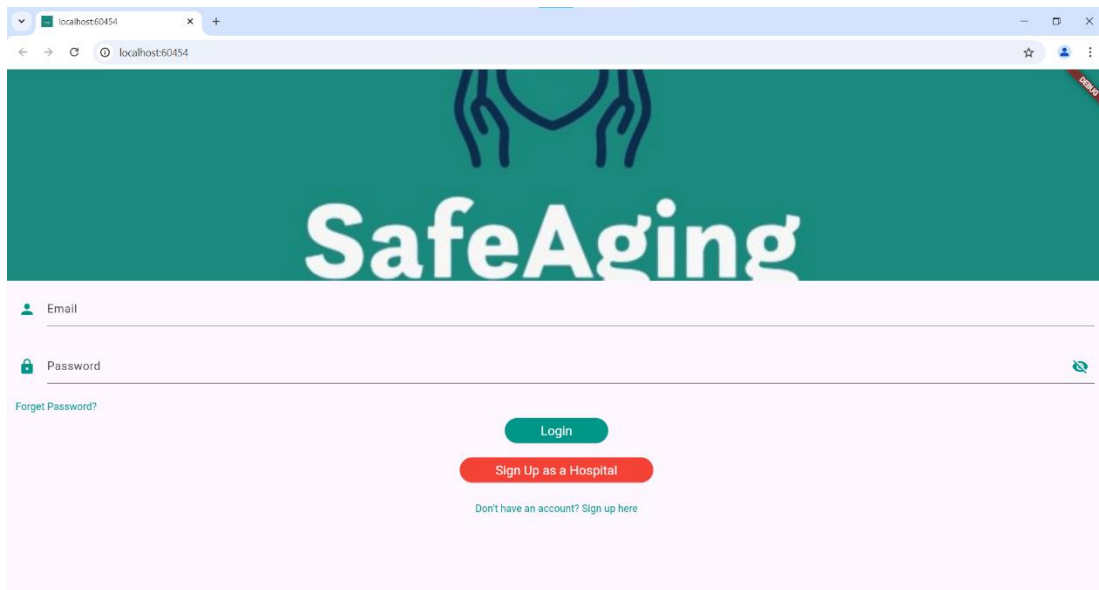


Figure 3.2: Website login Form

Sign up Validation

If the user signs up with an unmatched password the system will give him the alert of the mismatch, and the password must be a strong password.

login

To log in to the website, you must provide certain information such as your email and password that you have already registered with them. As seen in Figure 3.1b.

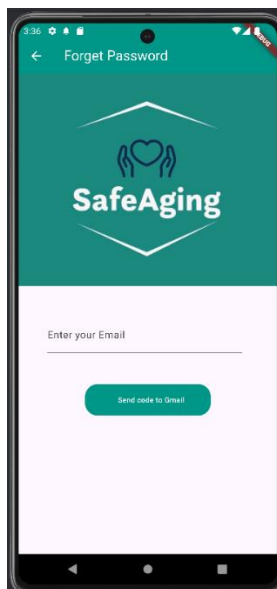
Login Validation

When a user attempts to login, the back-end validates the credentials; if they are invalid, the user is alerted, and if he attempts to log in using a non-existing email address, he is also notified.

Forget password

When a user wants to login and click on a forgotten password he will identify his email again to send the new password on the email.

3.4a and Figure 3.4b.



(a) Forget password form



(b) Forget password form2

3.4

And after this the new password will be generated randomly to be sent to the email that the user put and already registered in and then the user can register with it. See figures (3.5a 3.5b 3.5c) mobile (3.6a 3.6b) website.

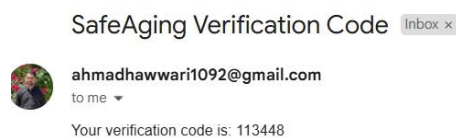


Figure 3.5a

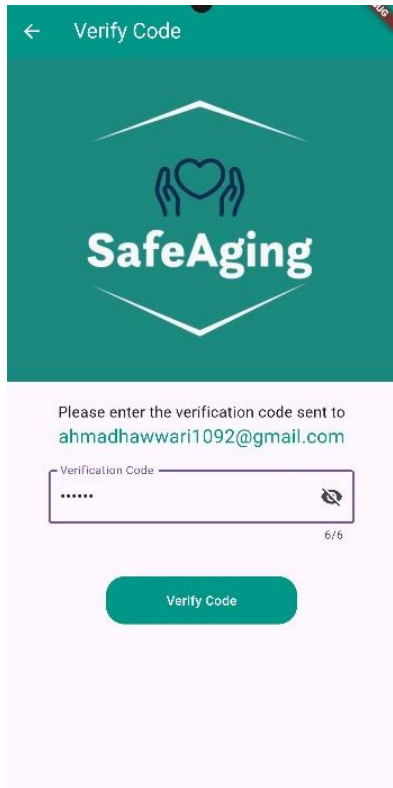


Figure 3.5b

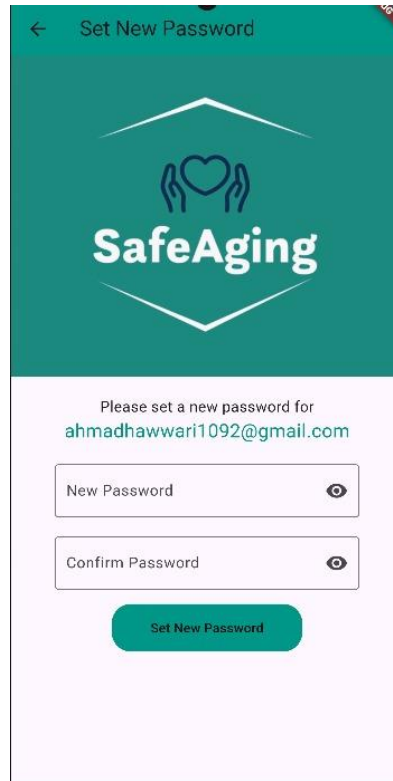


Figure 3.5c

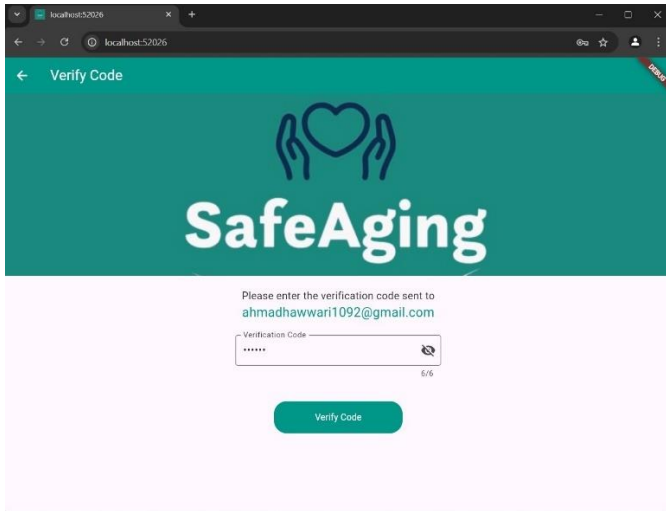


Figure 3.6a

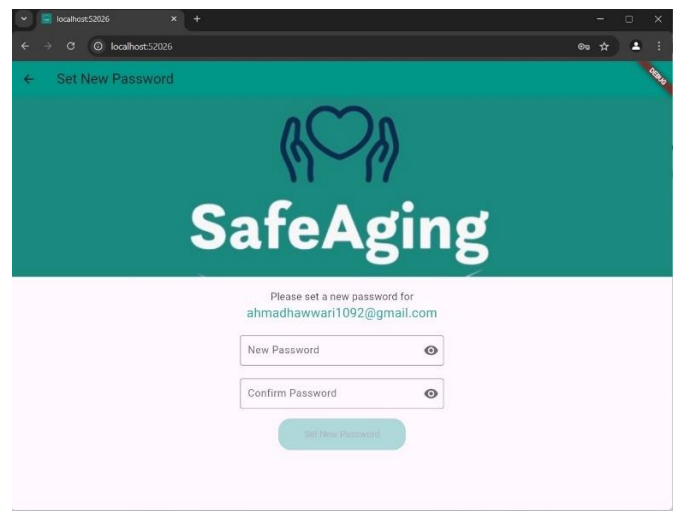


Figure 3.6b

2. User Profile

Each registered user has his own profile which he can upload his image, add his bio and update his own information. See figures 3.7

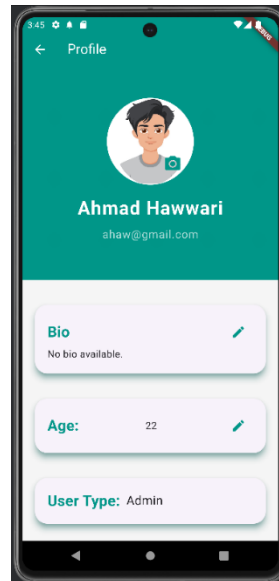


Figure 3.7: User profile page

1.1.1 Admin page

This is the Home page for the admin when he logs in to the program and he sees several scientific journals that have been added by doctors and tables for users where he has the authority to delete users from the application. As for doctors and hospitals, they must be approved by the admin after verifying their eligibility through proof of authenticity. See figures 3.8 and 3.9 .

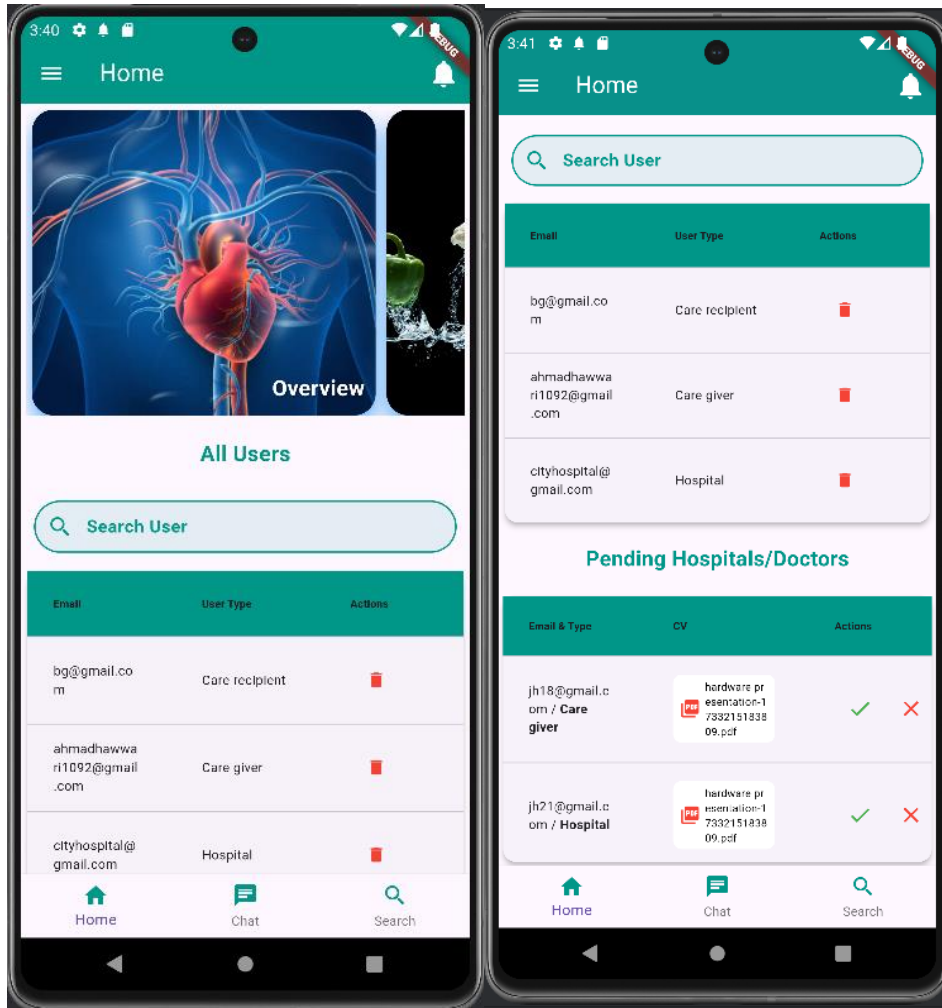


Figure 3.8: Homepage – Mobile

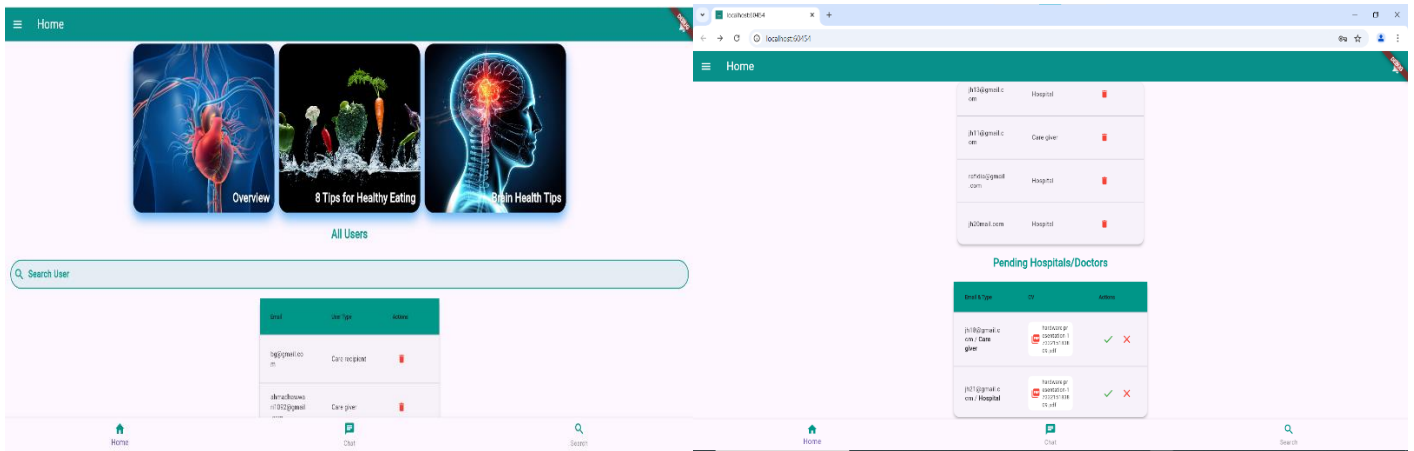


Figure 3.9: Home page - Website

1.1.2 Article Pages

This page shows one of the articles added by doctors or admins.

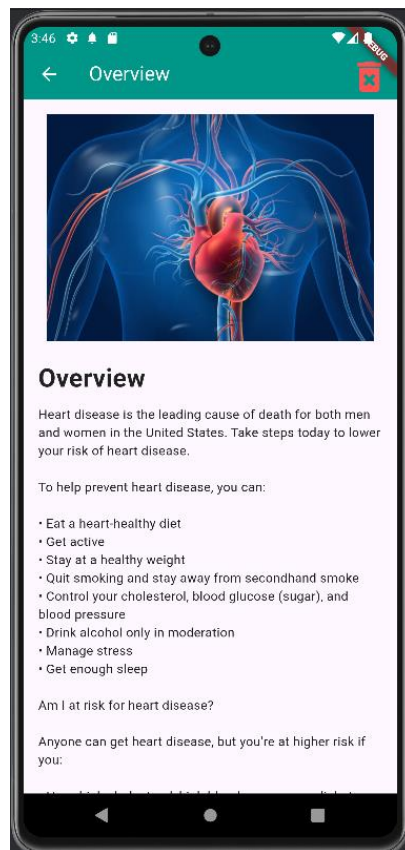


Figure 3.10: Article Page

This image shows the admin side menu which contains many features and characteristics. See figure 3.10a and 3.10b.

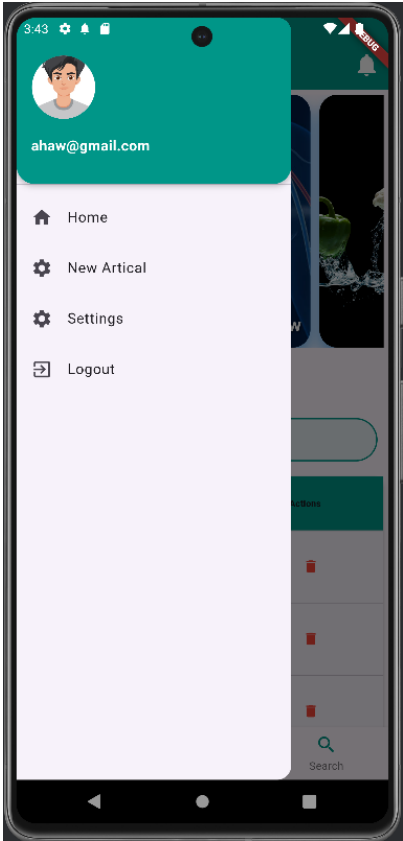


Figure :3.10a-mobile

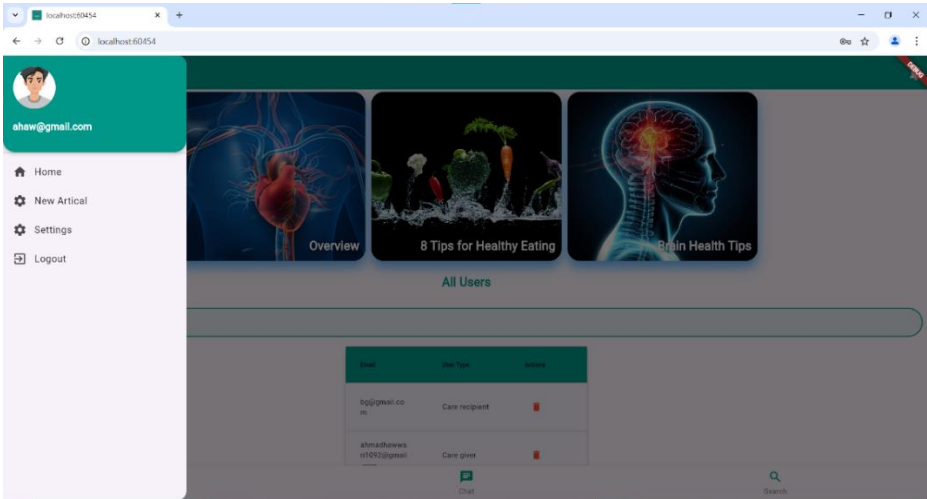


Figure : 3.10b- website

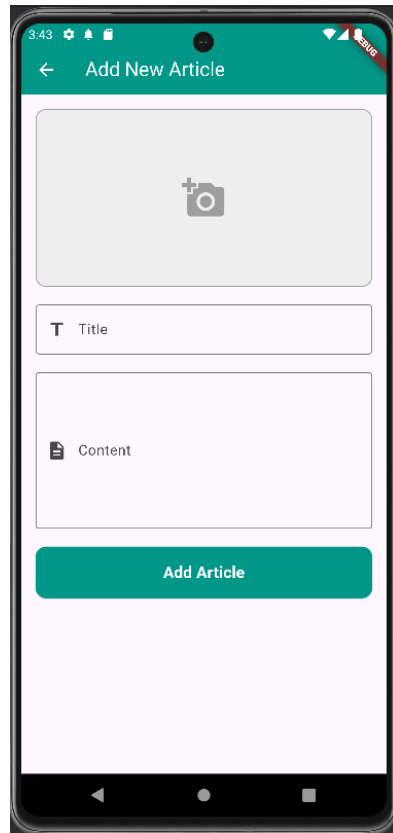


Figure 3.11a: Show how to add new articles-mobile

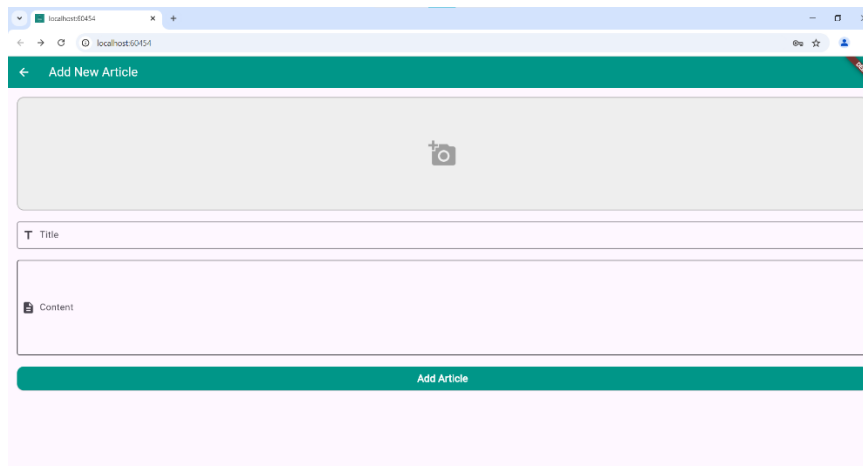


Figure 3.11b: Show how to add new articles-Website

1.1.3 Setting Page

The settings page is used to change the email or password as shown in the following image. See figure 3.12

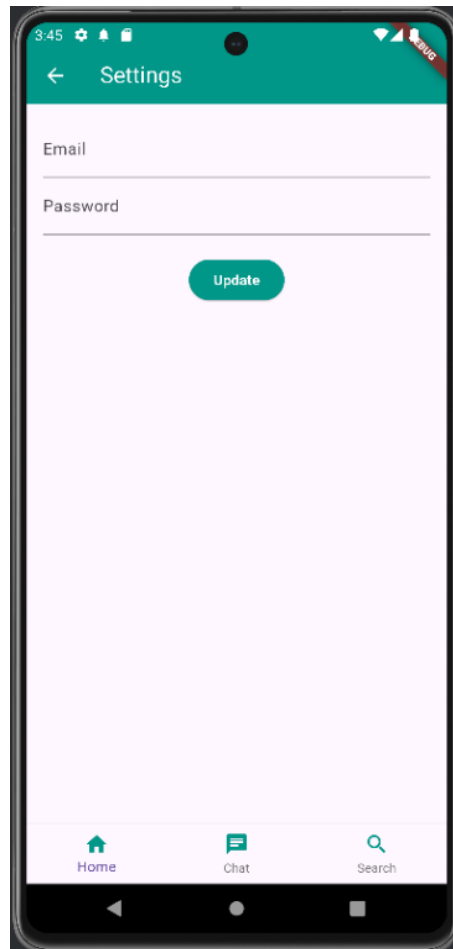


Figure 3.12

1.1.4 Search

Search is a practical and useful feature that is available to all users. They can filter users, meaning they can choose doctors only, hospitals, or the elderly, and so on, as shown in the figure 3.13a and 3.13b

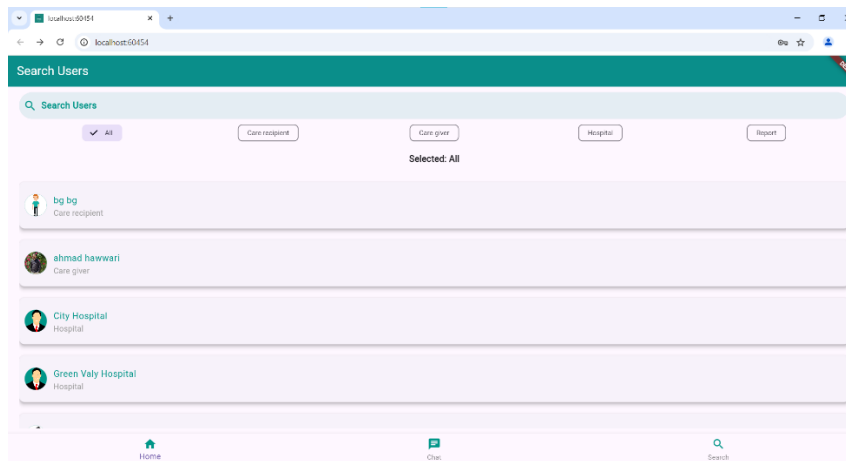


Figure 3.13a -website

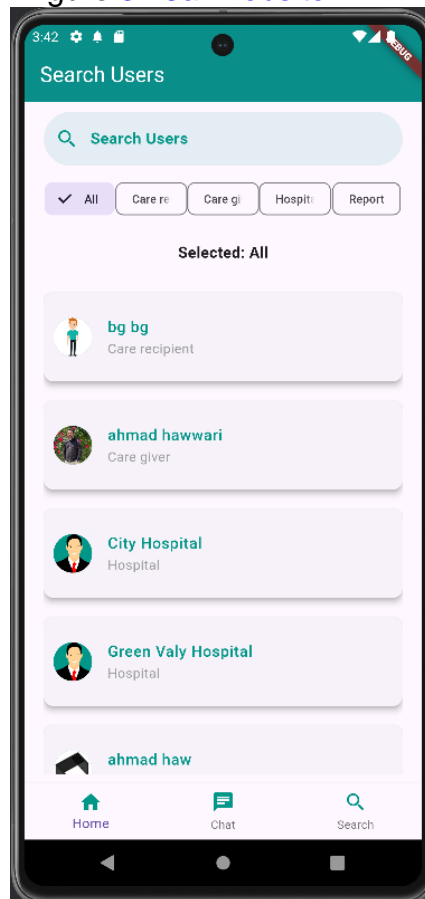


Figure 3.13b -mobile

The admin also has conversations in case he needs to communicate with one of the users, and he also receives notifications. We will put illustrative images of these features in the explanation about doctors and the elderly because they are repeated for them.

3.2.1 Doctor page

Here we will show the main interface of the doctor when he logs in. It includes several features and advantages. At first, the articles and magazines that have been added by the doctors appear, and a box appears to specify the appointments available to the doctor so that the elderly can book their appointments. Then the calendar table appears showing which days are available and which are full of reservations. The table below it shows the times of reservations for the elderly, Then at the end of the page, a list of elderly people who are following up with the doctor is displayed, and by clicking on his name, their page appears. See frgire 3.14a ,3.14b,3.14c -mobile.

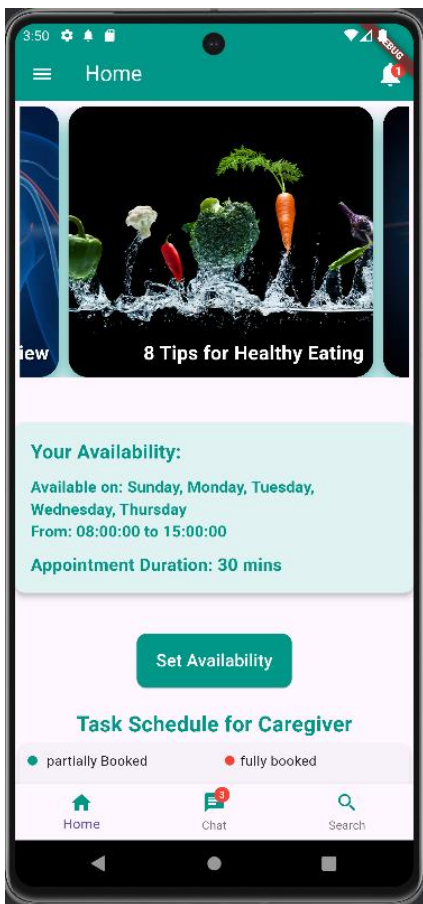


Figure 3.14a -mobile

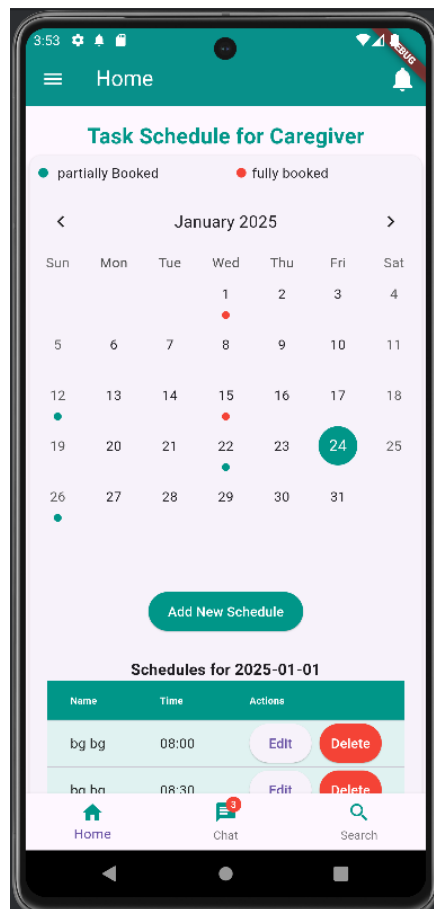


Figure 3.14b -mobile

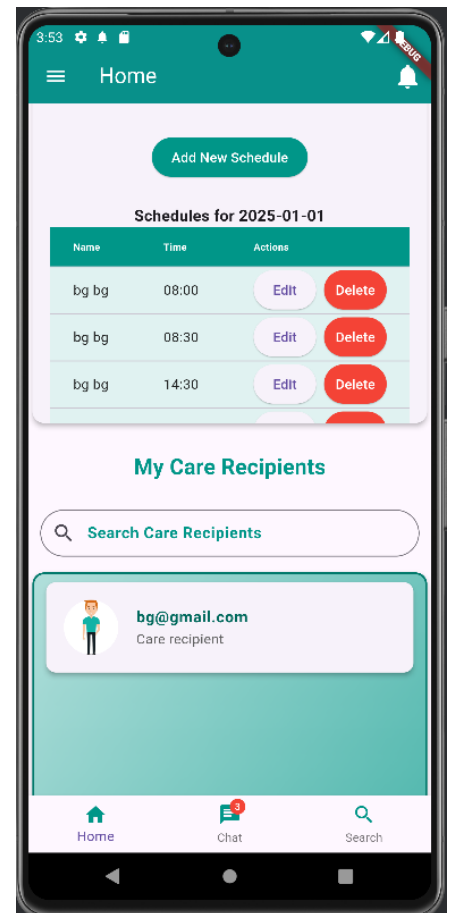


Figure 3.14c -mobile

See figure 3.15a , 3.15b, 3.15c -website

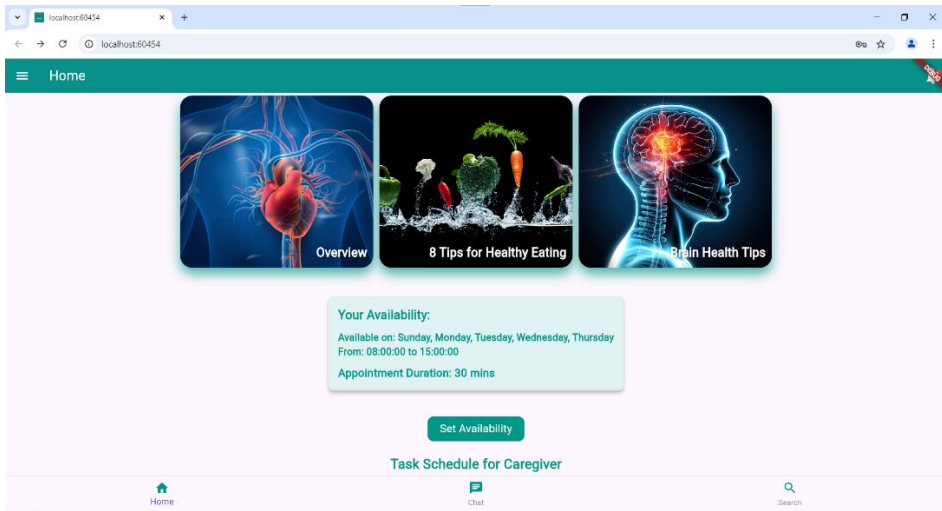


Figure 3.15a -website

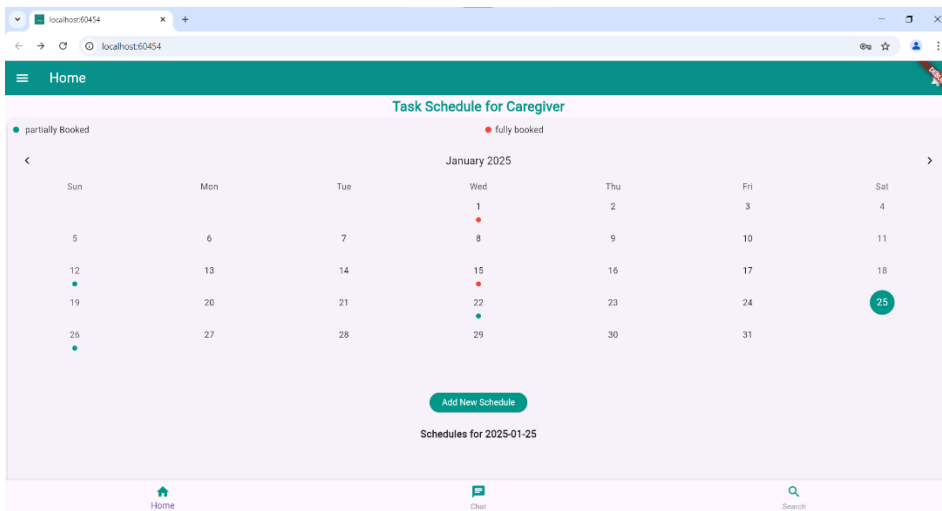


Figure 3.15b -website

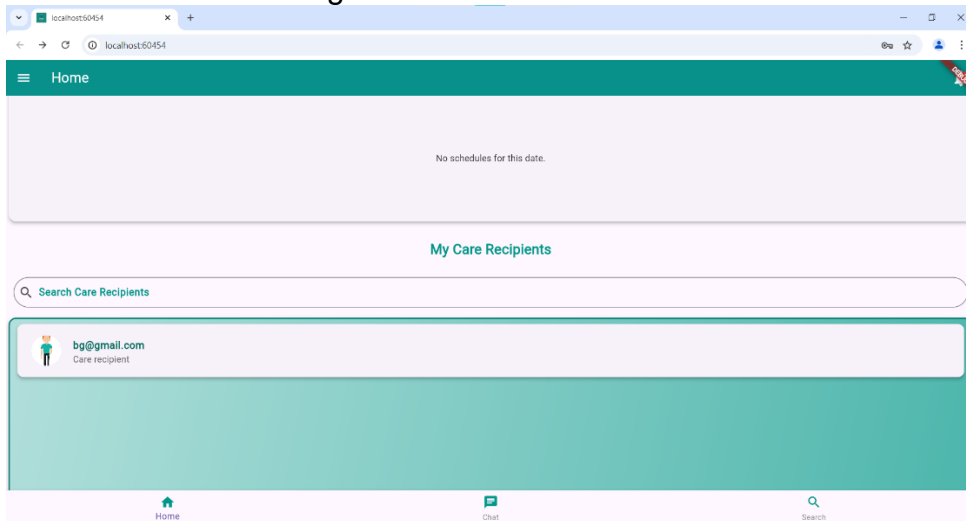


Figure 3.15c -website

3.2.2 Notifications for admin

The doctor receives notifications when a message is sent to him, or the emergency button is activated for one of his elderly patients, or when a request is made to start follow-up with the doctor, etc.

See [figure 3.16](#)

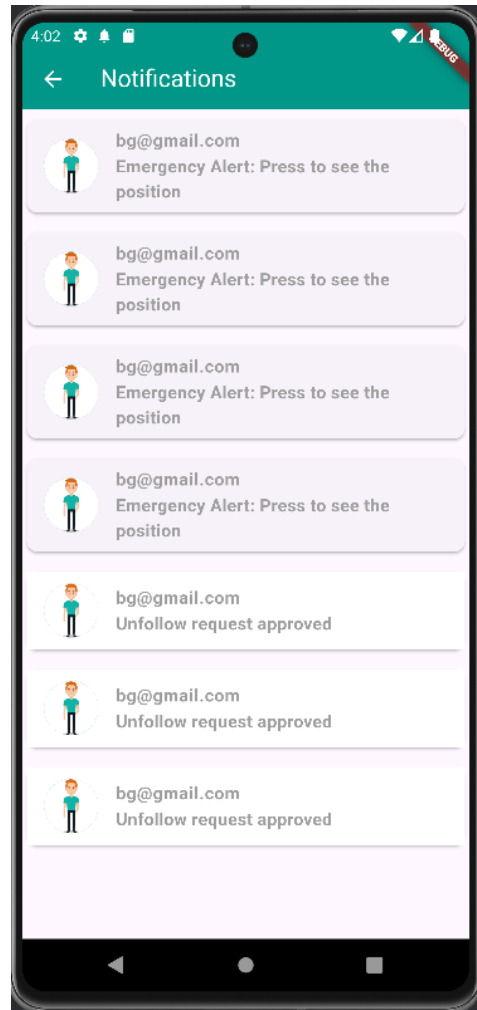


Figure 3.16

3.2.3 Emergency button (GPS)

There is an emergency button on the patient's page when he needs urgent help. When you click on it, his current location is sent to the doctor to provide urgent help. After opening the notification, a map appears with the location marked on it. see [figure 3.17a-mobile](#) ,[3.17b-website](#)

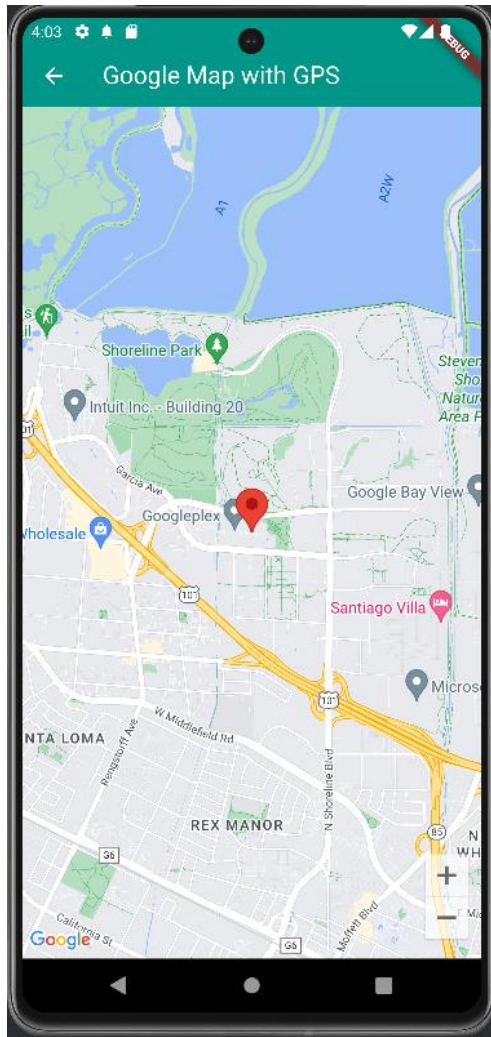


Figure 3.17a -mobile

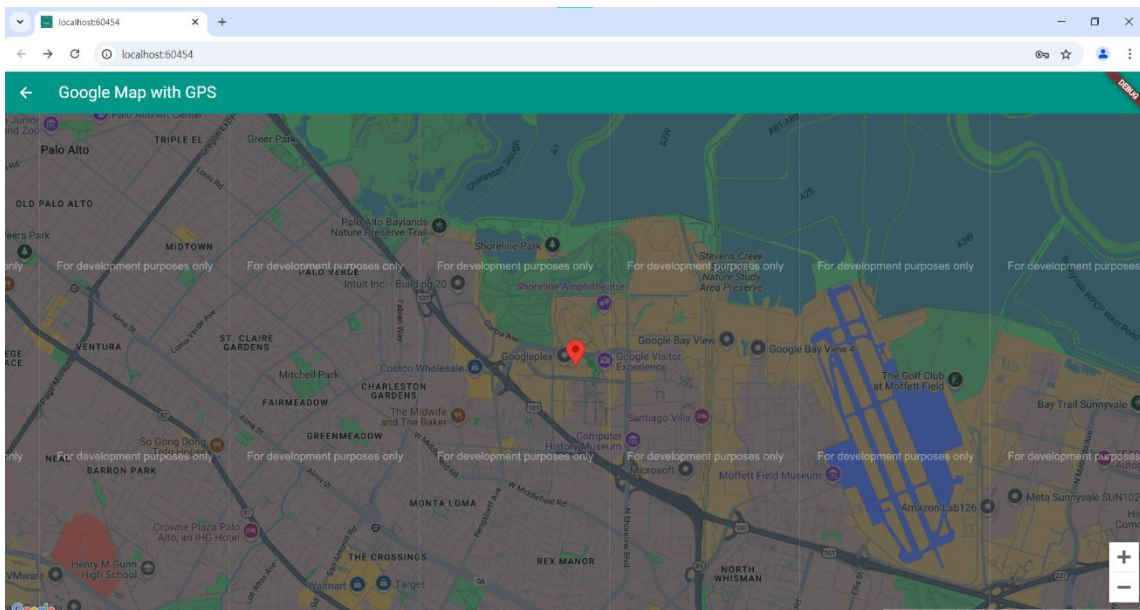


Figure 3.17b -website

3.2.4 Set Availability

Here the doctor determines the available appointments for bookings, the days, times and duration of the session. See figure 3.18

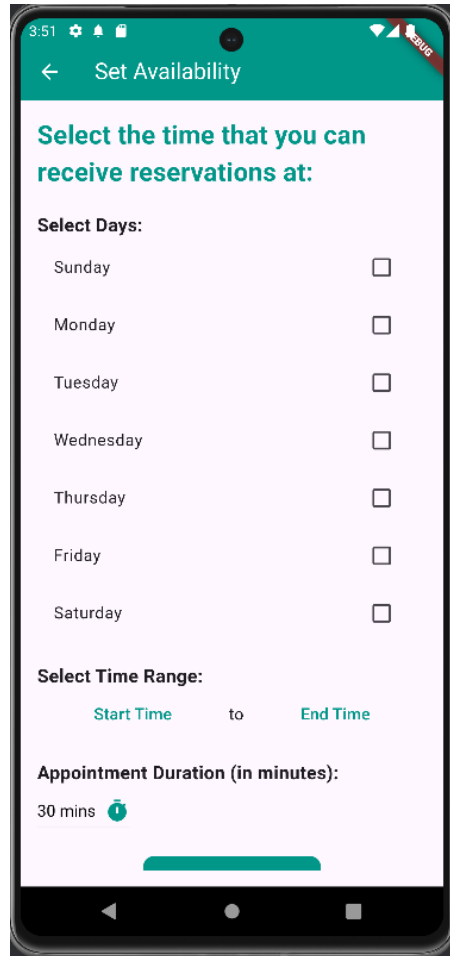


Figure 3.18

In addition to the side menu, you can access the personal file, settings, and log out. The settings for the doctor and the elderly are the same, but they differ from the admin. The difference here is that there is a feature to delete the account for users. See figure 3.19a and 3.19b

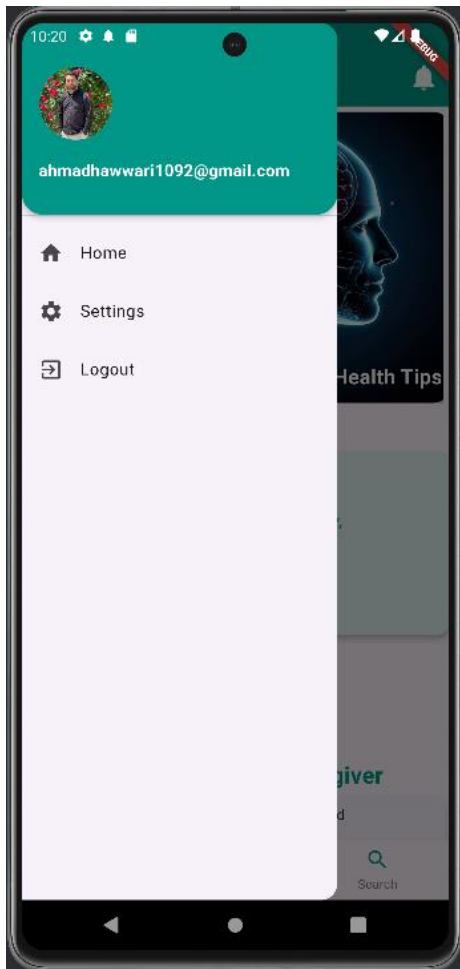


Figure 3.19a

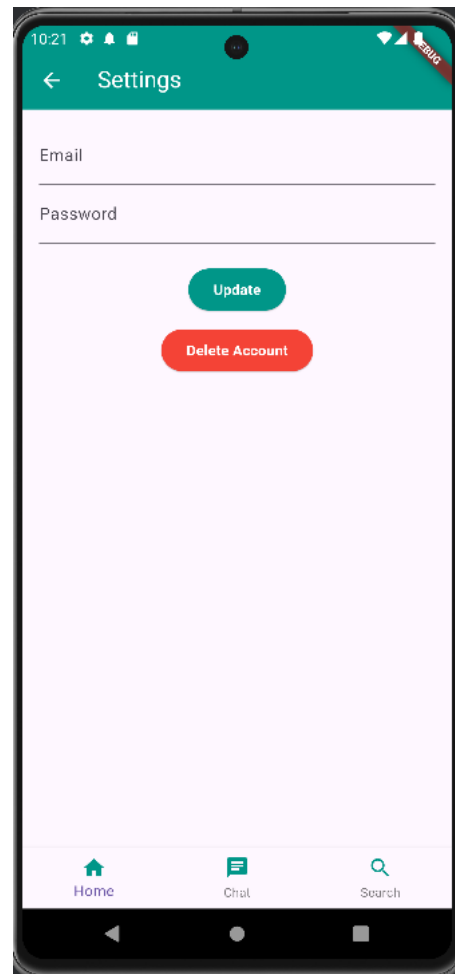


Figure 3.19b

3.2.5 Chating

One of the most important features of the application and facilitating communication is the presence of chats. This feature is available to all users. The doctor communicates with his patients, as well as the patients, and they can communicate with hospitals and also communicate with the admin when needed. This chat takes into account all situations. It provides audio recordings for the elderly, and also reads text messages to them because one of them may not know how to read and write, and it also sends pictures, There are several ways to use the chat, either by using the chat button in the bottom bar and choosing the desired person, or by searching for the person and entering his personal file. There is a chat button. See figure 3.20a 3.20b

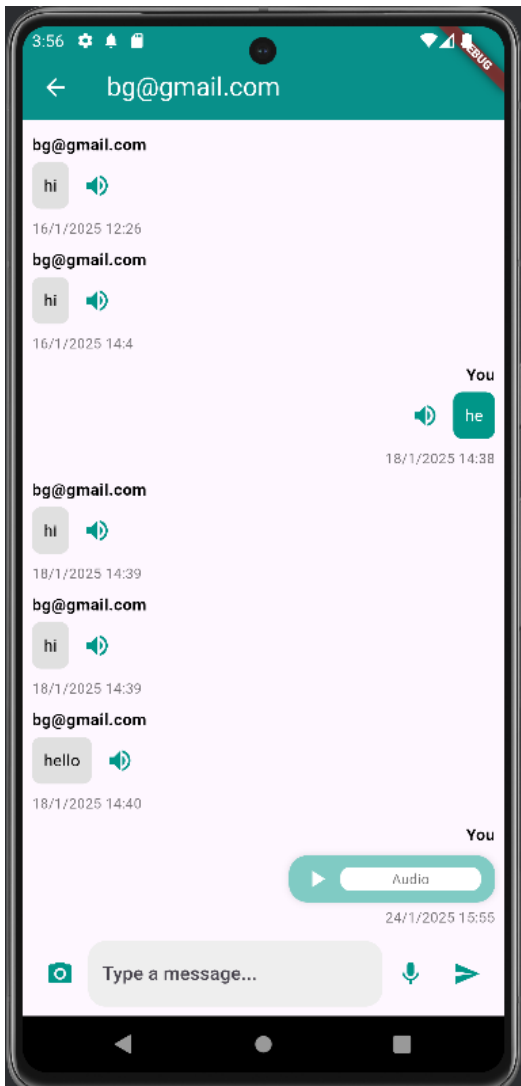
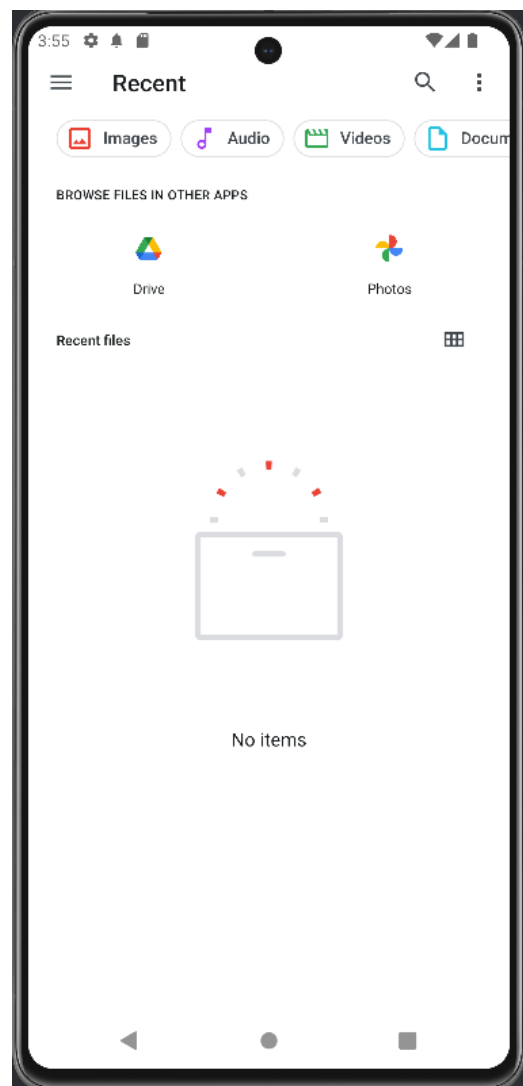


Figure 3.20a



Show upload photo Figure 3.20b

3.2.6 Care recipient information

As shown in the pictures of the doctor's home page, there is a table for elderly patients. When clicking on the patient, he is transferred to a special list containing the personal file, reports, medications, and patient history. See figure 3.21

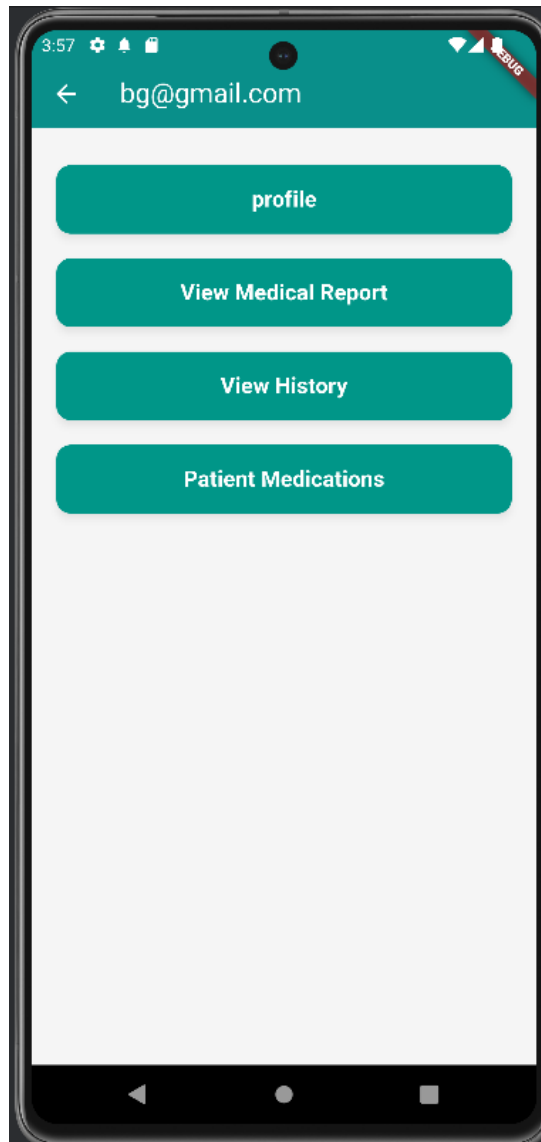


Figure 3.21

The method of following up with the doctor is to send him a follow-up request. Upon acceptance, the follow-up and communication are approved, and the follow-up request box is in the personal file of each user. The patient or doctor can cancel the follow-up and end the tracking of the health condition. See figure 3.22a-mobile and 3.22b-website

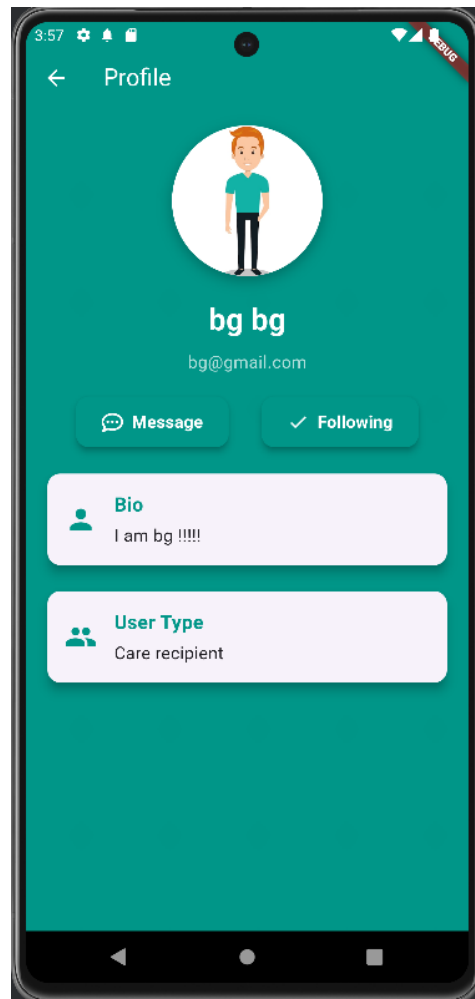


Figure 3.22

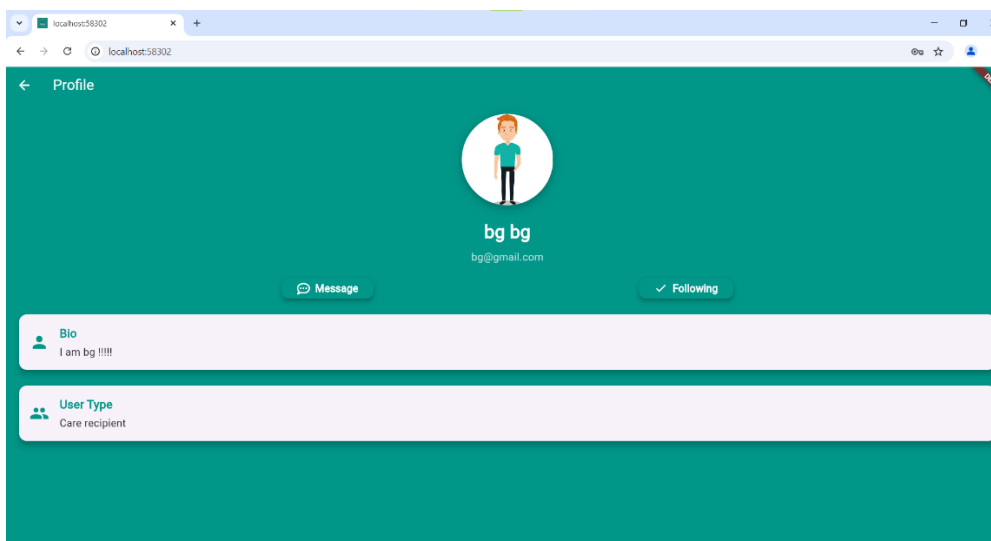


Figure 3.22

Display medical reports, here the patient's previous medical reports are displayed in order to evaluate his health condition, and the elderly person's vital signs are read, stored and displayed. The display is on the history button. See figure 3.23a-mobile (3.23b 3.23c)-website

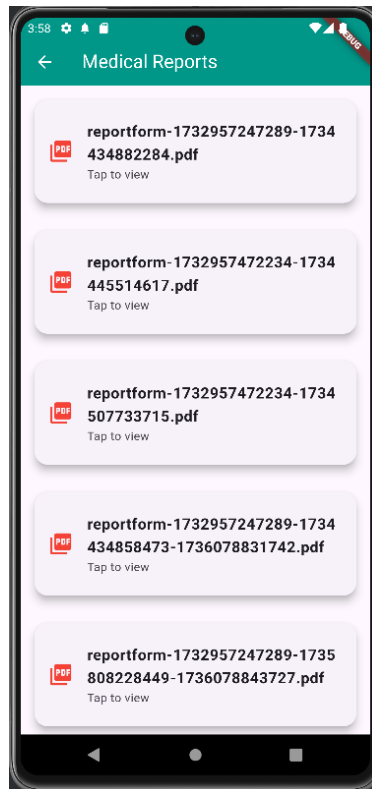


Figure 3.23a -mobile

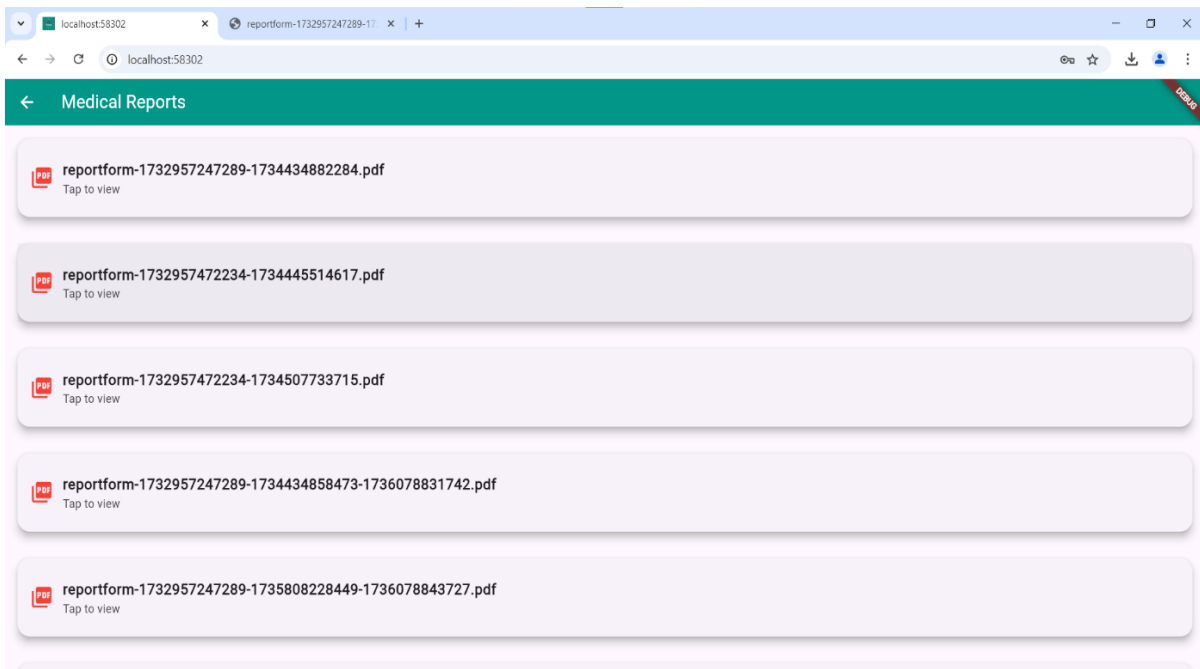


Figure 3.23b -website

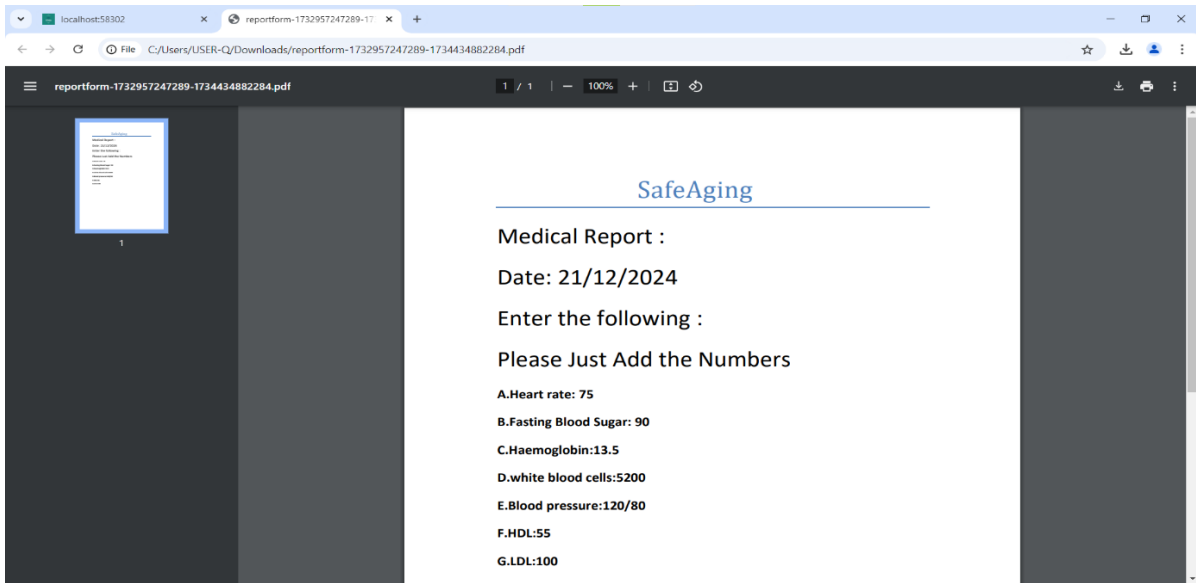


Figure 3.23c -website

Now display readings for the patient's condition. See figure 3.24a 3.24b 3.24c -mobile And 3.25a 3.25b-website.

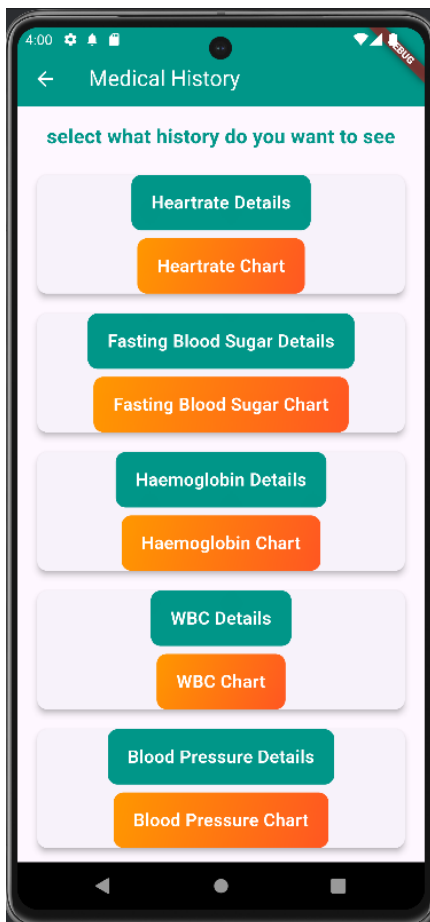


Figure 3.24a -mobile

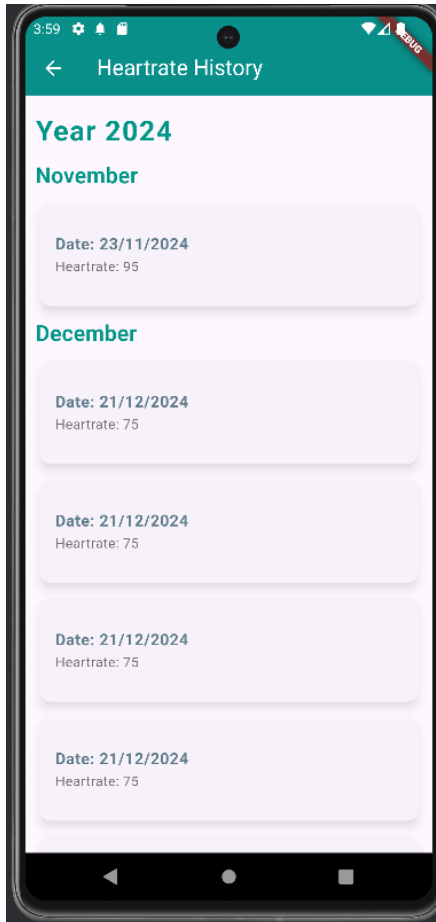


Figure 3.24b -mobile

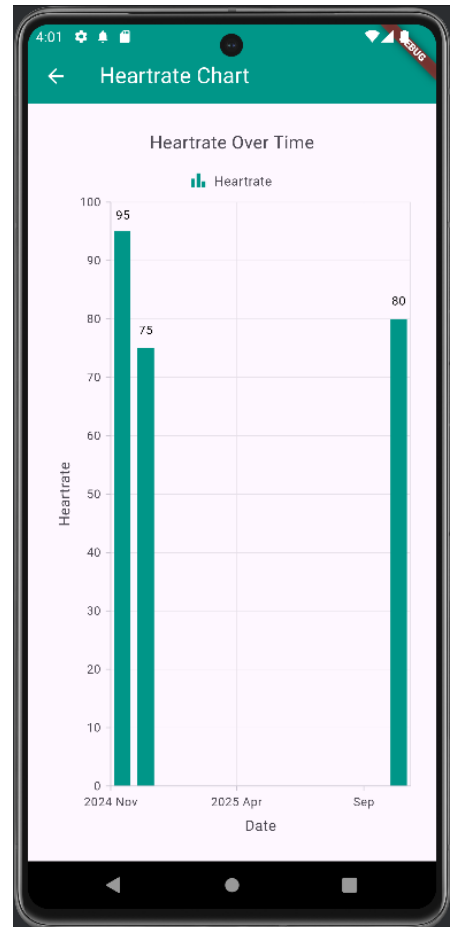


Figure 3.24c -mobile

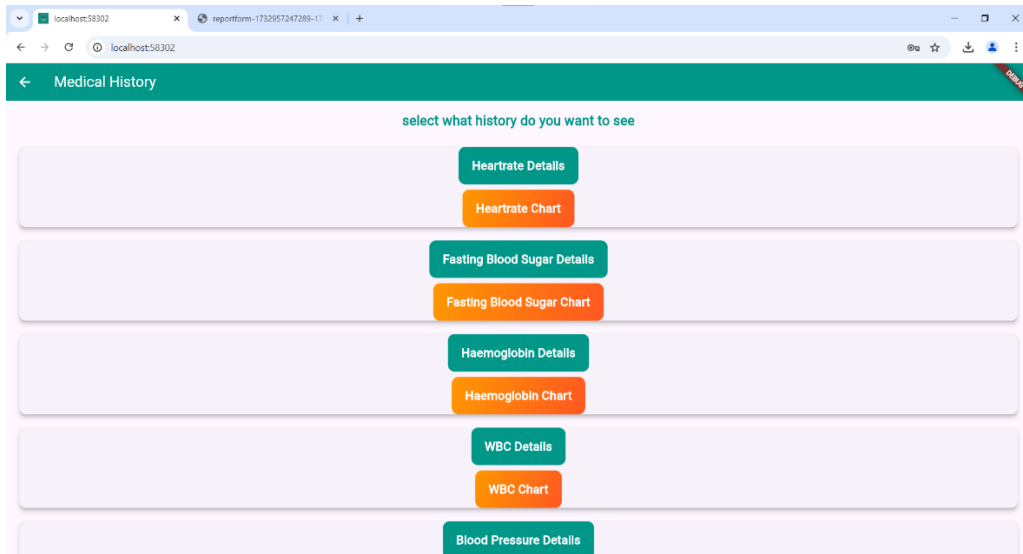


Figure 3.25a-website



Figure 3.25b-website

The doctor can add and delete medications for the patient from the medications box, and when clicking on the medication, it provides details about it. See figure 3.26-mobile and 3.27a 3.27b 3.27c-website.

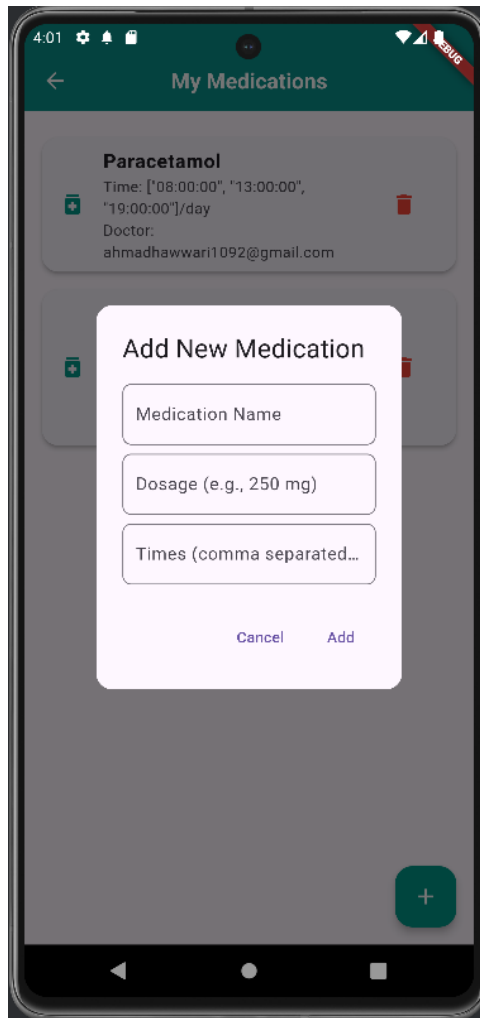


Figure 3.26 : Show medicines. This add screen appears when you click on the plus sign at the bottom of the screen.

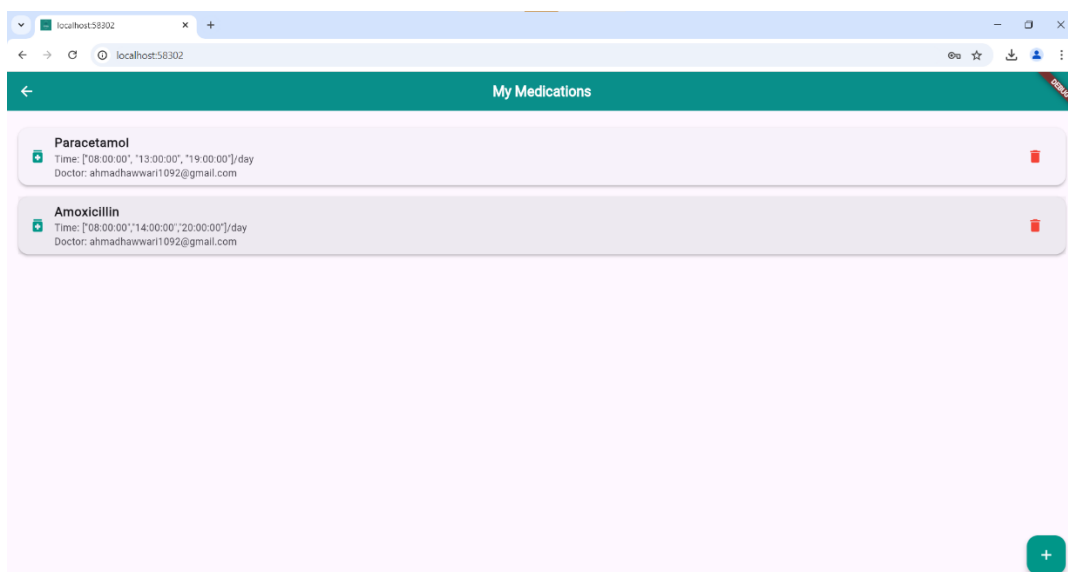


Figure 3.27a-website

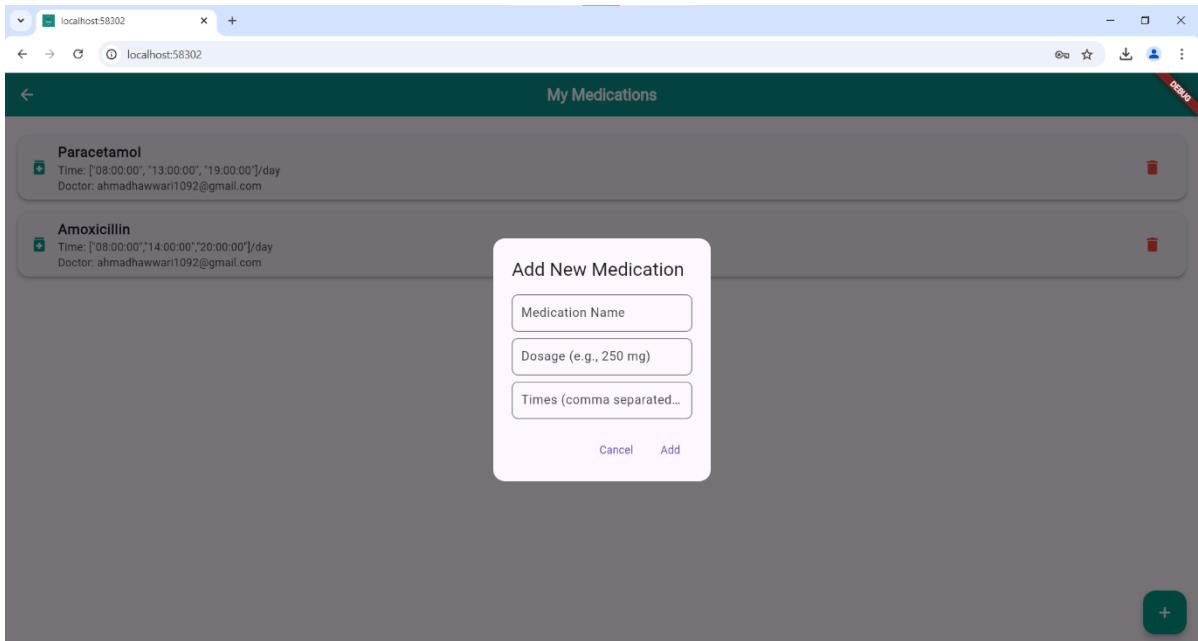


Figure 3.27b-website

3.3.1 Care recipient home page

The patient's home page initially contains fields for entering the patient's vital signs to assess whether or not it is necessary to see a doctor. The buttons for doctors, medicines, hospitals, reports, and the emergency button are at the bottom right of the screen, in addition to the side menu that contains many features. See figure 3.28a-mobile (3.28b 3.28c)-website.

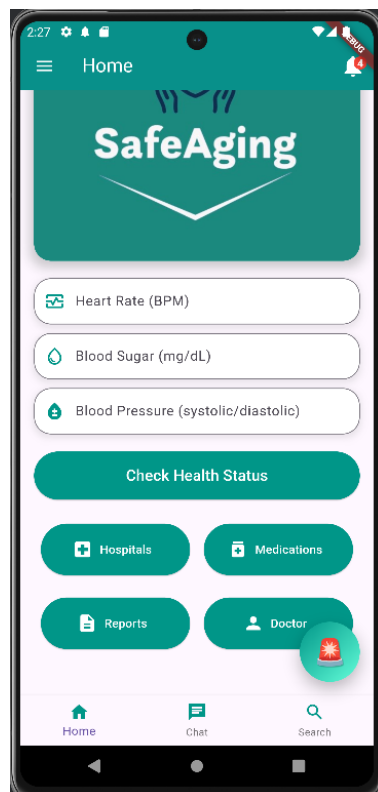


Figure 3.28a-mobile



Figure 3.28b-website

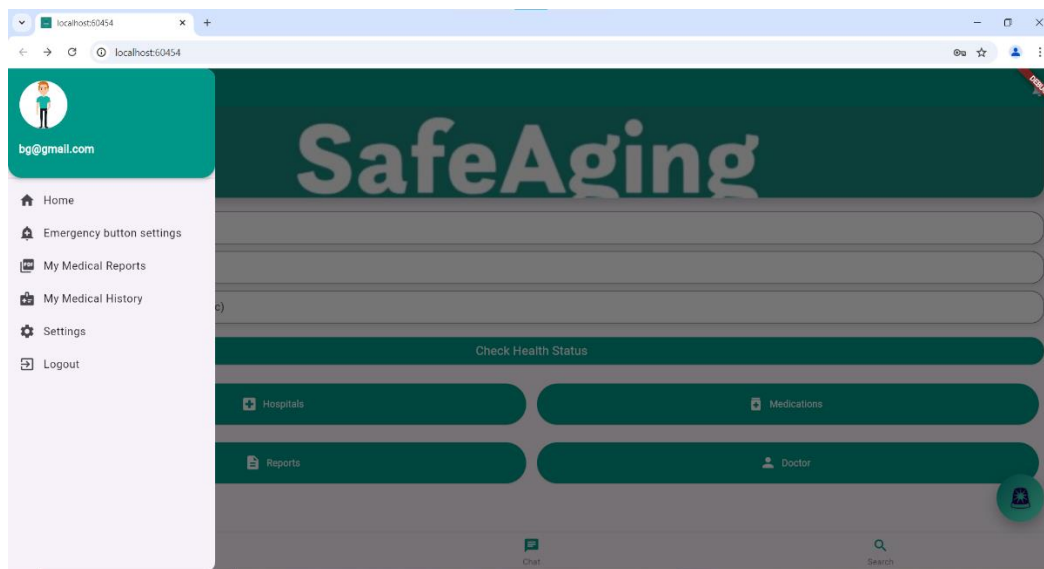


Figure 3.28c-website

In addition to the bottom bar that contains chat and search as explained by doctors, as well as notifications, but the patient receives a notification to remind him of the time of the medication. See figure 3.29a-mobile , 3.29b-website show notification .

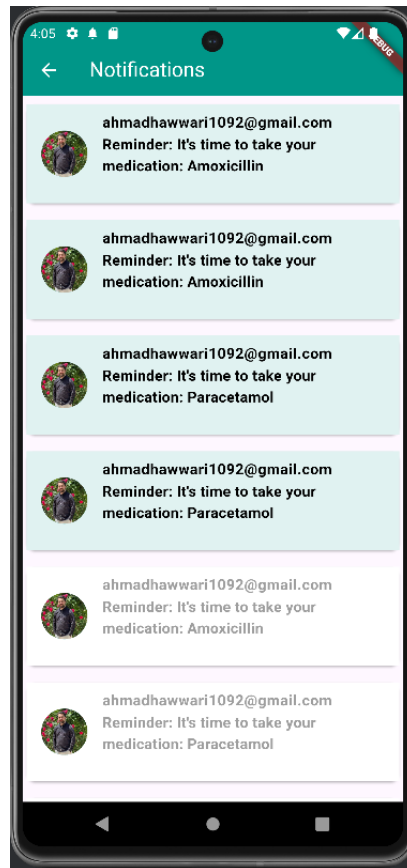


Figure 3.29a-mobile

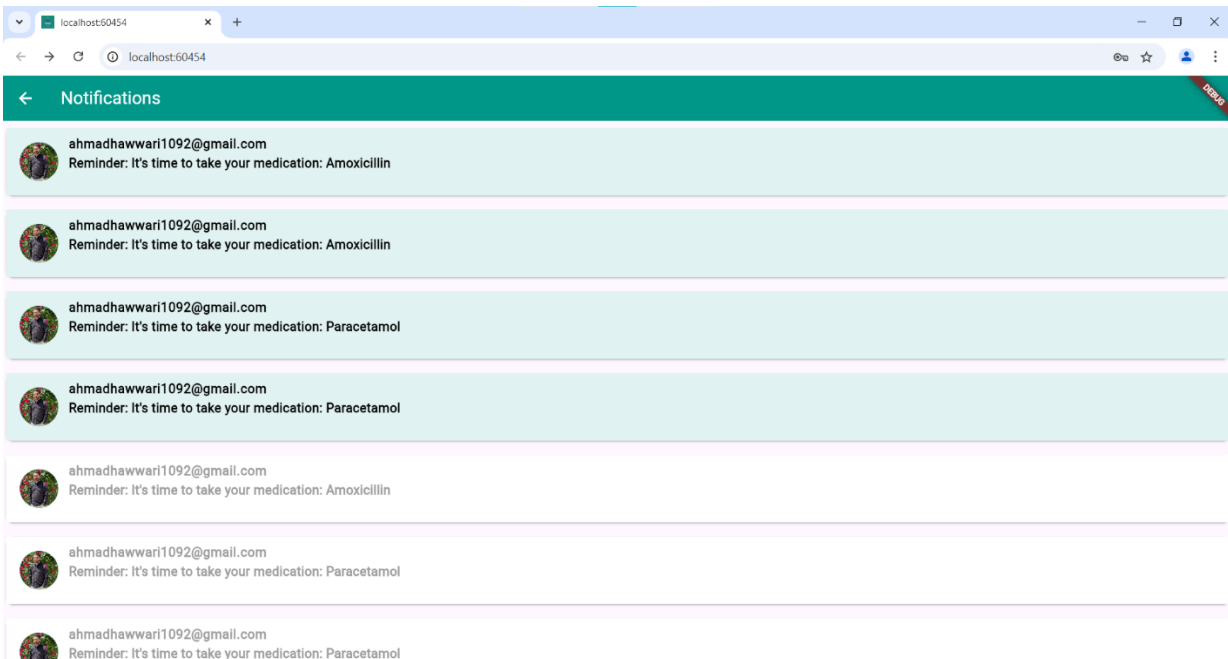


Figure 3.29b-website

3.3.2 Hospital page

Display the existing hospitals. When you click on the hospital, its details and the ability to contact it appear. See figure 3.30a-website ,3.30b-website , 3.30c-website

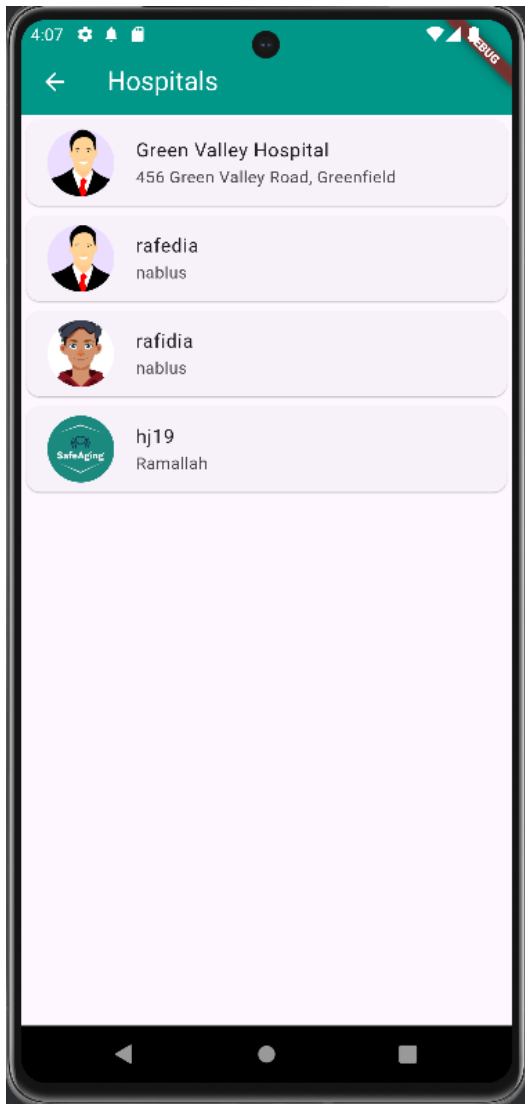


Figure 3.30a-mobile

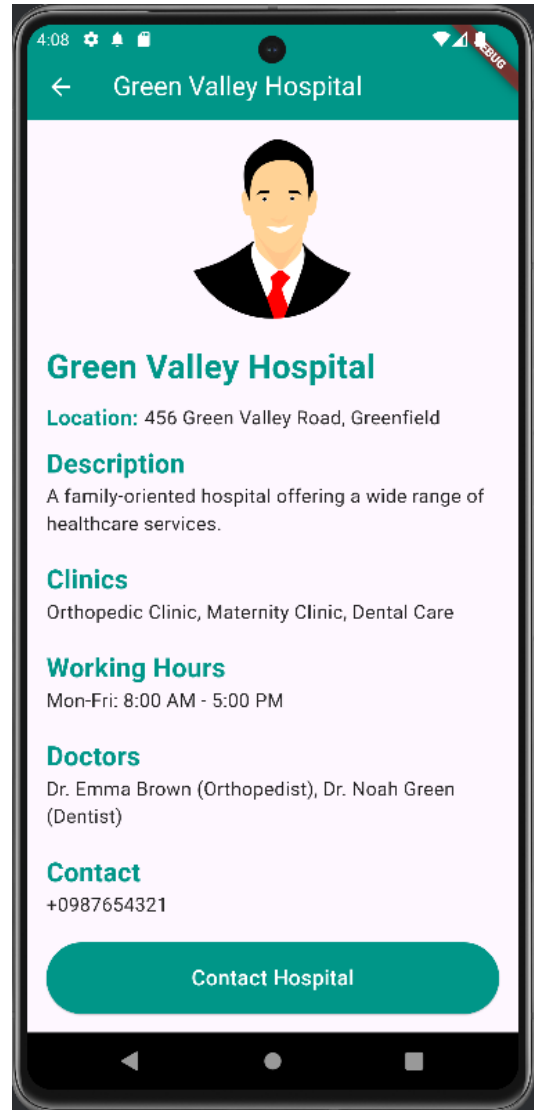


Figure 3.30b-mobile

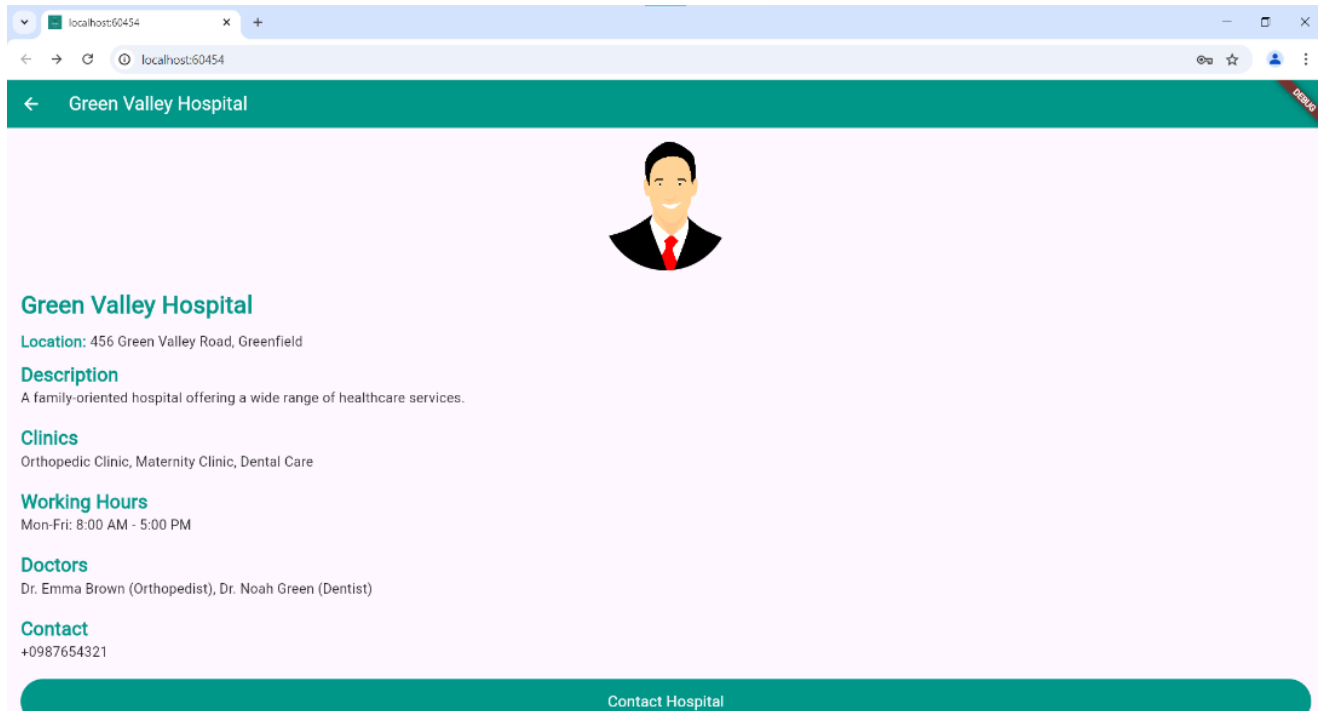


Figure 3.30b-website

3.3.3 Medicines page

Display the medications added by all doctors and provide details for each medication when clicked on . see figure 3.31a 3.31b-mobile 3.31c-website.

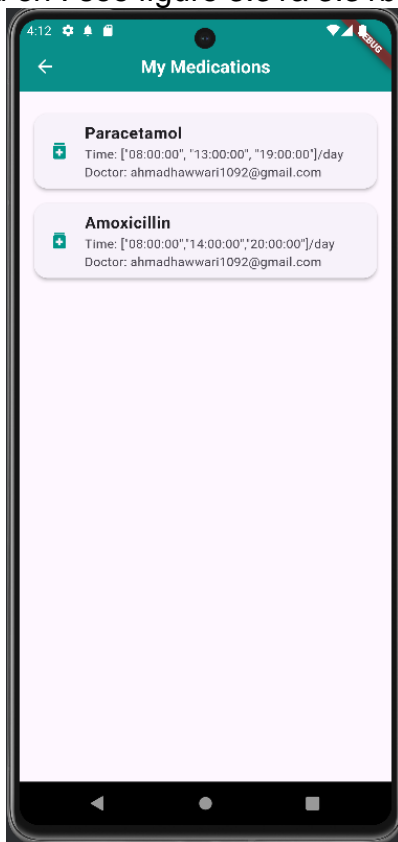


Figure 3.31a-mobile

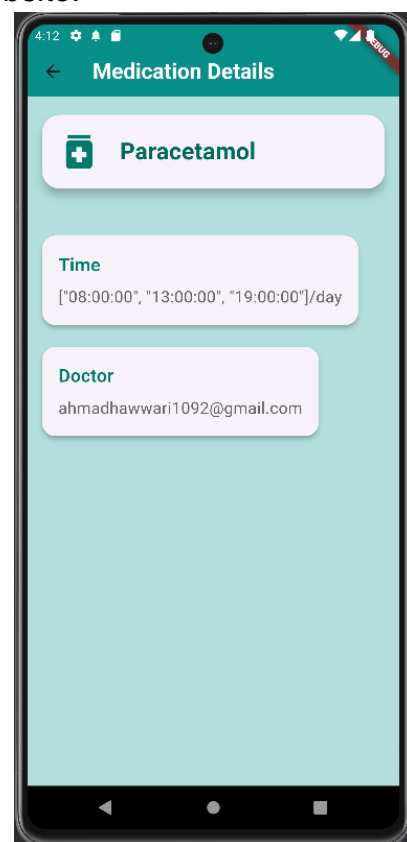


Figure 3.31b-mobile

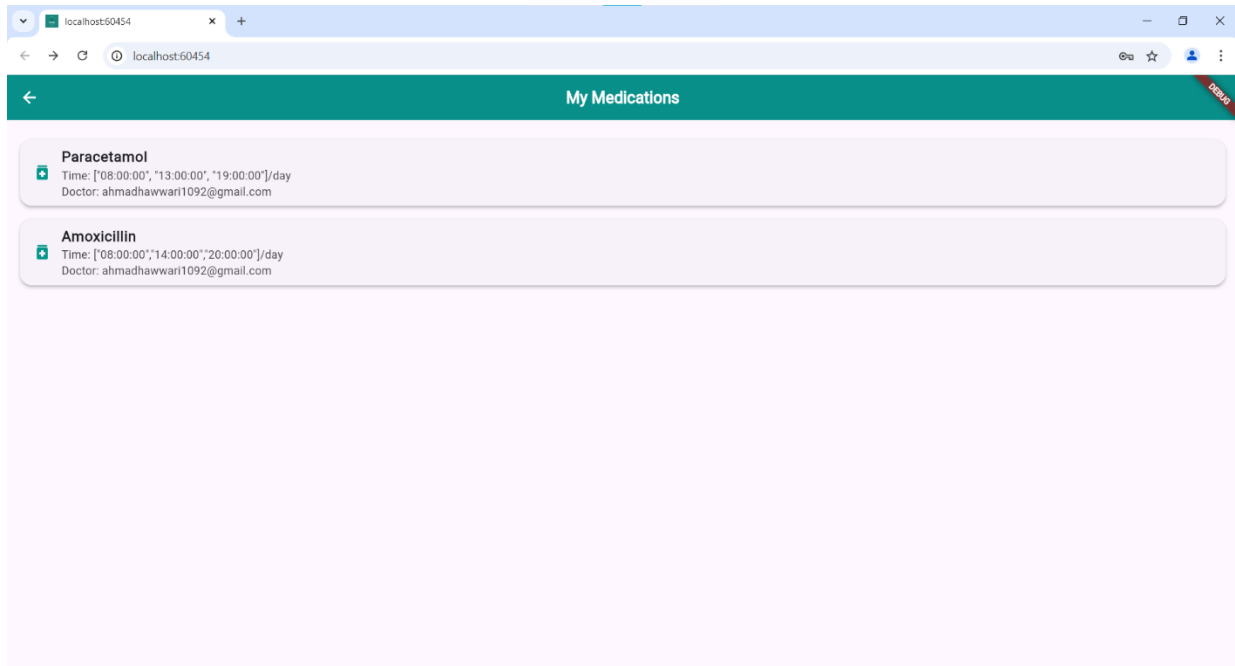


Figure 3.31c-website

3.3.4 Medical reports

Enter and upload medical reports . see figure 3.32a 3.32b

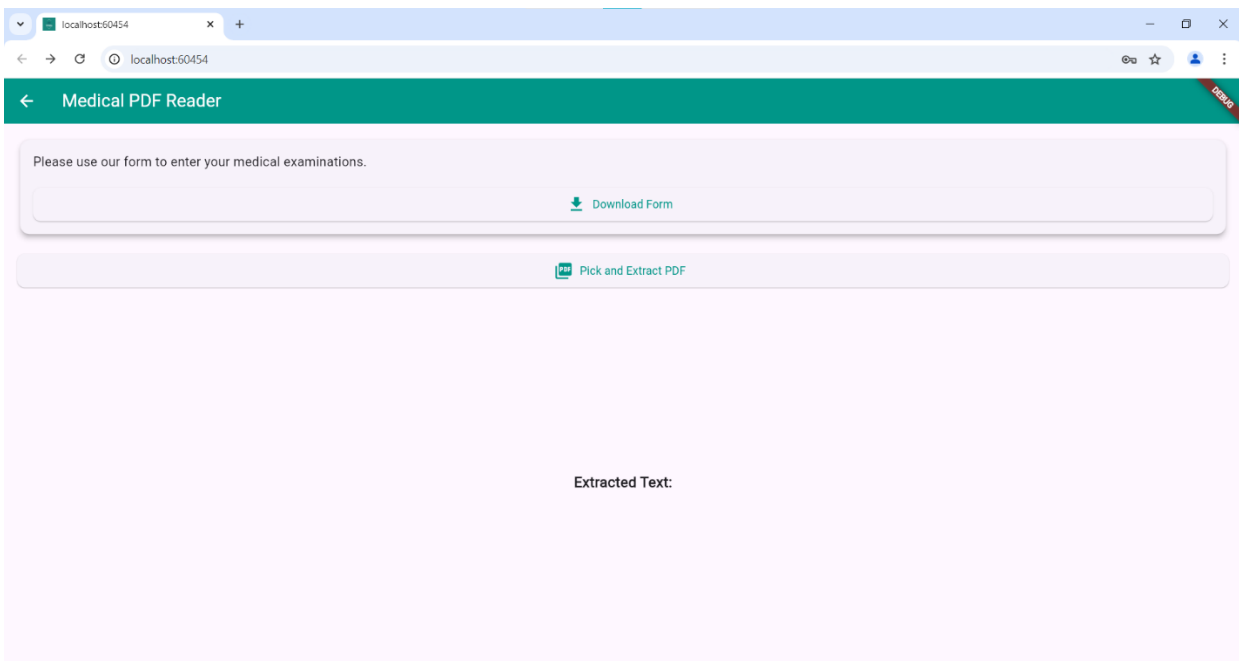


Figure 3.32a-website

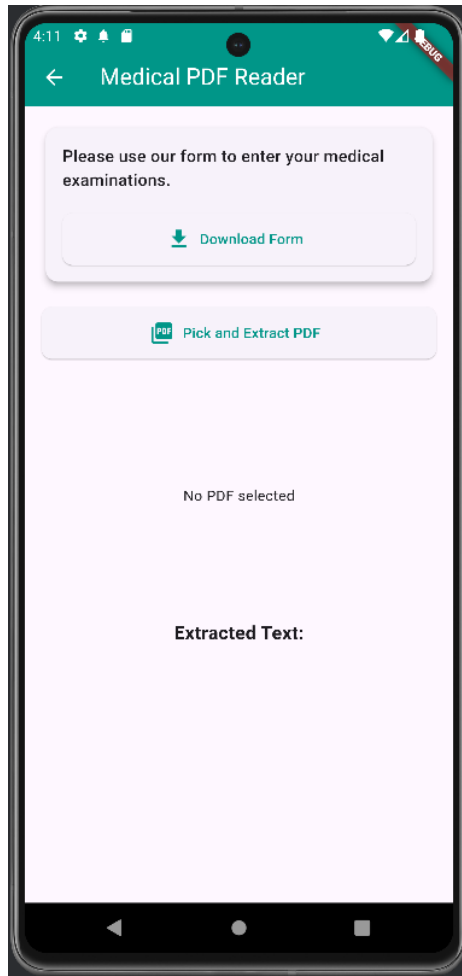


Figure 3.32b-mobile

From the side menu there is a box for the patient's attached reports. See figure 3.33

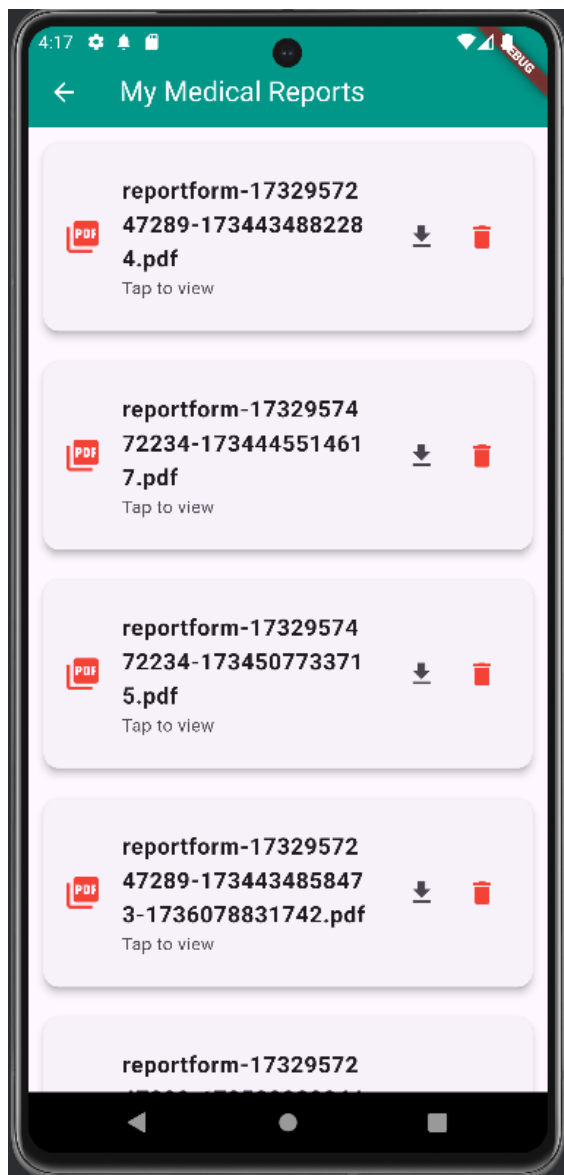


Figure 3.33-mobile

From the side menu there is a box to display the patient's history. This is the result of the program reading the medical reports. See figure 3.34a 3.34b 3.34c mobile , 3.35a 3.35b website

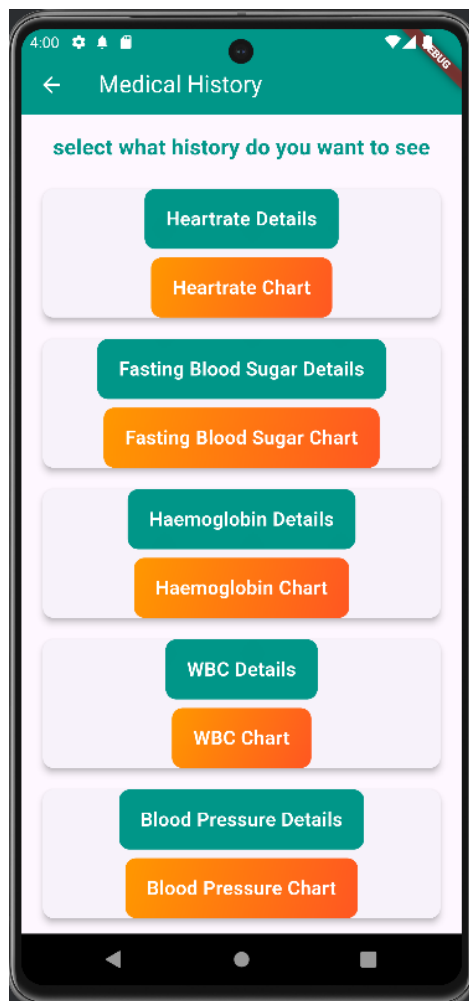


Figure 3.34a-mobile

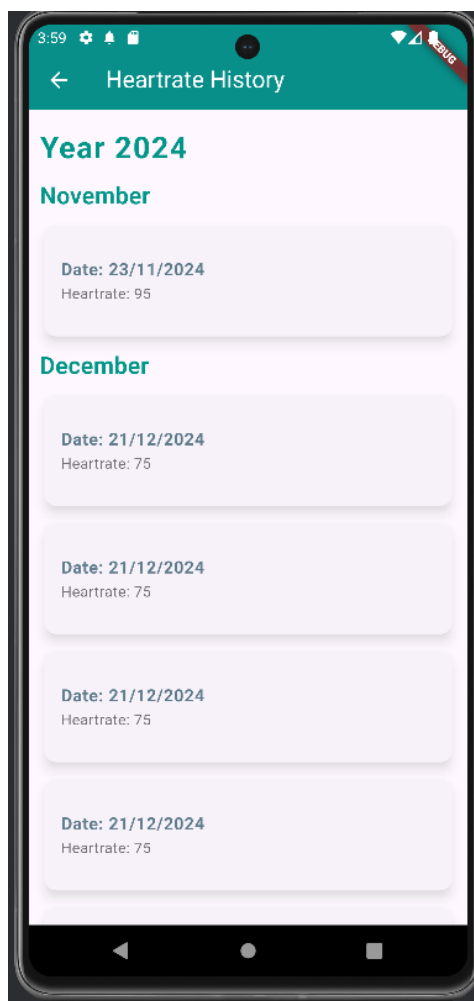


Figure 3.34b-mobile

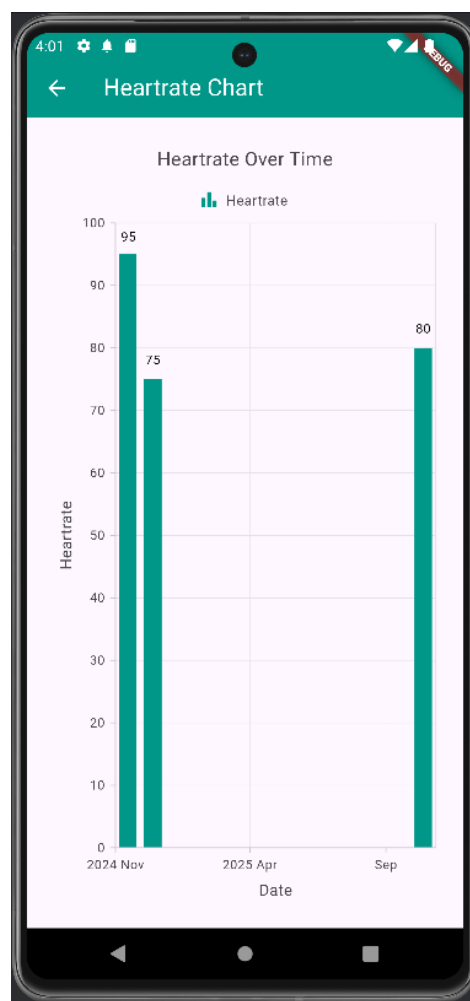


Figure 3.34c-mobile

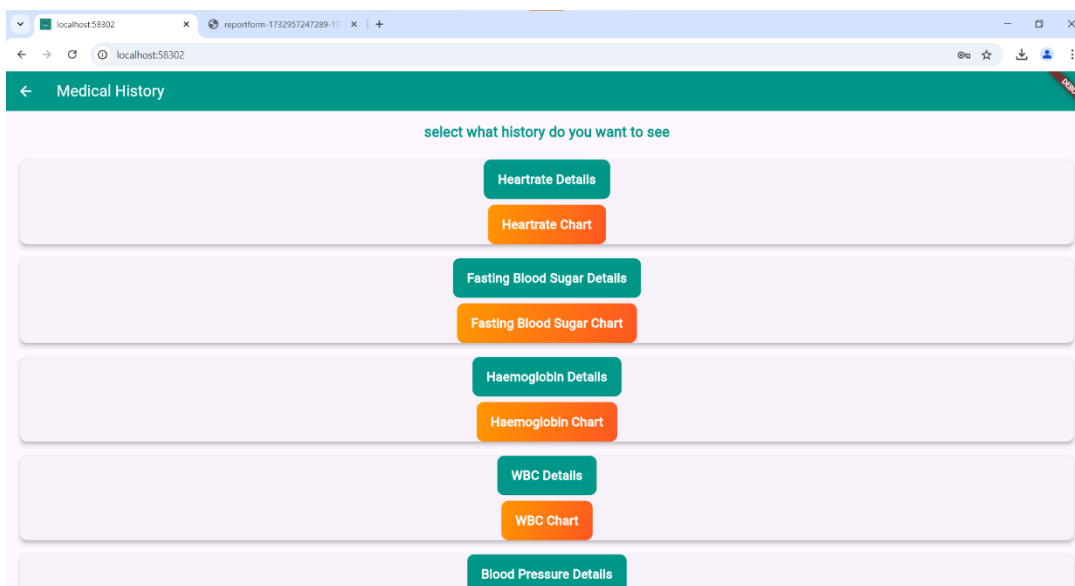


Figure 3.35a-website



Figure 3.35b-website

3.3.5 Emergency button

When you press the emergency button, it sends the current location to the doctor indicating urgent help. The emergency button has settings to choose who the doctors will receive the alert to. See figure 3.36a 3.36b

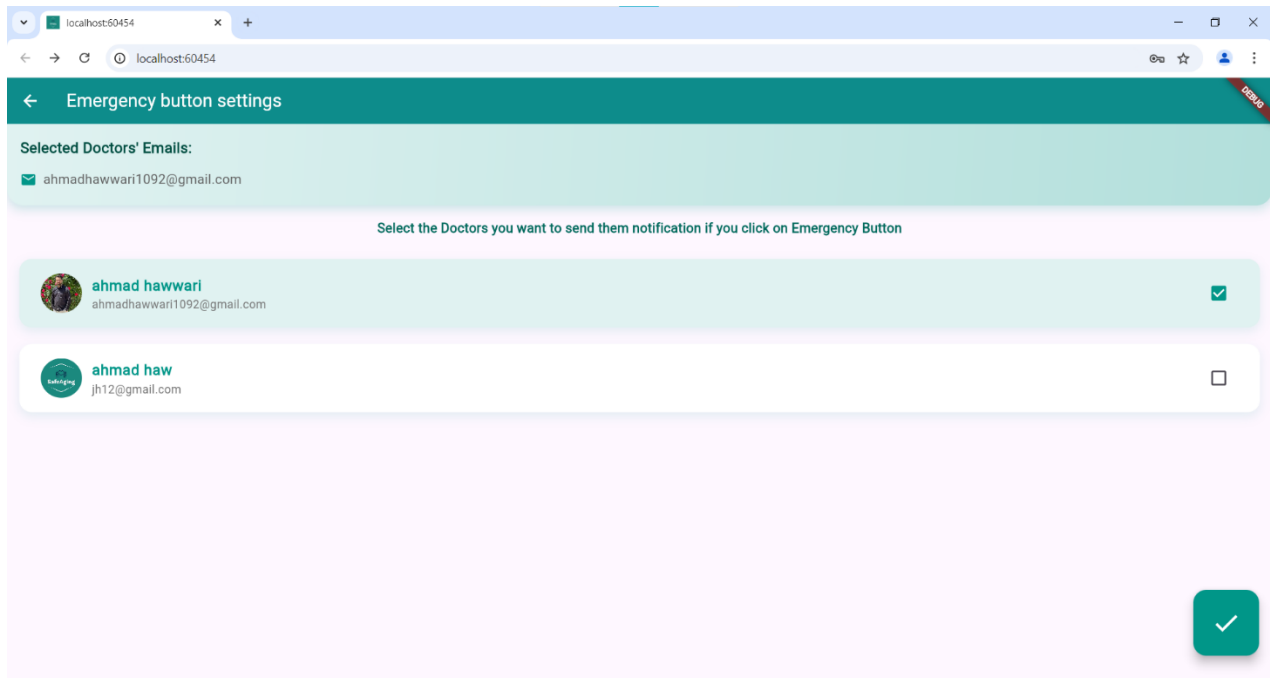


Figure 3.36a-website

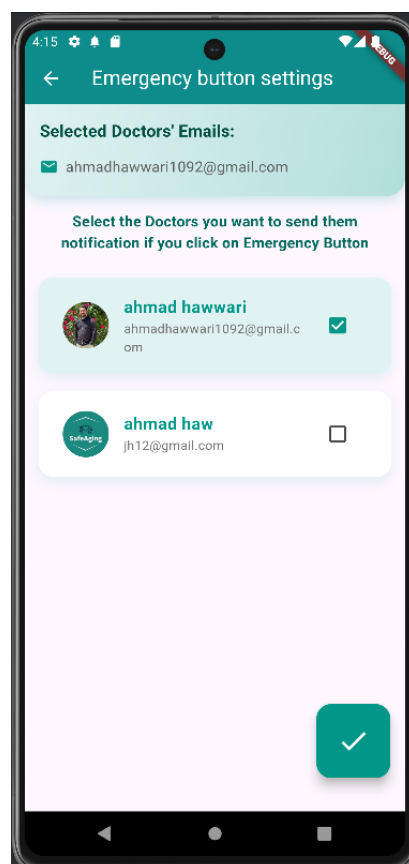


Figure 3.36b-mobile

3.3.6 Doctor page

Shows the list of added doctors. See figure 3.37

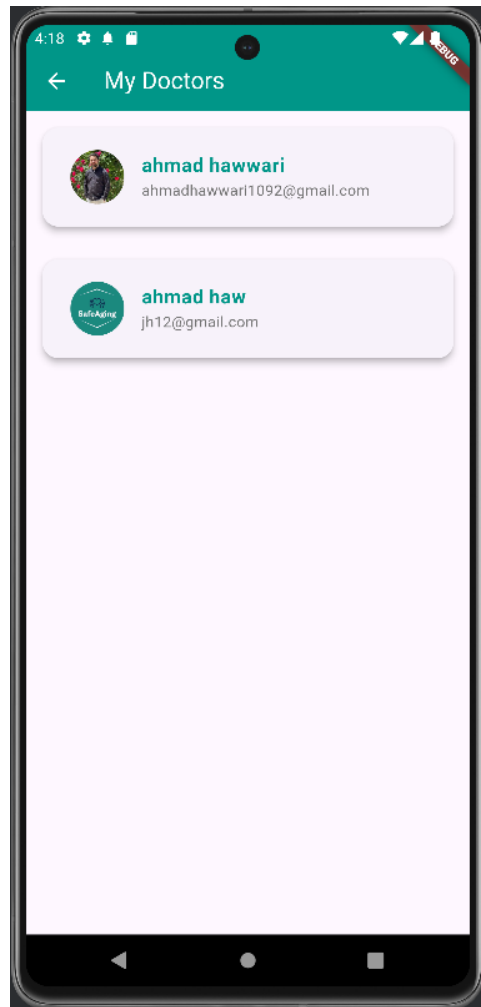


Figure 3.37-mobile

When choosing a doctor, the personal page is displayed between them, which shows the chat and follow-up buttons, the schedule of appointments, and below it is the schedule of medications that were added by the doctor. See figure (3.38a 3.38b 3.38c)mobile (3.39a 3.39b 3.39c)website.

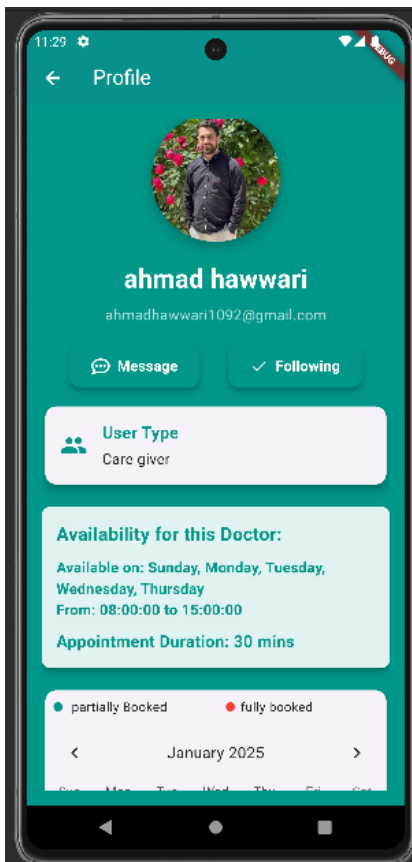


Figure 3.38a-mobile

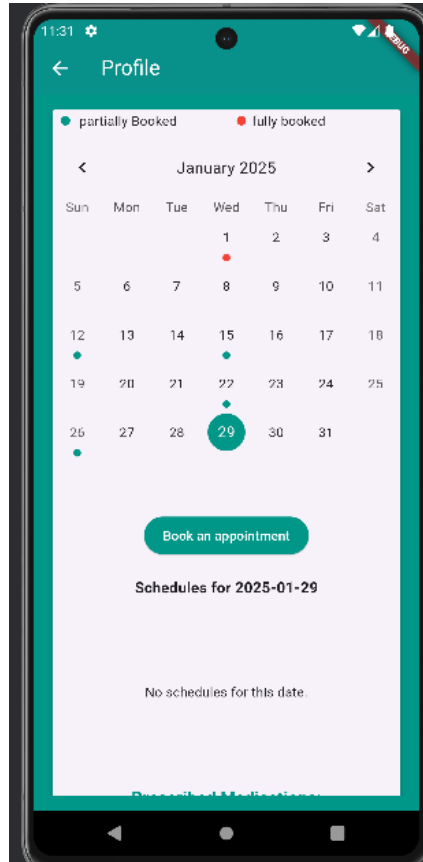


Figure 3.38b-mobile

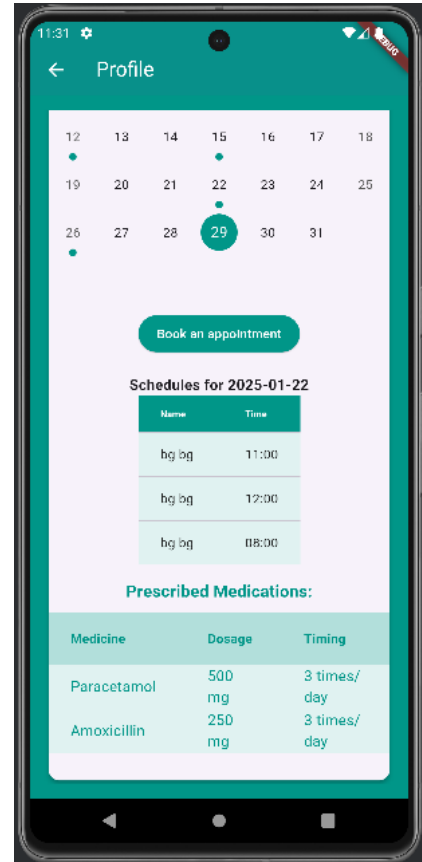


Figure 3.38c-mobile

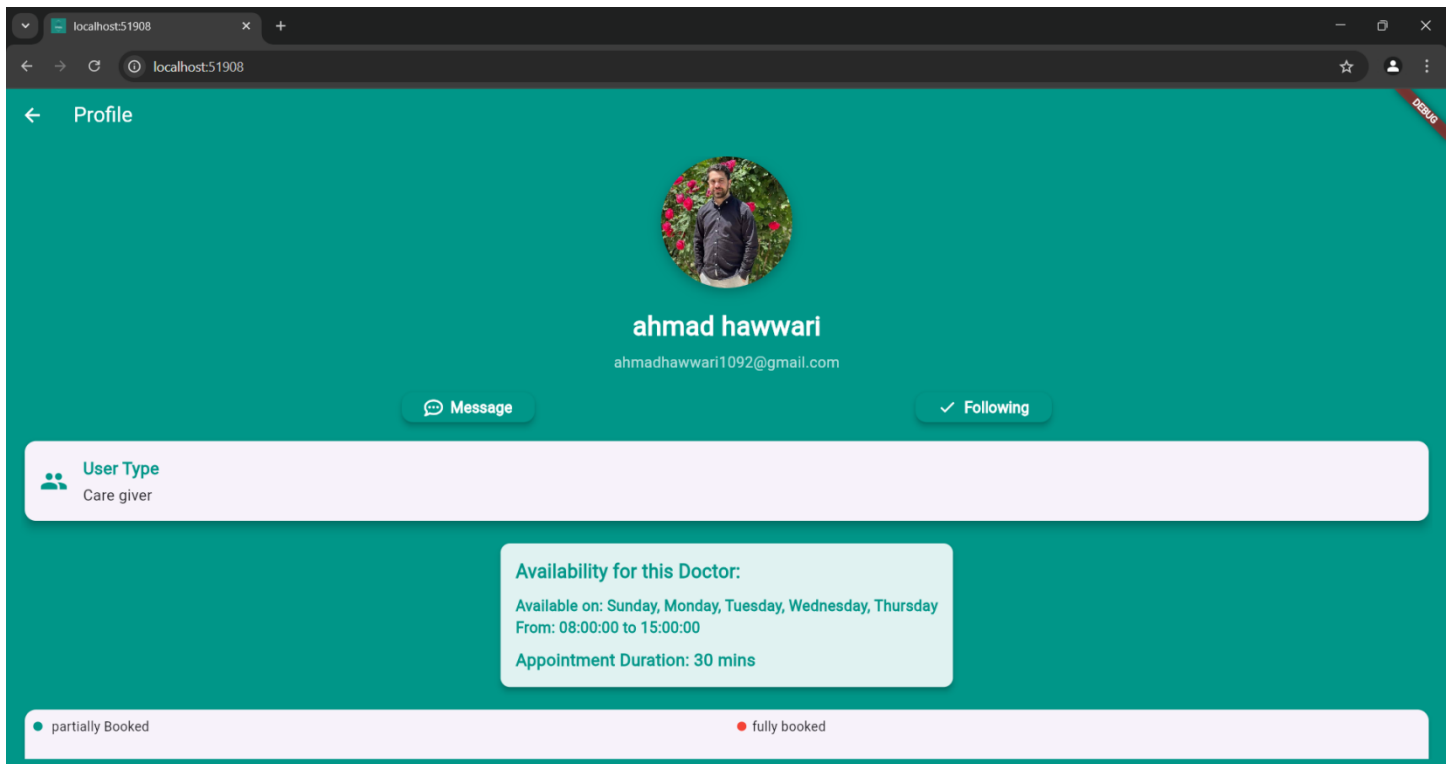


Figure 3.39a-website

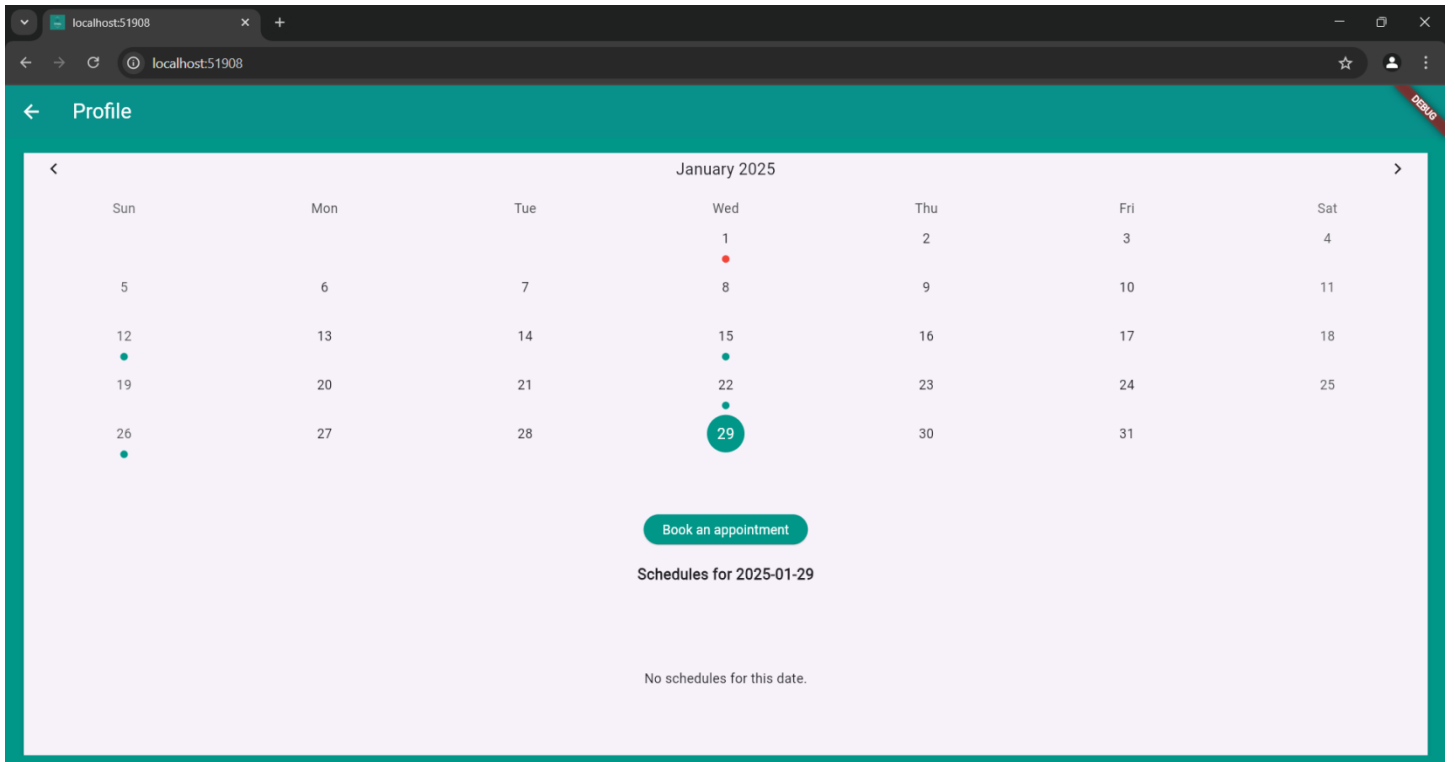


Figure 3.39b-website

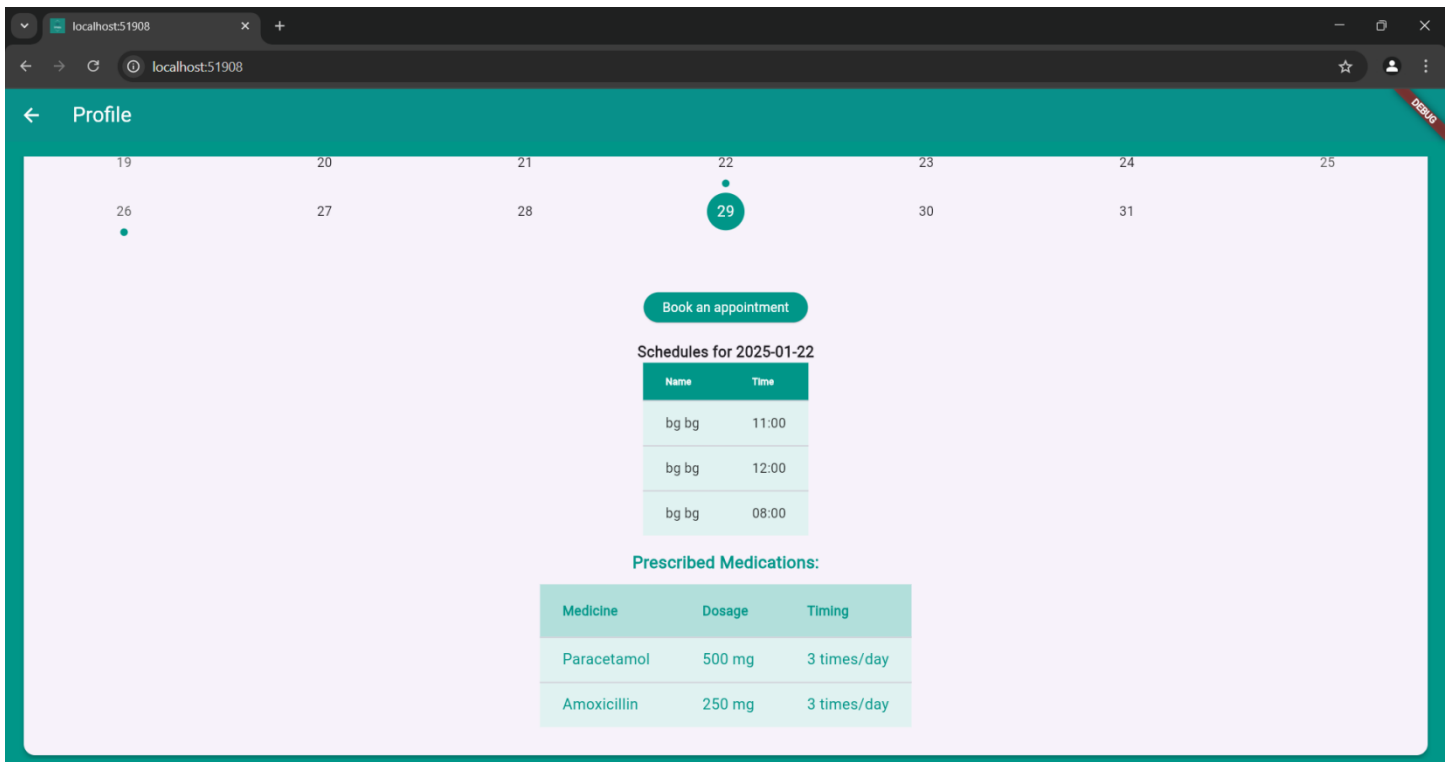


Figure 3.39c-website

3.4.1 login as hospital

Create a page for the hospital, display information about it, and the ability to communicate and chat with users . see figure 3.40a 3.40b 3.40c

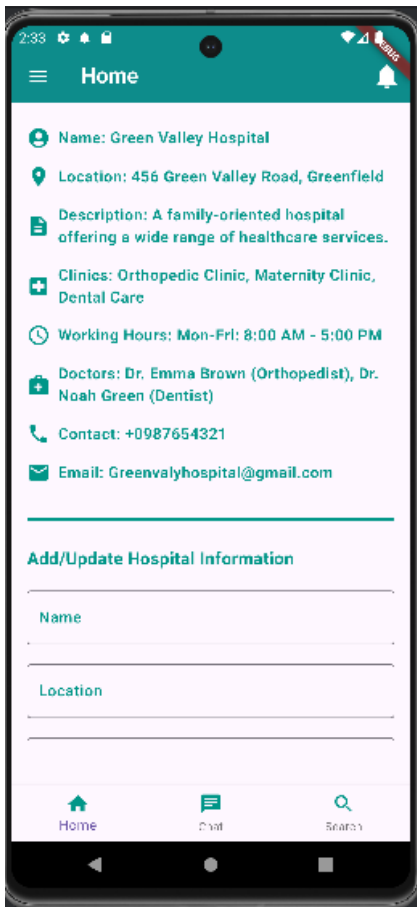


Figure 3.40a-mobile

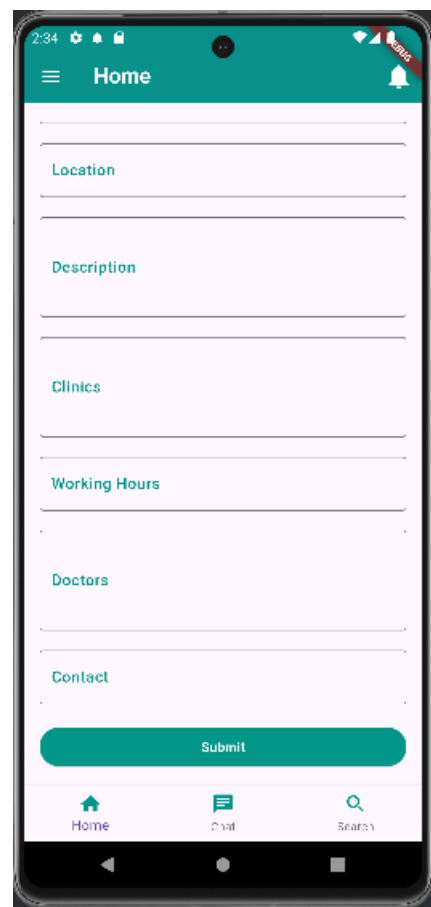


Figure 3.40b-mobile

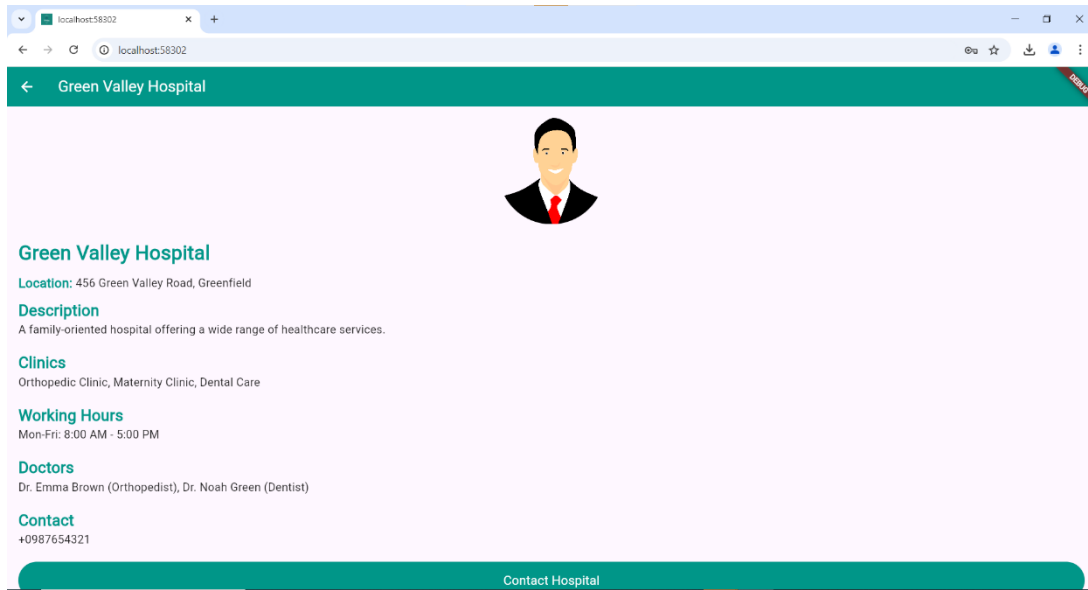


Figure 3.40c-website

Chapter 4

Results & Discussion

Results

Safe Aging is a mobile app and website that provides healthcare for the elderly and allows users to:

1. Users create personal accounts for themselves, whether they are doctors or elderly people.
2. Patients and doctors can add each other to follow up on the case.
3. Patients activate emergency button when necessary.
4. The ability to chat between users, especially patients and doctors.
5. Notify the patient when it is time for medication.
6. Ability to search for doctors and hospitals and communicate with them
7. The ability for users to communicate with the admin when needed, such as a report or assistance.
8. The admin accepts or rejects doctors and hospitals when creating an account according to the validity of the attached documents and the ability to delete any user from the application.

Discussion

Safe aging most likely supplied the following:

Providing an easy-to-use platform regardless of their technical knowledge so they can register on the app easily

Chapter 5

Conclusion & Future Work

Conclusion

Safe Aging is an application that provides health care and services to the elderly by ensuring continuous follow-up of their health condition and medications and easy communication with specialized doctors..

Future Work

There are several areas where the Safe Aging app could improve, including:

1. Work on improving the website design
2. Add a feature to order and deliver medications
3. Activate the emergency button on the phone's on/off button

