FACULTY OF COMPUTING
UTM Johor Bahru

Semester I 2024/2025

(SECP1513-08)

TECHNOLOGY AND INFORMATION SYSTEMS

DESIGN THINKING PROJECT:

MedLink System Integrated App

(Group 2)

Lecturer:

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Introduction

Design thinking is a problem-solving's process through collaborative designs on innovation. This project aimed to address the real-world challenge itself and improve our critical teamwork, problem-solving and communication.

Effective healthcare services are critical in ensuring public health and well-being. However, the manual processes used in healthcare systems mostly lead to inefficiencies, affecting patient outcomes. Therefore, the development of an integrated system is necessary to solve the problems for both patients and healthcare providers. In this report, we introduced the MedLink System Integrated App — a comprehensive solution addressing the challenges through the design thinking process.

The MedLink System enhances the efficiency and accessibility of healthcare. It is designed to help daily operations within hospitals, ensuring that patients feel attended to. It strengthens the bond between health providers and the patients through tools and features provided.

Timeline

November	
Timeline	**Task**
6 -7	Discussion and finalization of the project's title— MedLink System Integrated App.
8 -9	Empathy phase: Conduct interviews to gather insights and users' needs. Composite characters' research and development.
13	Title presentation and approval from the lecturer.
December	
11-18	Define phase: Analyze findings to articulate the problem. Ideate phase: Brainstorm and develop potential solutions.
20 -30	Prototype was created with specific features to represent the proposed solution.
January	
1- 2	Test phase : Test running prototype from user.

Empathy

3.1 The Users' Needs

To explore the users' needs, we conducted interviews and created composite characters as typical users within the healthcare system.

Our interviewees, Yap Wen Kang and Crystal Yap, shared their patients' experiences within the government healthcare system. They also shared challenges like lack of convenience, inefficiencies in time management, and limited access to personal medical data. For our composite characters, their background and challenges are shown in the table below.

Table below shows the background and challenges faced by composite characters :

User	Challenges
Name: Joanne, 28 **Background:** Nurse in a government hospital outpatient ward.	She frequently handles manual data entry for patient registration and encounters problems of delay or errors in patient information. She finds it difficult to keep the process organized when the government hospital is often overcrowded in the waiting area. She also noticed a lack of real-time communication tools between doctors and other departments results in delays in patient care.
Name: Dr. Syed, 45 **Background:** General practitioner in a busy government clinic.	He struggled with fragmented patient medical records, patient histories scattered in different departments, hard to access during consultation. He is also overwhelmed by high patient volume, difficult to prioritize patient according to conditions or urgent cases

By combining insights from interviews and developing composite characters, we gathered the difficulties from patients and medical staff in government healthcare institutions.

3.2 Evidence

Define

4.1 Framing The Problem

Manual data processing in hospitals like patients repeatedly filling out personal information and manual data entry by healthcare staff may lead to administrative burden and limited number of manageable patients.

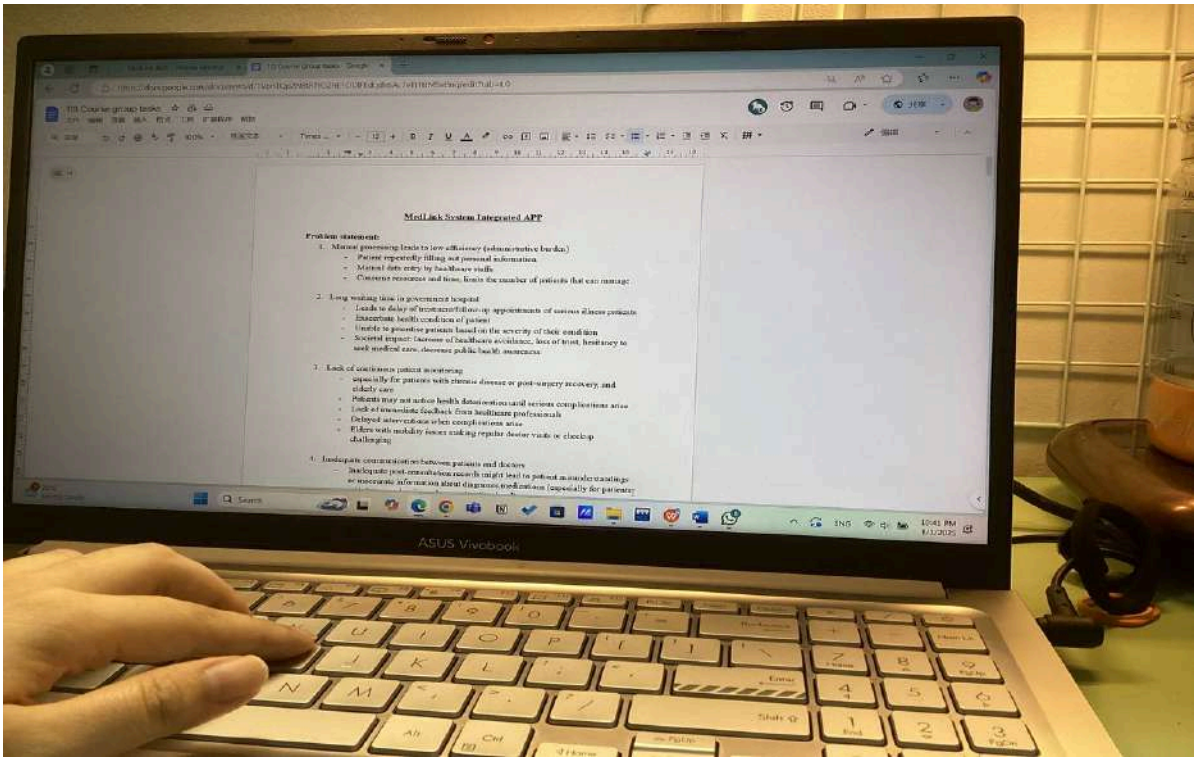
Next, long waiting times in government hospitals cause delays in treatment or appointments of serious illness patients. This may cause societal impact like increase of healthcare avoidance, and loss of trust.

Lack of continuous patient monitoring is also a problem for patients with chronic disease and post-surgery recovery. Patients may not notice health deterioration until serious complications arise and delayed interventions.

Inadequate communication between patients and doctors is another critical issue. Insufficient post-consultation records may lead to inaccuracies in diagnoses and medications. Besides, limited healthcare access in remote locations or villages leaves many without timely care during emergencies, increasing risks in critical situations.

Lastly, incomplete and inaccessible patient medical records lead to fragmented care and delayed treatments during emergencies or for the management of chronic illnesses.

4.2 Evidence


MediLink System Integrated APP
Problem statement:
ASUS Vivobook

Ideate

5.1 Solution

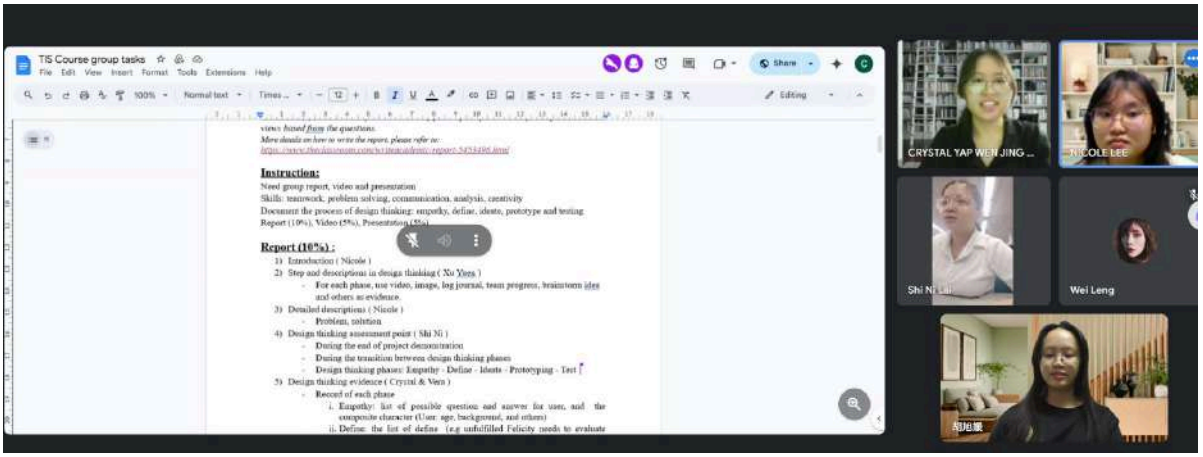
A digital patient registration system in MedLink System enabling automated data entry through smart forms. Patients can update their medical history.

It has a smart appointment scheduling system that prioritizes patients based on their symptoms. Reminders for appointments provided to improve compliance. Moreover, a real-time queue tracking function enables patients' flexibility.

Post-hospital care features include health trackers that synchronize with wearable devices to record vital data such as blood pressure and telemedicine consultations for remote doctor interactions. Additionally, a central digital medical record system ensures seamless data sharing across providers, real-time updates, and emergency access to critical information. Patients benefit from post-consultation summaries, and detailed outpatient records.

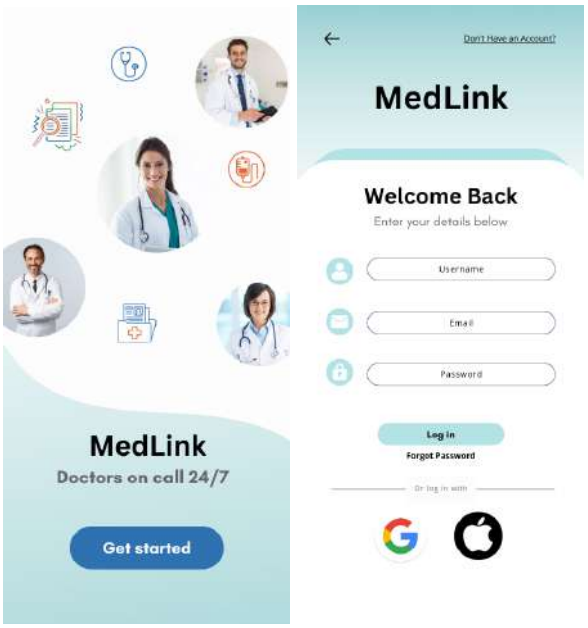
The system also includes an emergency button for instant notifications to the nearest hospital, complete with location details and secure sharing of medical history for timely care. Educational resources and health tips are personalized based on patients' profiles, offering professional advice on preventive care and lifestyle.

5.2 Evidence

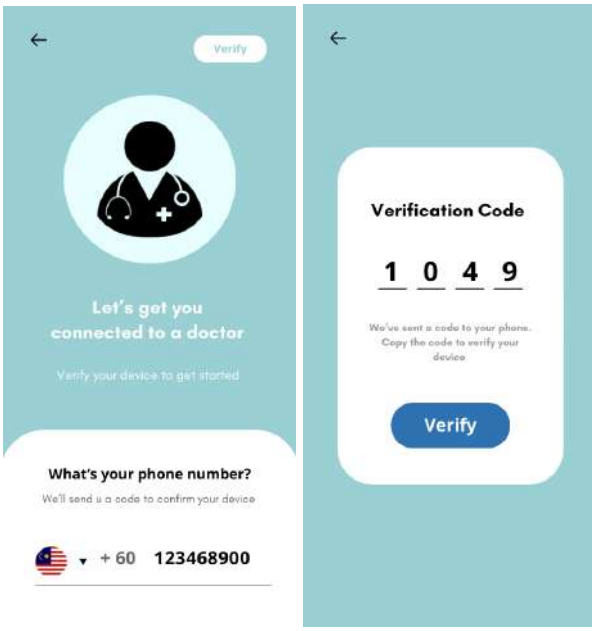

TIS Course group tasks
Instruction:
Need group report, video and presentation
Skills: teamwork, problem solving, communication, analysis, creativity
Document the process of design thinking: empathy, define, ideate, prototype and testing
Report (10%), Video (5%), Presentation (5%)
Report (10%) :
1) Introduction (Nicole)
2) Step and descriptions in design thinking (Xu Yees)
- For each phase, use video, image, log journal, team progress, brainstorm idea and others as evidence.
3) Detailed descriptions (Nicole)
- Problem, solution
4) Design thinking assessment point (Shi Ni)
- During the end of project demonstration
- During the transition between design thinking phases
- Design thinking phases: Empathy - Define - Ideate - Prototyping - Test
5) Design thinking evidence (Crystal & Wen)
- Record of each phase
i. Empathy: list of possible question and answer for user, and the composite character (User: age, background, and others)
ii. Define: the list of define (e.g unfulfilled Felicity needs to evaluate
CRYSTAL YAP WEN JING ...
NICOLE LEE
Shi Ni Lai
Wei Leng

Prototyping

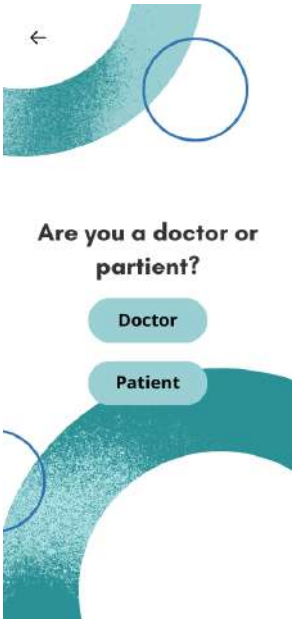
6.1 Prototype



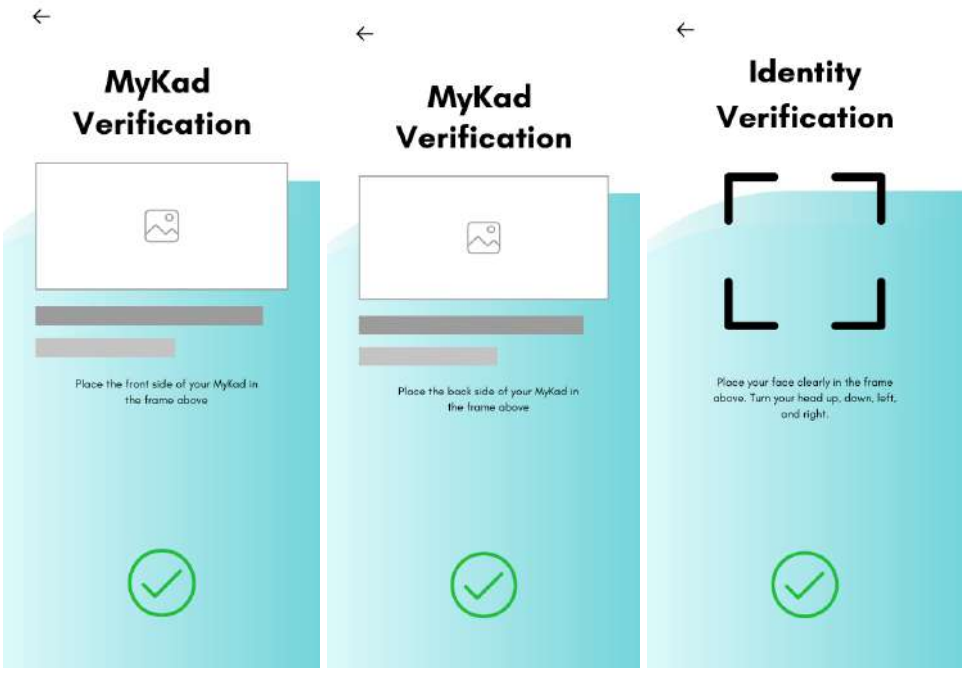
Log in by username, email and password. Click “Don’t have an account” to sign up users.



Phone number verification.



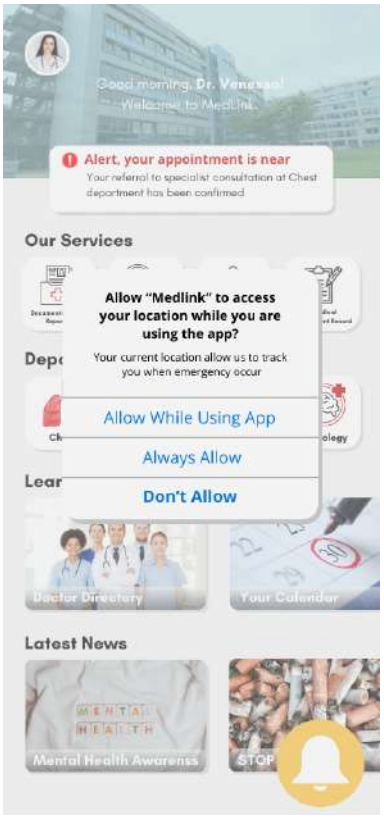
Choose your role as doctor or patient.



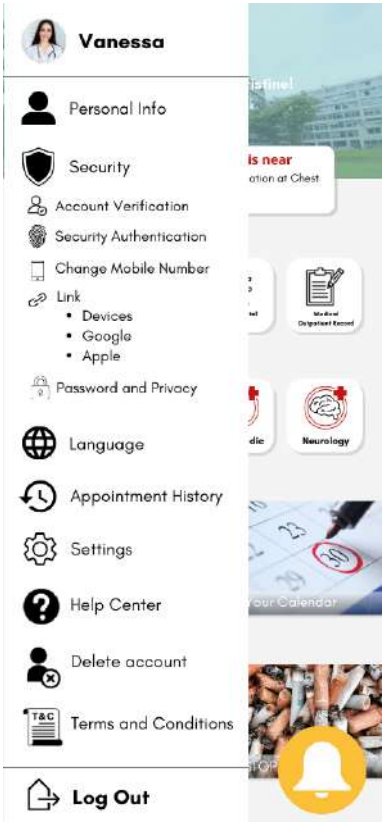
IC Verification

For doctor,

Home page and notification button

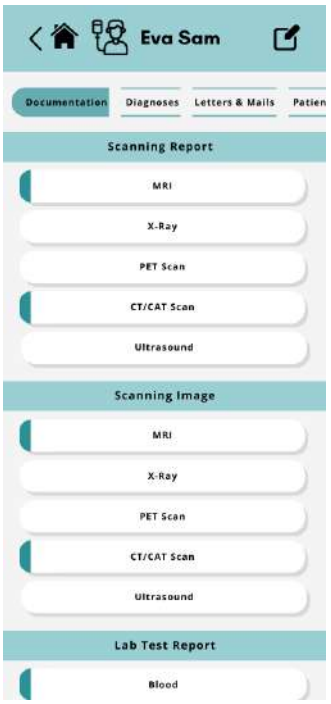


Permission for location tracking.



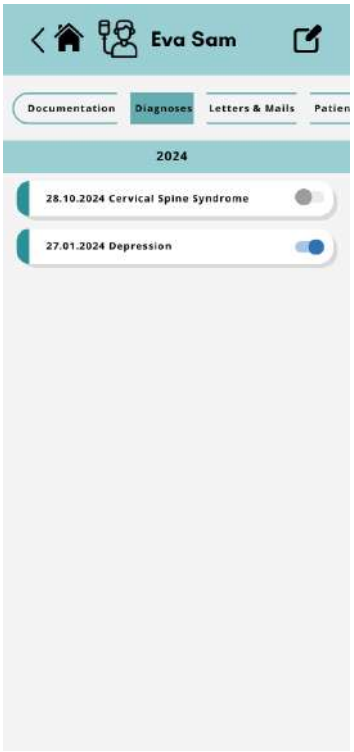
Click the profile picture for your profile details.

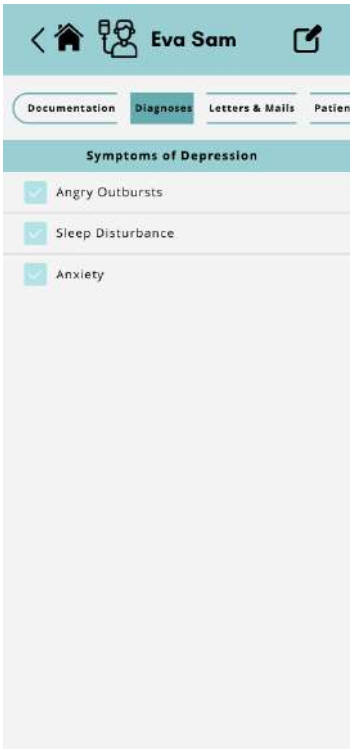
Documentation and Reporting Section

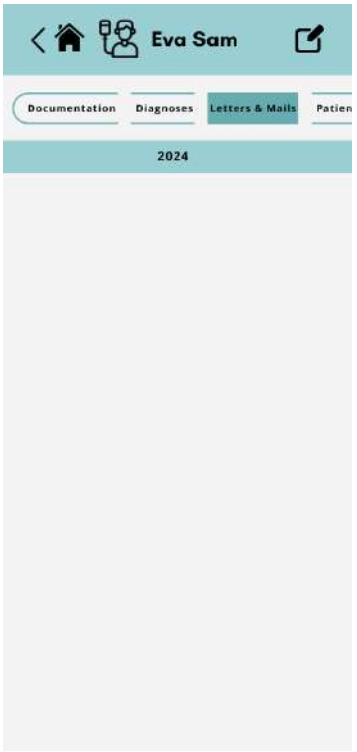


Patient list is shown. Click in for their information.

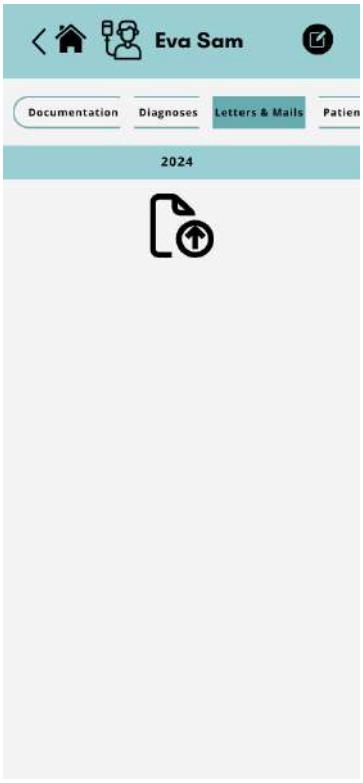
Upload documents here.



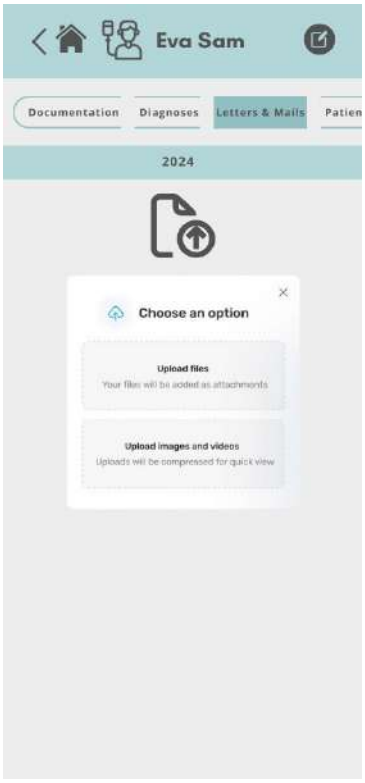




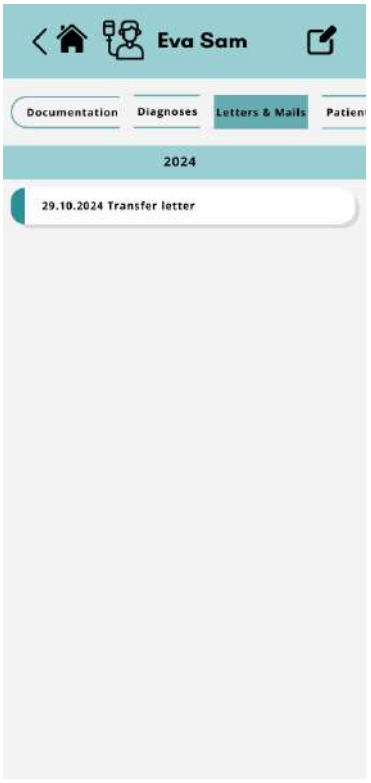
The patient's diagnoses are shown here. Blue button indicated there is symptoms recorded. (Pic 2)



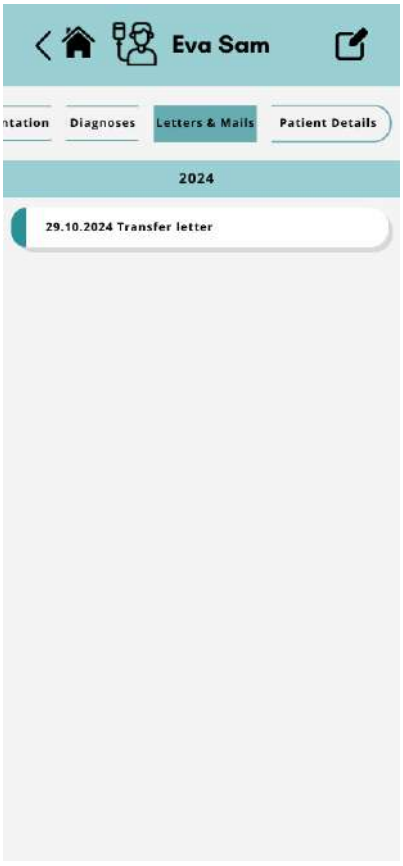
Edit button at the right top.

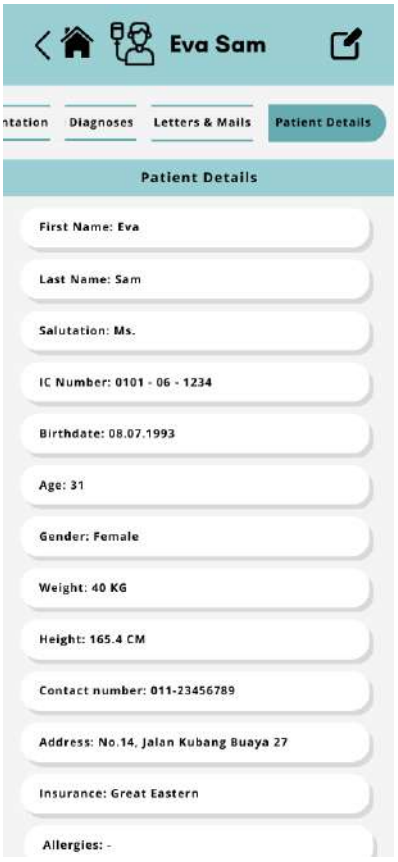


Choose media to upload.



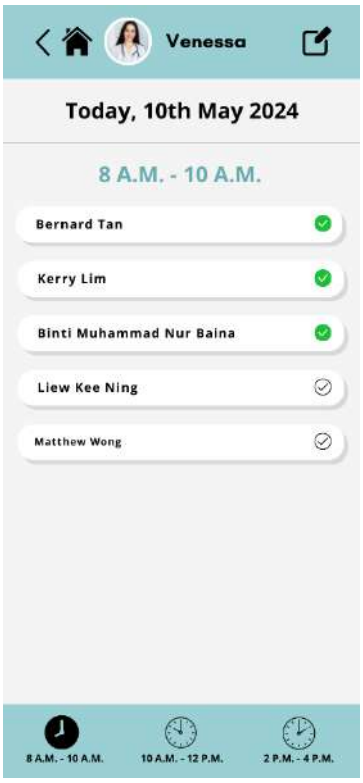
Uploaded media is shown.





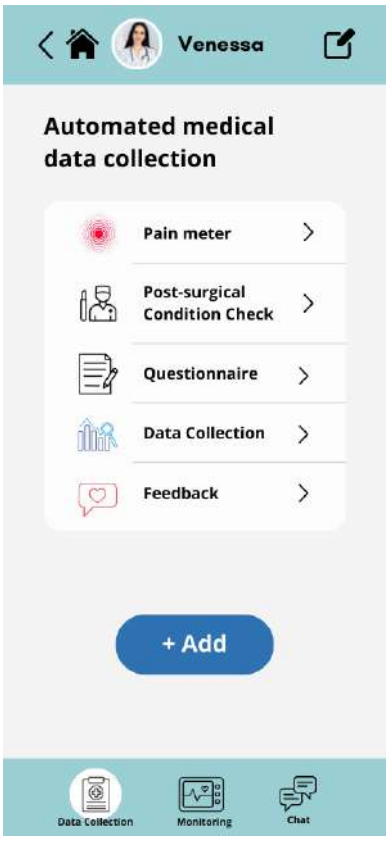
Patient details are displayed.

Appointment and Queue Management

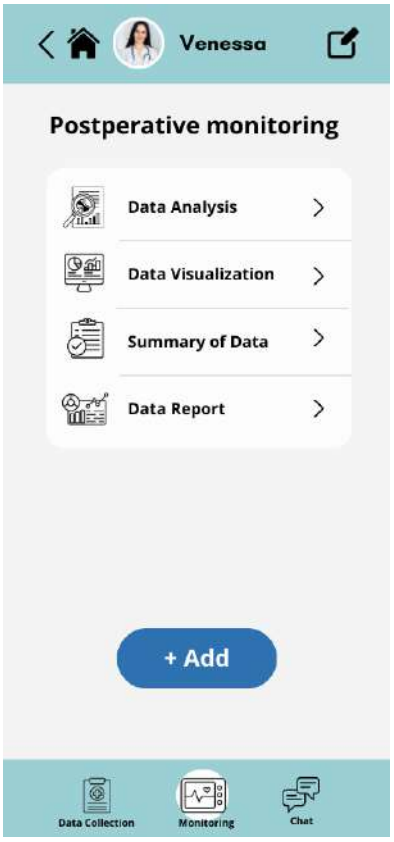


Show the daily slots of your appointment.

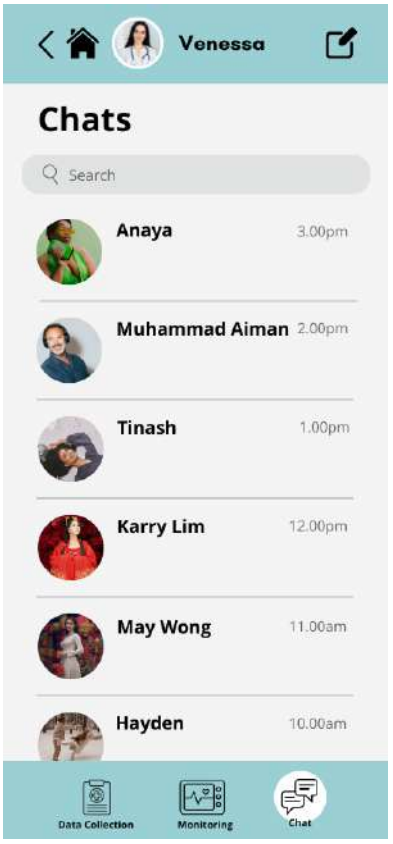
Post-hospital Care



Health record from patient is under the data collection

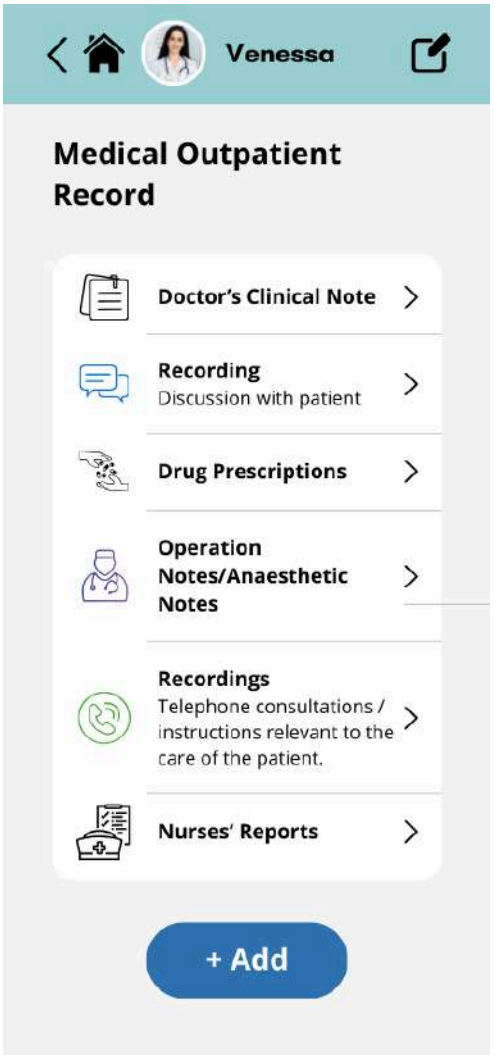


Analysed data by medical staff are shown.



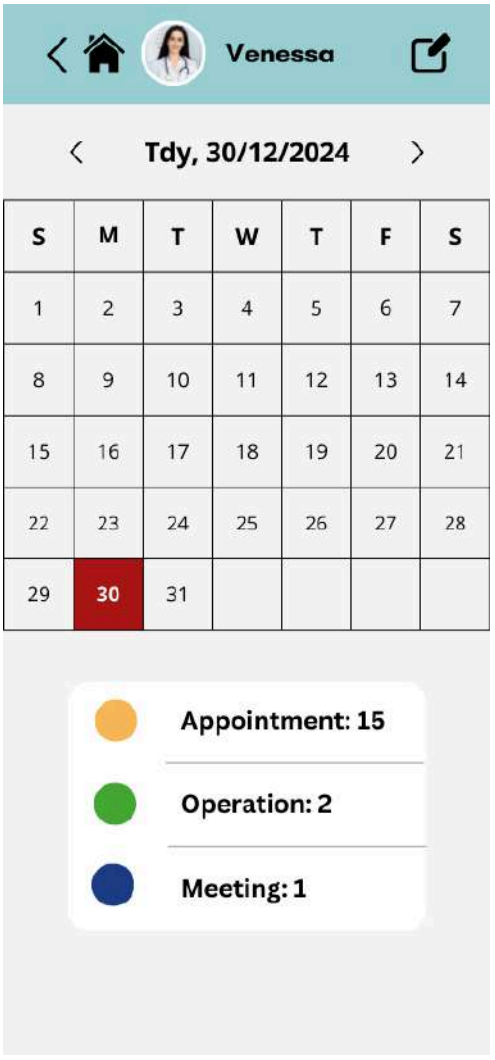
Live chat with patients.

Medical Outpatient Record



Every record can be seen by a patient.

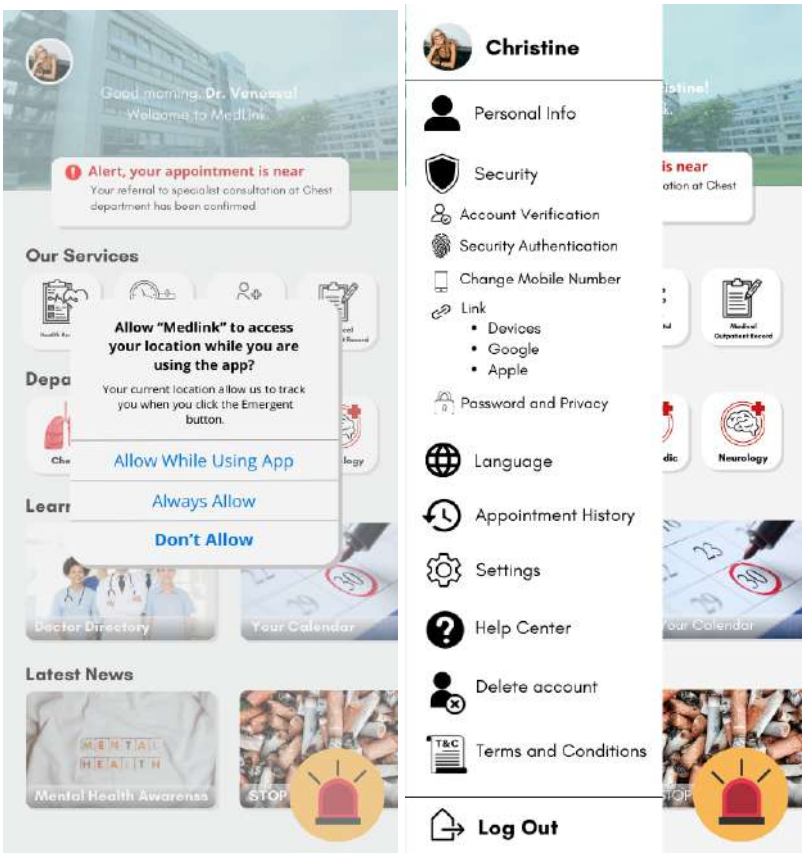
Your Calendar



Schedule of the day is shown.

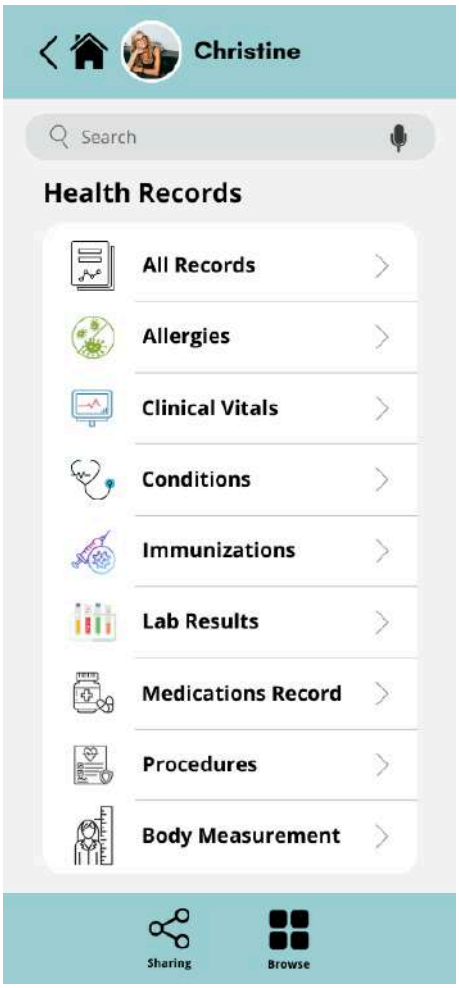
For patient,

Home page with an emergent button.


Alert, your appointment is near
Your referral to specialist consultation at Chest department has been confirmed
Our Services
Allow "Medlink" to access your location while you are using the app?
Your current location allow us to track you when you click the Emergent button.
Allow While Using App
Always Allow
Don't Allow
Doctor Directory
Your Calendar
Latest News
Mental Health Awareness
Christine
Personal Info
Security
Account Verification
Security Authentication
Change Mobile Number
Link
Devices
Google
Apple
Password and Privacy
Language
Appointment History
Settings
Help Center
Delete account
Terms and Conditions
Log Out
Neurology

(Refer above)

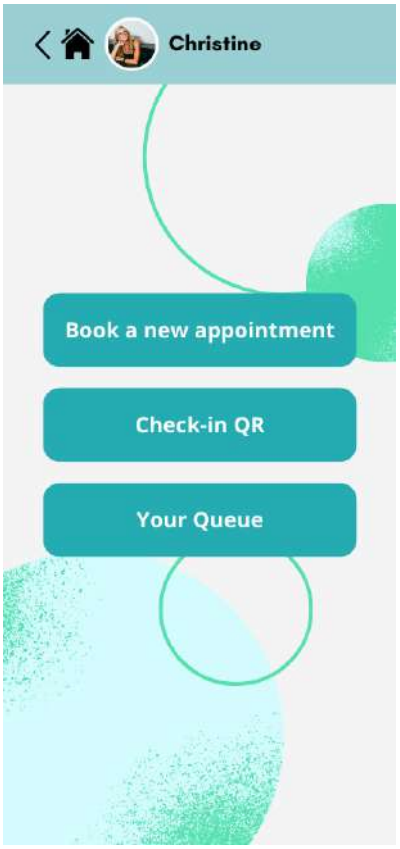
Health Record



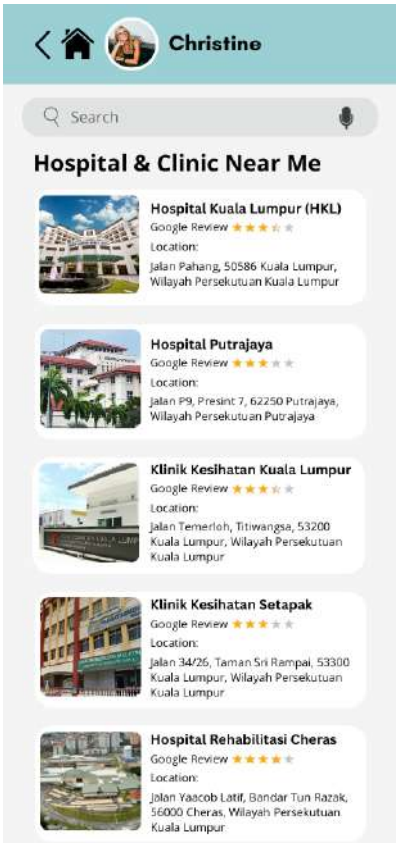
Physical indicators self-recording and the medical report.

Sharing permission for your doctor to track your records.

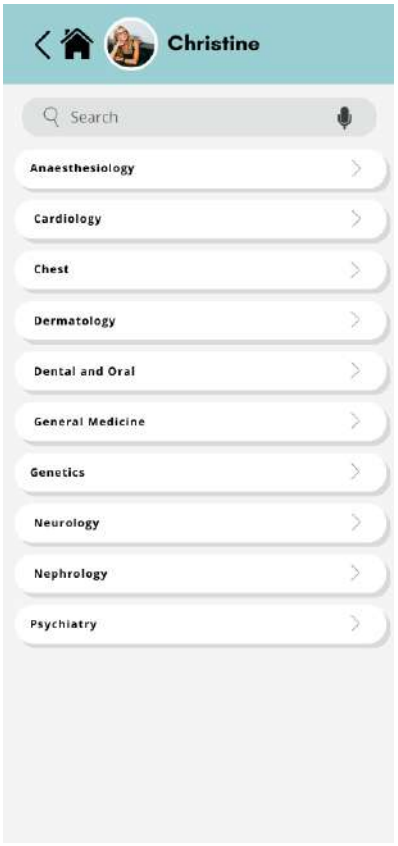
Appointment and Queue Management



Choose an action.

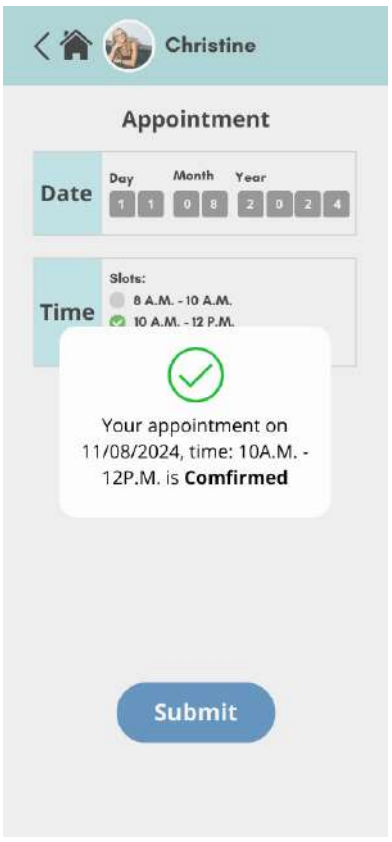


Choose a hospital/clinic.

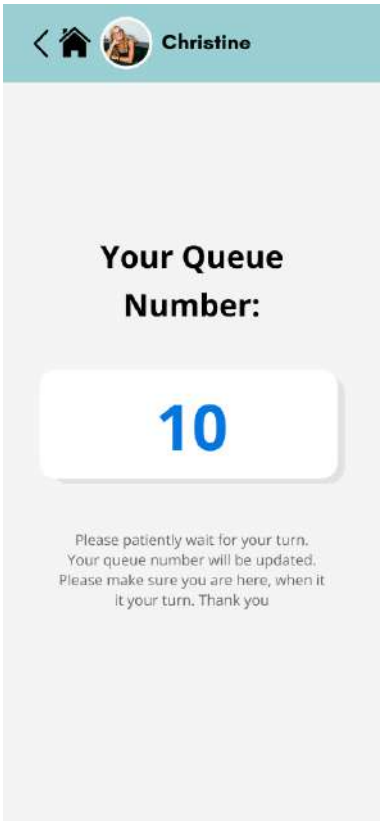


Choose a department for appointment booking.

Choose date and time.

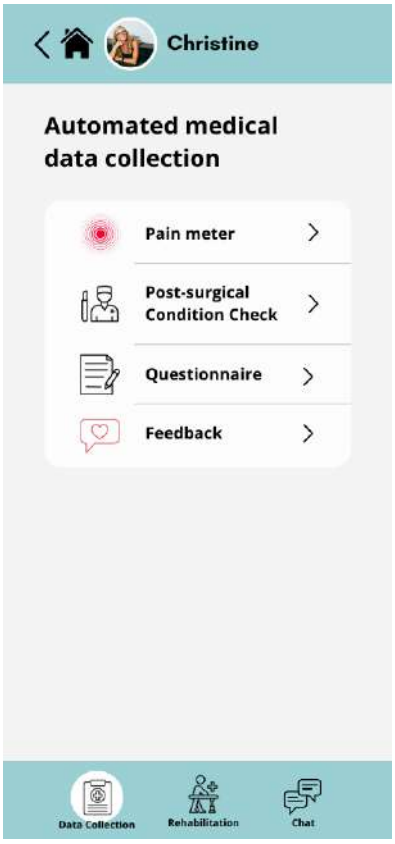


A QR code is given for check-in on the appointment's day.

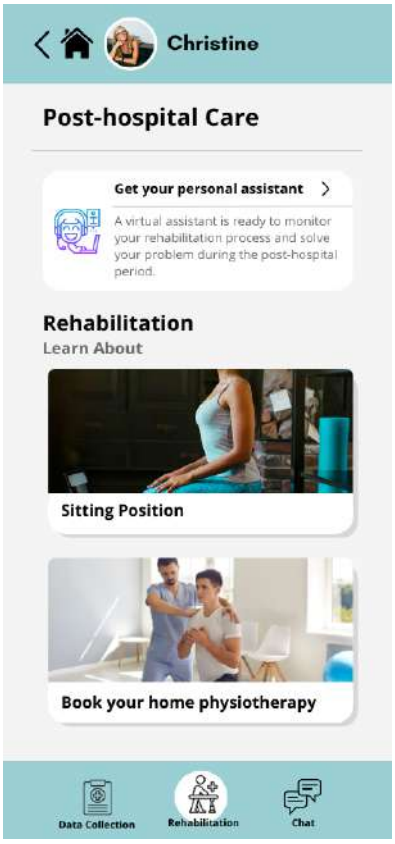


Get your queue number after checked in. The number will be real-time updated. Choose “Your Queue”, you can recheck your queue number.

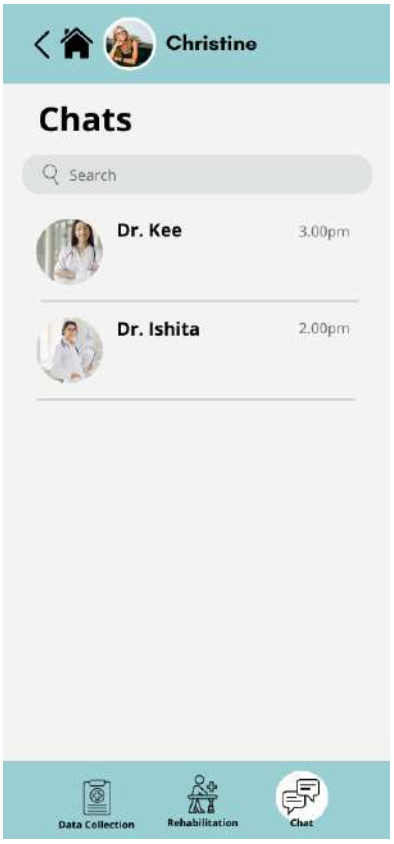
Post-hospital Care



Fill in the info here.

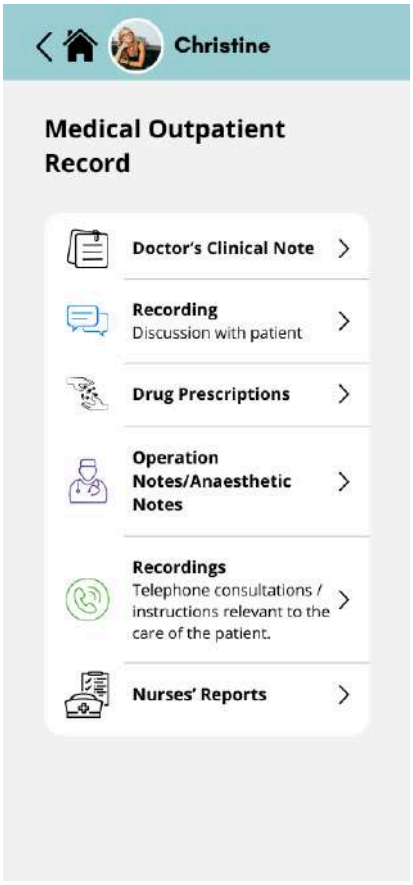


Rehabilitation’s knowledge and AI assistant are here.



Live chat with doctor

Medical Outpatient Record

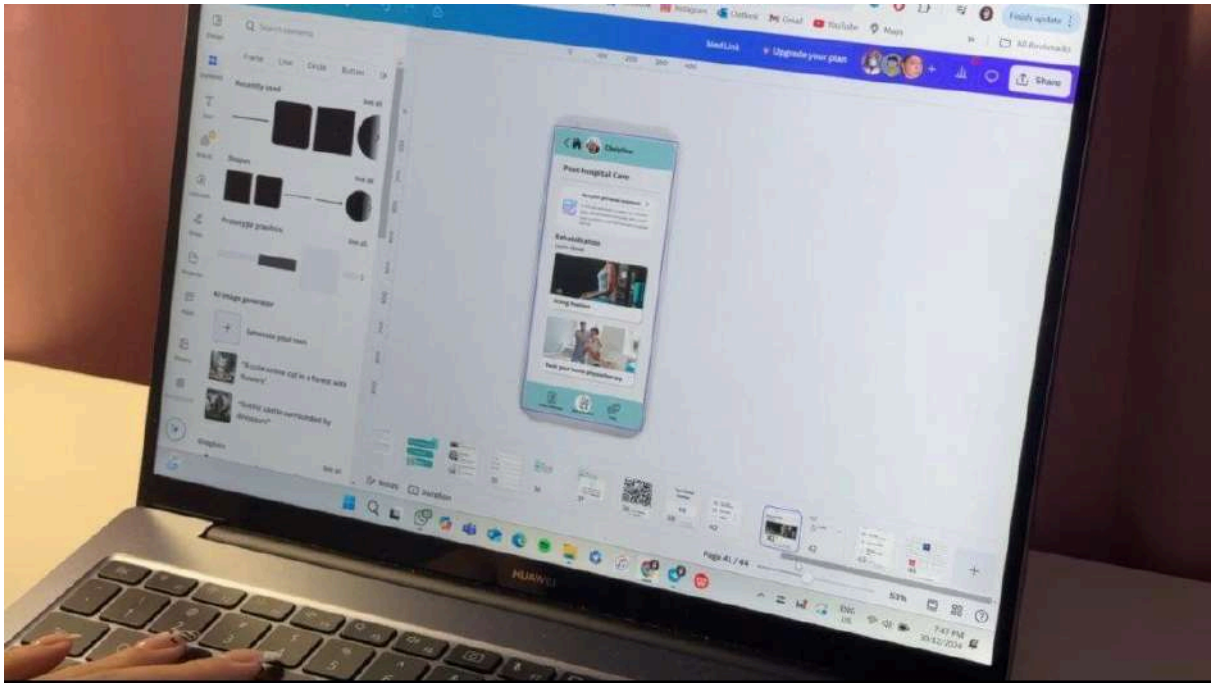


All the doctor uploaded records are shown here

Your Calendar

Your appointment of the month

6.2 Evidence



Test

7.1 Testing

While testing, our tester provided positive feedback on the app's sleek design, and usability. She believed that the app was somewhat effective in addressing challenges in Malaysia's government healthcare system but suggested further improvements to tackle the complexity of these issues. She recommended us to focus more on appointment booking and medical records integration. Moreover, she suggested the implementation of an ID authentication system for doctors for security purposes.

7.2 Evidence

Assessment Point

In the **empathize phase**, we reviewed articles and news to understand the challenges faced by public and medical staff. Interviews gave us a direct perspective of how these issues impact the public's lives. Composite characters are developed to provide a clearer picture of the medical staffs' pain points. While **defining**, we categorized the interviewees' problems into actionable problem statements, allowing us to focus on the users' main concern.

During **ideating**, we brainstormed potential solutions and discussed the best options. It helps to have a clearer execution plan for the project. While **prototyping**, we designed the user interface (UI) with Canva and converted it into a testable prototype with Marvel. It showcased how the system functions in a real-world setting and allows us to modify before final implementation.

During **testing**, our tester provided positive feedback. She recommended us to focus on appointment booking and medical records integration. We identified areas for improvements and ensured the solution remains practical and effective for real-world use.

Summation, the MedLink app improves healthcare efficiency and accessibility by streamlining registration, centralizing records, and managing queues. Smart appointments, telemedicine, and emergency tools help reduce waiting time and ensure continuity of care. Whereas, centralized records preserve patient data. We provided an overview of the app's potential to address issues in the government healthcare system, validating its effectiveness and user-centered design.

Reflection

Crystal Yap:

1. Goal: To develop strong communication skills, a problem-solving mindset, and gain industrial exposure to prepare for future career.
2. Design thinking helps me to understand user needs, define problems effectively, and create innovative solutions, which are essential to develop effective and high-quality projects.
3. I want to improve skills in programming and multimedia tools by actively participating in industry workshops or visits and build my portfolio to support career goals.

Aw Xu Yuen:

1. Goal: To gain extensive opportunities to engage with industrial visits across various computing fields to enhance my practical experience.
2. Design thinking helps me address real-world challenges effectively, enabling me to participate in meaningful projects, enhance my practical skills.
3. I will attend more industry visits to deepen my knowledge and stay updated on current trends, participating in international competitions to gain practical experience.

Nicole Lee:

1. Goal: To gain comprehensive knowledge and practical skills in my field, enabling me to contribute innovative solutions to real-world problems.
2. Design thinking enhances my problem-solving ability and makes my solutions innovative yet practical.
3. I plan to involve myself in more project work to acquire hands-on experience by collaborating on projects dealing with real-world challenges.

Sam Wei Leng:

1. Goal: To have a full ability to run a formal and big project by myself or my team and become a respectful leader in my future career.
2. This design thinking project let me know what my disadvantages are and encouraged me to be a more uplifting and progressive person in improving myself.
3. I will have a deeper self learning plan since knowledge is endless and the community keeps advancing. The only thing I can do to not be eliminated in the industry is be a stronger me.

Lai Shi Ni:

1. Goal: To make an impact through technology, helping people in need and solving problems to improve the world.
2. Design thinking has taught me to think critically and creatively, actively seeking out problems in my life and others' to solve
3. I need to open up my eyes to notice the various problems faced by people in real life and how we can leverage the latest technology to solve the problems.

Task Distribution List

Group Member	Task
Nicole Lee	Introduction & detailed description (problem, solution and teamworking) & video editing
Sam Wei Leng	Prototyping
Aw Xu Yuen	Video editing
Lai Shi Ni	Assessment points
Crystal Yap Wen Jing	Design Thinking Phases (Empathy & Testing)

References

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