WEB-BUZZ VISION CONSULTATION APPLICATION

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WEB-BUZZ VISION CONSULTATION APPLICATION

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Thesis submitted in fulfillment of the requirements
for the award of the degree of Bachelor of
Computer Science in Computer System and Networking

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ABSTRAK

Strabismus, sering dikenali sebagai mata bersilang, adalah salah jajaran mata. Salah satu masalah mata yang paling berleluasa. Bermula pada 2019, wabak penyakit koronavirus (COVID-19) menyebabkan gangguan yang ketara dalam semua sektor kesihatan termasuk sektor oftalmologi. Orang ramai terpaksa menangguhkan rawatan kerana tidak dapat hadir atau klinik terlebih muatan. Sebaliknya, Disebabkan beban kerja rekod pesakit yang berat, kebanyakan doktor mata tidak menguruskan pesakit itu juga. Doktor mata menggunakan kaedah tradisional untuk merekod rawatan pesakit secara manual. Oleh itu, sistem ini dicadangkan untuk mengatasi had semasa sistem perundingan penglihatanberasaskan web Beberapa kajian telah dilakukan untuk mencari platform sedia ada, peranti, malah antara muka yang sesuai dan mesra pengguna sebagai rujukan untuk projek ini. Pengumpulan data sebagai kaedah tinjauan dijalankan untuk mengetahui projek dan keperluan reka bentuk sistem yang dicadangkan. Sistem ini melaksanakan metodologi tangkas kerana ia memberikan responsif yang lebih tinggi dan meminimumkan ralat semasa pembangunan. Metodologi ini terdiri daripada 6 fasa iaitu keperluan, reka bentuk, pembangunan, ujian, penggunaan dan semakan. Pertama, keperluan dan objektif projek ditentukan, diikuti dengan reka bentuk dan pembangunan sistem. Selepas fasa pembangunan, kaedah UAT dijalankan untuk menguji kefungsian, ketersediaan, prestasi dan fleksibiliti sistem. Secara ringkasnya, sistem yang dicadangkan ini akan dikeluarkan dan dinilai oleh pengguna.

ABSTRACT

Strabismus, often known as crossed eyes, is an eye misalignment. One of the most prevalent eye problems. Begun in 2019, the outbreak of coronavirus disease (COVID-19) caused significant disruption in all health sectors including the ophthalmology sector. People are compelled to postpone treatment because they are unable to attend or the clinic is overloaded. On the other hand, Due to the heavy workload of the patient record, most eye doctors did not manage the patient as well. Eye doctors use the traditional method to manually record the patient's treatment. Hence, this system is proposed to overcome the current limitation of the web-buzz vision consultation application. As a reference for this project, some studies had been done to identify an existing platform, device, and even an appropriate and user-friendly interface. The survey method of data collecting is used to determine the project and design requirements of the proposed system. The system implements an agile methodology as it provides higher responsiveness and minimizes errors during development. The methodology consists of 6 phases which are requirement, design, development, test, deploy and review. First, project requirements and objectives are determined, followed by the system design and development. After the development phase, a UAT method is conducted to test the functionality, availability, performance and flexibility of the system. In a nutshell, this proposed system will be released and evaluated by users.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Strabismus is a condition in which both eyes fail to align in the same direction. In other words, one eye is turned in a different direction than the other, causing a disjointed appearance. Therefore, they do not look at the same thing simultaneously. It can be constant or intermittent. The misalignment may permanently affect the same eye which can call as unilateral strabismus, or it may affect both eyes at the same time which can be said as alternating strabismus. If strabismus is not treated properly and timely diagnosed, leads to vision loss, impaired binocular function, and cosmetic consequences (Zhu *et al*., 2019). Predominantly, many children with strabismus could be successfully corrected if discovered and treated at an early stage. As a result, early detection and treatment of strabismus is one most important factoring obtaining good results and should have cooperation with the general practitioner and the pediatrician (Chen *et al*., 2018).

The type of strabismus is characterized by a visible misaligned of the eyes with one eye or both eyes turning in, out, up, and down. When one eye can deviate inwards. This is known as esotropia (cross-eyed, see Figure 1.1). When one eye can deviate outwards, it should be called exotropia (walleye, see Figure 1.2). Besides, if one eye may diverge vertically upwards, it should be called Hypertropia (see Figure 1.3). Otherwise, it should be differentiated as Hypotropia (see Figure 1.4) (Warrington, 2019). Strabismus can be treated with either non-surgery treatment or surgical treatment. The non-surgery treatment option includes Orthoptics, Prismatic correction, pharmacological, and so on. Orthoptic exercises are widely used for the treatment of intermittent exotropia. It goes through the fusional exercise with the pencil push-up activities, performed with a pencil positioned at arm's length and slowly dragged towards the nose, inducing strengthening convergence and adaption. Besides, Ophthalmic prims are used by bringing the picture

closer to the fovea to aid in the sensory fusion of the patient. This treatment is mostly used to treat aberrations of fewer than 20. On the other hand, there are three main types of strabismus surgery treatment: weakening procedure, Strengthening Procedure, and Vector Adjustment Procedures.

Figure 1.1 Example image of Esotropia

Figure 1.2 Example image of Exotropia

Figure 1.3 Example image of Hypertropia

Figure 1.4 Example image of Hypotropia

However, according to the World Health Organization, the disease was declared a worldwide pandemic on March 11, 2020, and the 2019 novel coronavirus or 2019-nCoV, also known as the COVID-19 disease, had spread rapidly over the world by the middle of 2020 (Cucinotta & Vanelli, 2020).As a result, the Movement Control Order (MCO) was proclaimed on March 18, 2020, in most countries around the world, affecting the majority of the population. During the COVID-19 outbreak, widespread adjustments and limits to social and sanitary standards created considerable barriers to eye-care access (M. Toro *et al*., 2020). To limit human-to-human virus transmission, certain international ophthalmology organizations have urged to postpone any therapy other than urgent or emergency care (Cummings *et al*., 2021; Dolar-Szczasny *et al*., 2021). Thus, it caused some pathologies may not be detected, diagnosed, and treated on time such as Strabismus and it could get worse if the treatment is delayed (Gul & Altintas, 2020). According to the research, patient visits have also decreased dramatically in numerous subspecialties, with a loss of more than 81% of yearly patient volume in eye care over two weeks in March and April 2020 compared to the same time in 2019 (M. D. Toro *et al*., 2022). These problems can be avoided if the patient still can meet the appointment or treatment on time. Therefore, the patient will need to see the doctor for follow-up to see if the patient has responded to treatments and make adjustments if necessary.

In this project, a Web-Buzz Consultation application is proposed to overcome the problems. This Vision Consultation application is mainly supposed to organise a virtual consultation with doctor and patient that they are currently perform in physical consultation. Besides, this project is supposed to save all the patient's treatment records into the database for letting doctors easier to manage the data. Moreover, the proposed system will also have video conferencing and chat features. This feature aims to help the patient who is affected by the quarantine phase or emergency can still meet with the doctor without further delay.

1.2 Background of the Problem

Due to the heavy workload of the patient record, most eye doctors did not manage the patient as well. This includes that all the records or data of the patient are saved in the traditional manual operations. Sometimes, it brings inconvenience to eye doctors such as manually record the condition of patient's eye and the treatment on the paper. Most eye doctors also did face the difficulty to find the location of the record in paperwork as it is a heavy workload even though it is categorized. Moreover, since the majority of doctors and nurses are not familiar with traditional manual operations, they are unable to handle their data effectively. For example, if a patient makes an appointment and it is recorded in a book or on a piece of paper, it does not alert the patient or the doctor of the appointment unless the nurse reminds them.

On the other hand, it also brings an issue to patients since the Covid-19 started spreading around the world. Sometimes, patients cannot attend the appointment with the doctor due to the quarantine (Hanaei *et al*., 2020). However, the disorder of strabismus is not encouraged to delay the treatment because it can be got worse.

To overcome such problems, we develop a system that has several features like allowing eye doctor to track all their patient record in the database and finding out the data of the patient by searching the name and schedule for all the booking appointments. The proposed system also will have some features to get the patient to meet with an eye doctor through a video conferencing function. The eye doctor can record down the diagnosis as a progress record of treatment and patients can attend the appointment online wherever they are.

1.3 Objective

The objective for this project are:

i. To identify the current limitation of Consultation process

ii. To develop a Web-Buzz Consultation Application

iii. To evaluate the functionality of the proposed system

1.4 Scope

This system is only applicable with the camera-built computer

i. This web-based system is developed for end-users who are eye doctors and patients.

ii. It is free to use without any in-app purchase

iii. The system will be developed using MERN stack for web-based development

1.5 Significance

i. Doctor

Doctor can easier capture the eye of patients without manual drawing on paper. They can save all the patient records on the system instead of saving in paperwork and can be able to manage the patient efficiently.

ii. Patients

Patients can have a process of virtual consultation through video conferencing with a doctor in an interactive way and proceed with the appointment without further delay.

1.6 Thesis Organization

This thesis is divided into five chapters which are an introduction, literature review, methodology, result and discussion, and conclusion.

Chapter 1 explains the (background of the study (introduction) and briefly describes the problem statement, objective, scope, significance, and thesis organization. Going through this introduction, we will have a better understanding of exactly what the system is and how the problem mentioned has been solved.

Chapter 2 briefly explains the literature review for the project. This chapter conclude the information of three related existing system compared to proposed system. The information is about the features, similarities, advantages, and disadvantages.

Chapter 3 is mostly about the methodology used in this project and the interface design of web application system. The hardware and software that is required to use to develop this system will be discuss in detail. The stages that are used in this project are requirement, design, develop, test, deploy and review.

Chapter 4 is talking in depth about the design process, the implementation, and the testing outcomes. After the tests are complete, all the data is the output.

At last, in Chapter 5, we'll talk about what we learned, what we had to cut out, what we had to add, and what we'll keep working on to make the application even better in the future. When discussing potential future work, the developer may recommend a few different upgrades.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses on the literature review of the existing system with the proposed system. The main objective of this chapter is to identify the strength and weaknesses of the existing system which then will lead to the development of new technology as well as enhancing the proposed system.

Currently, there is no related web-based application that fully functional feature and record data into the database, but the available application is specific. As an example, there has only the application with the consultation function in general health including the ophthalmology sector. In this chapter, there are three existing systems have been analyzed in terms of their features.

2.2 Comparison of Existing System

2.2.1 RingMD

RingMD is a revolutionary digital healthcare communications platform that provides individuals all over the world with access to high-quality, low-cost healthcare. People may connect with world-class physicians anytime, anywhere. The Founder of RingMD is Justin Fulcher. The platform is currently being used worldwide, including in Asia, Europe, and the United States. They also launched its simple-to-use mobile application which brings more convenience to people.

First, from the perspective of patients, they can be able to direct contact with doctors by entering the details personal information and booking slot. Patients can

arrange a consultation with a specific doctor and select how to interact. For example, they can communicate with a doctor by video, audio, or encrypted texting whenever it is convenient for them. However, due to the pandemic, patients need to fill in the coronavirus status before making the appointment as shown as Figure 2.1 below.

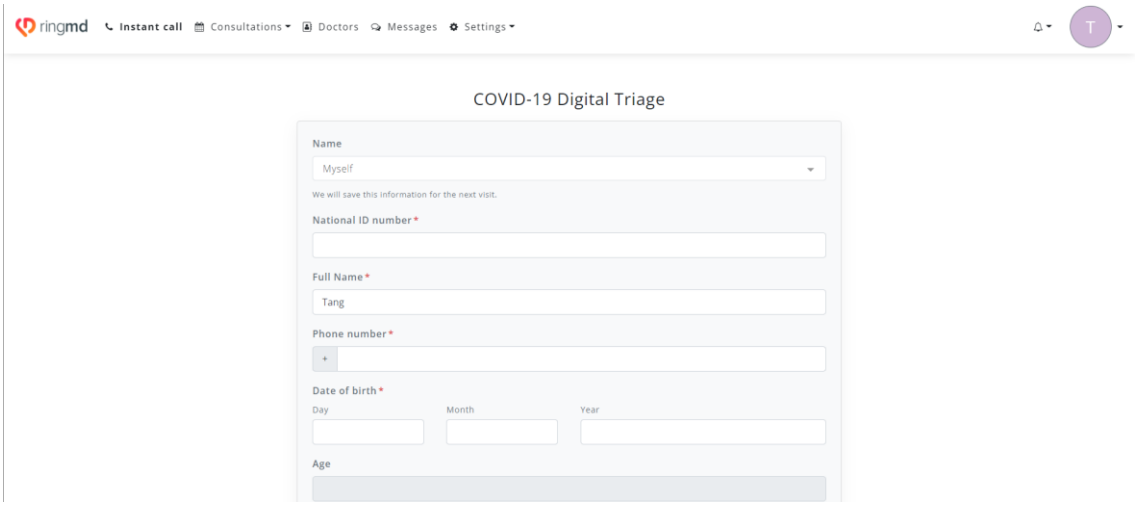


Figure 2.1 Instant Call feature

Besides, the system can be able to call and show all the consultation records in four different ways. For example, it will show the user the Upcoming and Expired events that the user has booked. Not only that, but the system is also able to display the previous meeting whether it is completed or failed as shown as the Figure 2.2 below.

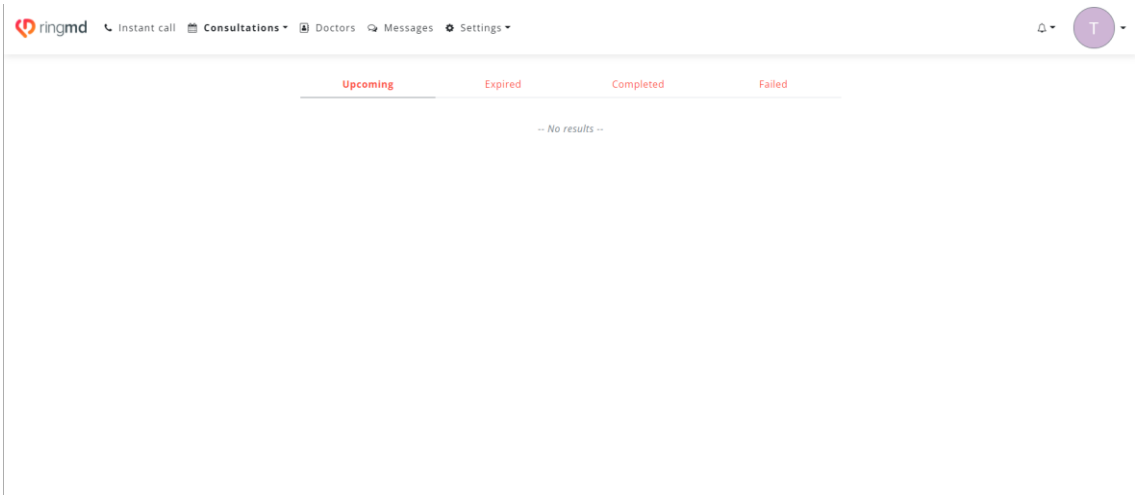


Figure 2.2 Consultation Schedule feature

To make easier the searching, the system provides us with the specialty filter option so that users do not need to scroll down all the doctor lists to find out a certain doctor. Users can search for symptoms in the search bar at the top or directly pick a medical category and be presented with doctors who specialize in those areas as shown as the Figure 2.3 below.

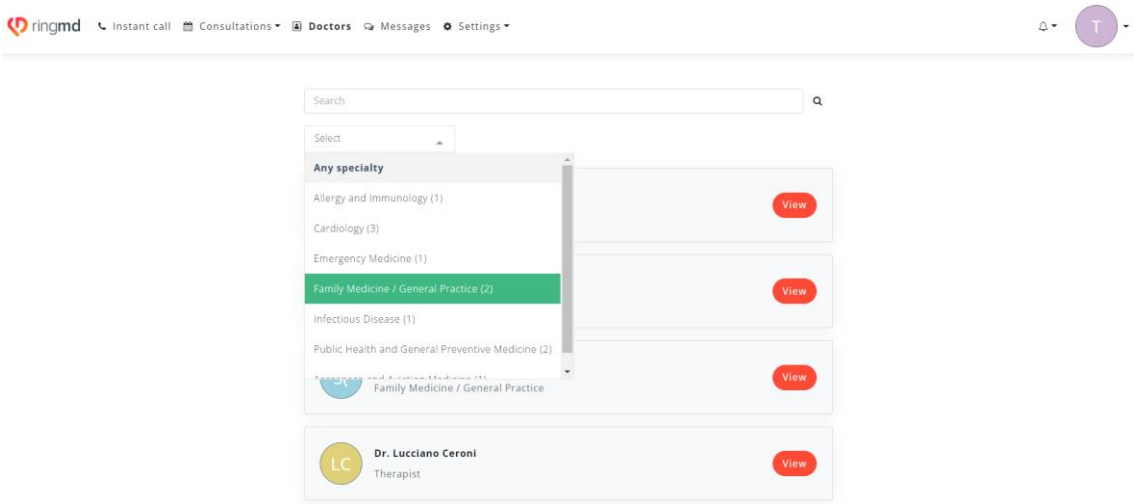


Figure 2.3 Searching for the doctor by category and name

To speak to a doctor in health advice, the system provides phone calls and video conferencing functions to allow users to contact the doctor to get the information they want. During video conferencing, patients can send messages and transfer files with the doctor. The Figure2.4 below shows the interface of video conferencing with doctor page.

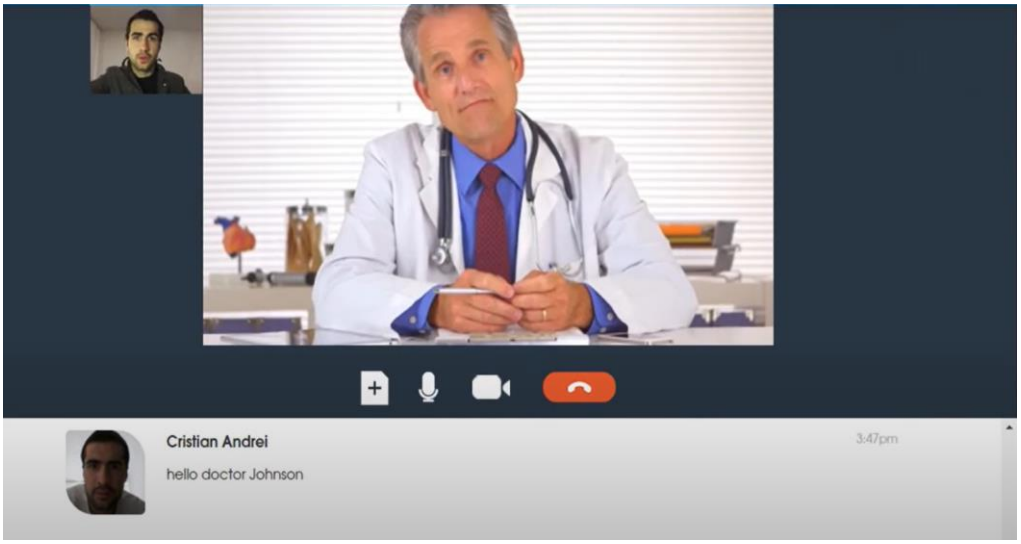


Figure 2.4 Video Conferencing with Doctor

On the other hand, from the perspective of a doctor, there have several main functionalities that are different from the patient dashboard. Firstly, it has a call request function. The doctor can choose to stay in an offline moment or an online moment. I stay in an offline moment; the Doctor will not be able to receive any alert new calls and vice versa as shown as Figure 2.5 below.

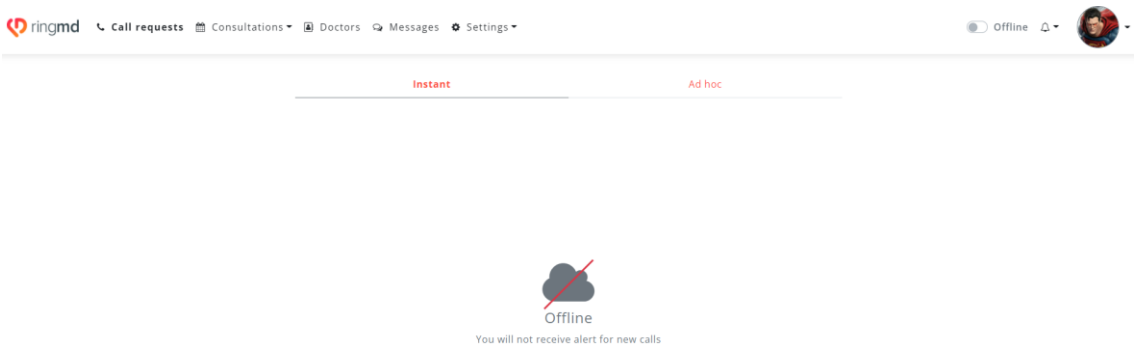


Figure 2.5 Offline and Online Mode

Secondly, the system will show the timetable format for the consultation schedule. The doctor can see whether the time is reserved, available, or unavailable at that time by typing the date as shown as Figure 2.6 below.

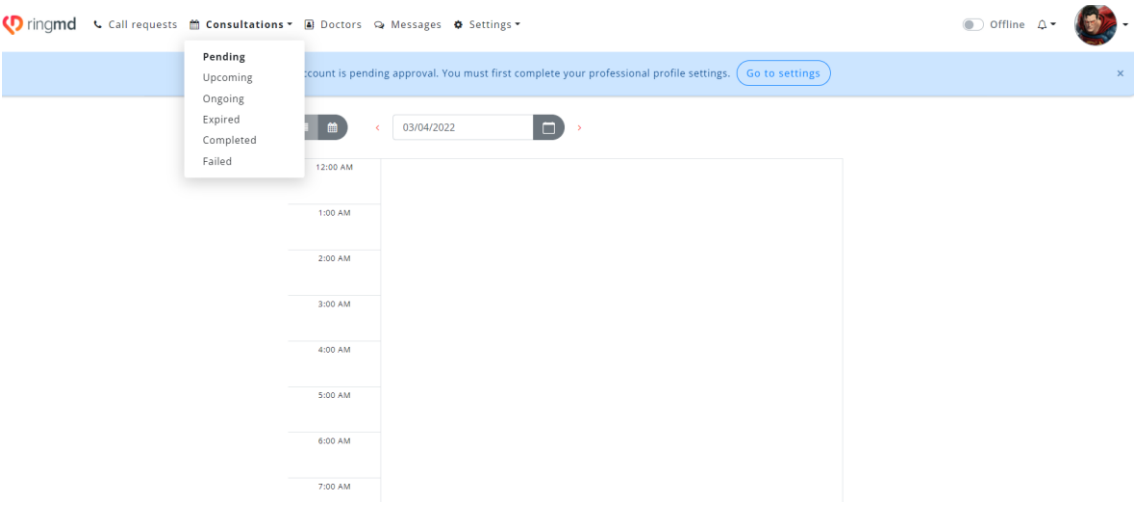


Figure 2.6 Additional feature on the consultation page in doctor perspective

2.2.2 MyCyberMD

MyCyberMD is a medical portal that provides healthcare services to the doorstep with a push of a button. This platform is created by RISHRACK company. It has an existing hospital located at Jalan Solaris, Solaris Mont Kiara, 50480 Kuala Lumpur. The mission of this company is built keeping in mind the new normal, from virtual consultation to online description and medicine delivery to doorsteps.

The main function of this platform is patients can communicate with a doctor in a few methods. One of the methods is using the Home Visit feature as shown as the Figure 2.7 below. Patients can book an appointment by using the website platform or using WhatsApp to further discussion with their customer service. If the case is urgent or after office hours doctor house calls, the patient can directly book an appointment through WhatsApp.

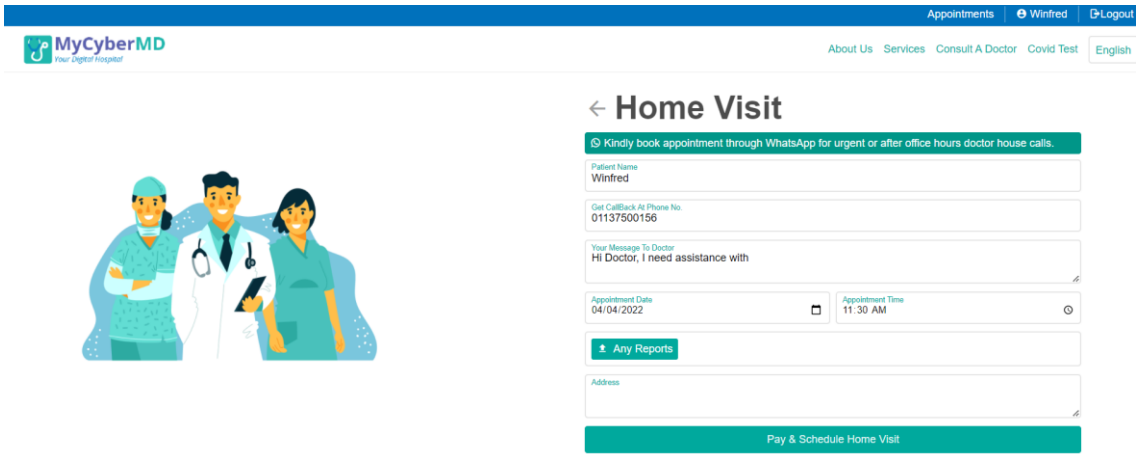


Figure 2.7 Home visit feature

Moreover, the patient can also use the On-Call consultation feature to talk with the doctor. Its features will deal with an instant doctor who is available 24/7 to meet with the patient. Therefore, if a patient happens an emergency, he still can connect with a doctor anytime, anywhere. The Figure 2.8 below shows the interface page of on-call consultation feature.

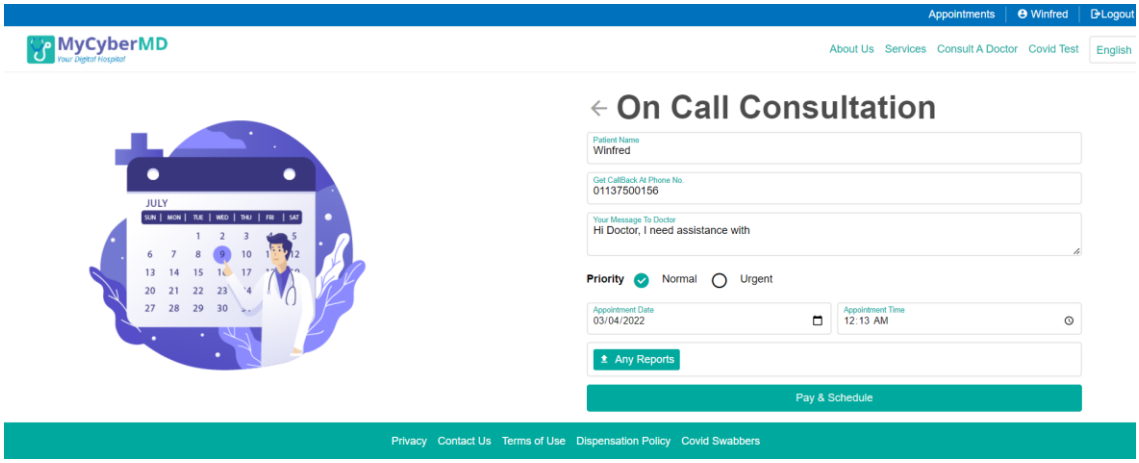


Figure 2.8 On-call consultation feature

Other than the home visit and On-Call consultation feature, the patient also can chat with the doctor to get a quick resolution to basic questions. The Figure 2.9 below shows the interface of chat feature.

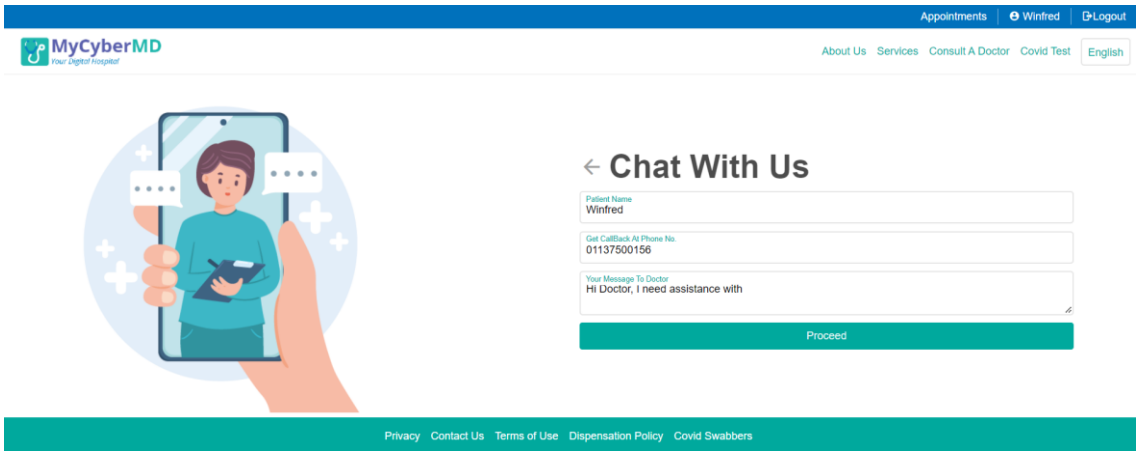


Figure 2.9 Chat feature

Lastly, the patient also can ask a question by using the ask Doctor feature. Patients need to post the question in details information, and they will get the answer from their experts soon. On this page, the patient also can check whether the question is already asked by another patient or not by typing the related keyword of the problem in the search box. The Figure 2.10 below shows the interface of ask doctor feature.

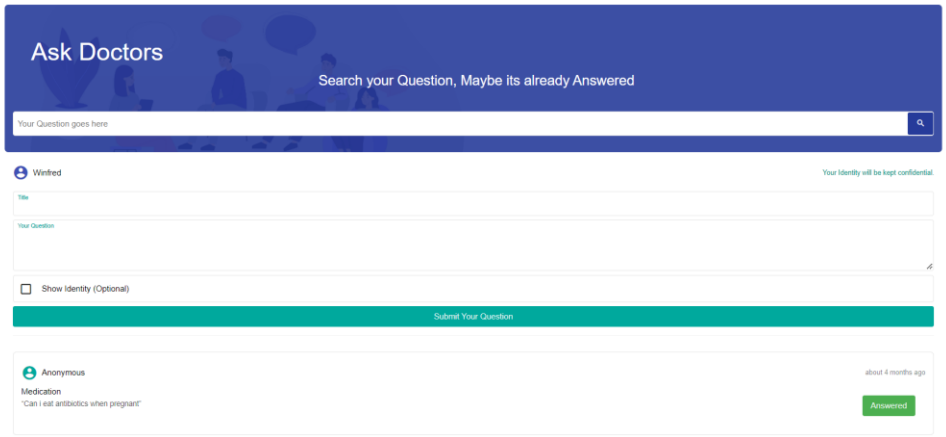


Figure 2.10 Ask Doctor feature

2.2.3 iCliniq+

ICliniq+ was developed in 2010 by Dhruv Suyamprakasam, an Indian telemedicine portal, as a platform for Indians to access telemedicine. Growth has continued to be exponential, with over 3,500 doctors on their panel representing over 80 different specialties spread over 190 different countries and addressing over 600 queries per day. every day! With over 3,500 specialty sts on its panel spanning 80 specialties and located in over 190 countries, they handle over 600 inquiries every day. This growth has been exponential. They also released a user-friendly smartphone application, making things easier for everyone.

The main function of this application is the user can ask the physician the question in a few methods. One of the methods is to use the online portal. Users can pose a text-based inquiry as shown as Figure 2.11 below.

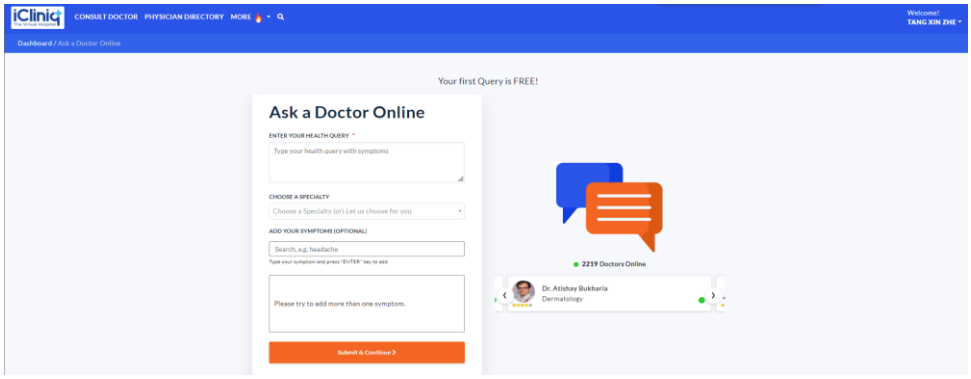


Figure 2.11 Ask Doctor feature

Besides, the other option is to start the conversation via telephone. User can post their health issues with a time preference then the user can securely connect with the doctor with a phone call. Due to the private and secure information of the patient, the number of the doctor will be hidden by the central phone system. The Figure 2.12 below shows the interface of phone call page.

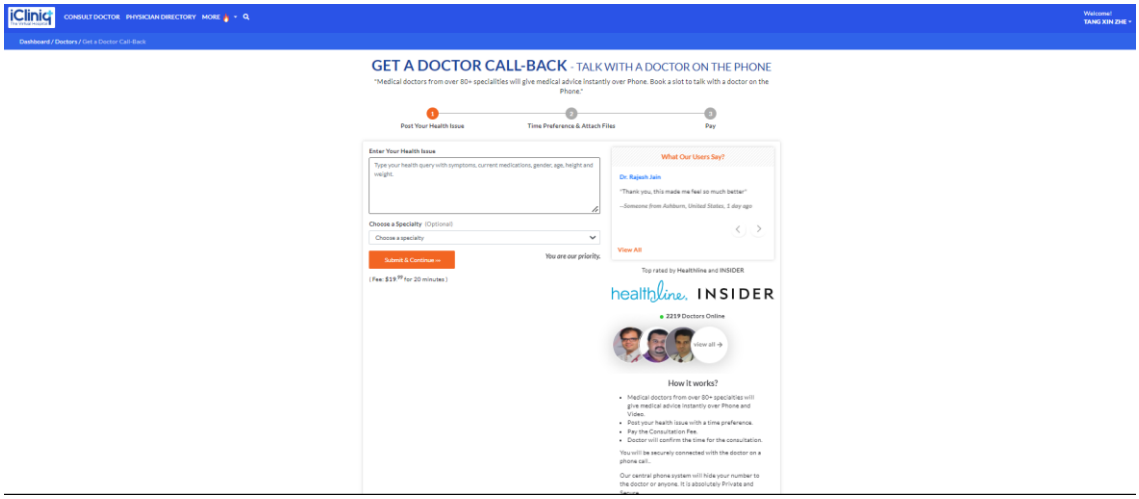


Figure 2.12 Phone call feature

Furthermore, users can also online chat either by text chat or video chat with the physician. The Figure 2.13 below shows the interface of video chat page.

Figure 2.13 Video chat feature

In addition, the system also provides the symptoms checker feature which can be done without being interviewed by a physician. Patients must enter some information

about their age and gender, as well as click on the body part that is causing the issue, and the associated symptoms will emerge as shown as Figure 2.14 below.

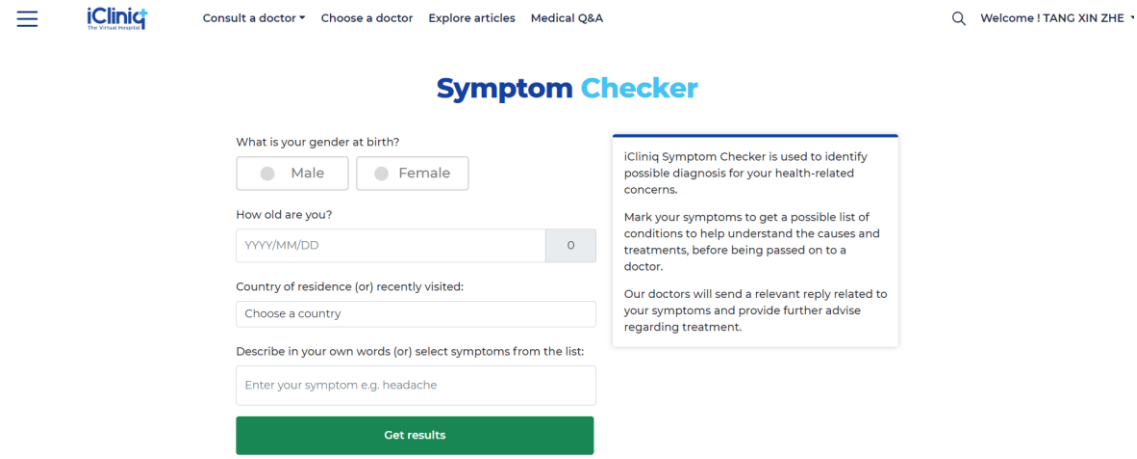


Figure 2.14 Symptom checker

On the other hand, from the perspective of a doctor, there have several main functionalities in this system. Firstly, the system enables the doctor to see all the appointment and their visitor book for virtual and direct visits. During the virtual consultation, both doctor and patient can draw on the drawing pad for better understanding. The Figure 2.15 below shows the interface of video conferencing with doctor.

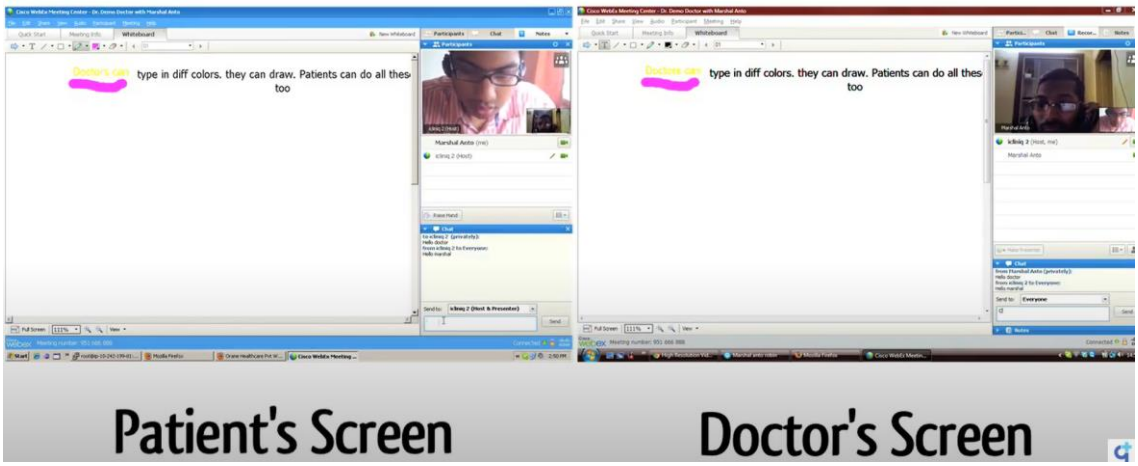


Figure 2.15 Video conferencing feature

Besides, the system also enables the doctor to write prescriptions for the patients and patients will receive them in pdf format. The Figure 2.16 below shows the interface of e-Description page.

Figure 2.16 e-Description in pdf format

2.3 Comparison of Existing Application and the Proposed Application

In this section, a comparison table will be built based on different aspects to compare the existing applications with the proposed application as summarized in Table 2.1. In Table 2.2 the advantage and disadvantages of the existing applications will be discussed.

Table 2.1 Comparison of the three existing application and the proposed application

Category	**System**			
	RingMD	**MyCyberMD**	**iCliniq+**	**Proposed System**
User	Patient Doctor	Patient Doctor	Patient Doctor	Patient Doctor
Language Flexibility	English Espanol Russian Portuguese Arabic language	English Malay	English	English
Chat/Instant message	√	√	√	√
Video Conferencing	√	X	√	√
Phone consultation	√	√	√	√
Query/Forum	X	√	√	√

Favourite doctor option	√	X	X	√
Booking Slot	√	√	√	√
Time Schedule	√	X	√	√
Chatbot	X	X	√	√
Application Type	Web	Web Mobile	Web mobile	Web Mobile Responsive Web
Application Category	Health	Health	Health	Health
Searching	√	√	√	√
Edit Profile	√	√	√	√
Booking Record	X	X	√	√
Recent Request	X	X	X	√

Table 2.2 The advantage and disadvantage of existing application and the proposed application

Existing Application	Advantages	Disadvantages
RingMD	**Pricing** ● Chat message feature is free ● Phone and Video consultation charge same amount of money **Ease of use** ● Easy to use ● Most language availability ● Neat and clean interface **Other** ● Able to add doctor to favourite option	● Only for web
MyCyberMD	**Pricing** ● Affordable price with full access ● Ask Query is free **Ease of use** ● Net and clean interface **Other** ● Able to book for home visit	● Two languages provided only ● Not provide Booking Record ● Not provide Timetable Schedule ● Not provide Video consultation
iCliniq+	**Pricing** ● Free to use symptom checker feature **Ease of use**	● Only English is provided ● Price for either chat, phone or video consultation is costly

	● Clean interface **Other** ● Provide e-prescription	
Proposed System (Web-based Binocular Vision Consultation System)	**Results** ● Free to use with full access **Ease of use** ● Clean, neat, and attractive interface ● Provide user manual ● Simple navigation **Other** ● Provide eye capture function ● Provide face emotion detection	● Only for web-based ● Only English is provided

2.4 Comparison of Existing Application and the Proposed Application

Based on the comparison and analysis of the three selected existing applications, each application has its distinct characteristics, and some may have a lot of room for improvement. Overall, all the existing applications are good and ready for public deployment. The three existent application's principal role is virtual consultation between patient and doctor. According to the research, the proposed web-based application should have some distinguishing qualities that make it appealing to users, such as recent request feature and a chatbot function that answers specific questions automatically.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter will cover the approach used to construct the Web-Buzz Vision Consultation Application and the design, interface, and framework architecture of the application.

3.2 Methodology

There are several types of methodology development models in software engineering, each with pros and disadvantages depending on the situation. However, just one methodology will be adopted for this project's development. After researching approaches, the Agile development model was selected as the development model for this project because it is the most appropriate development model among the others. The agile SDLC model is a hybrid of iterative and incremental process models with a focus on process adaptability and customer satisfaction via speedy delivery of functioning software products. There have 6 stages of the agile software development life cycle which are requirement gathering, design, development, testing, deployment, and Feedback as shown in Figure3.1 below.

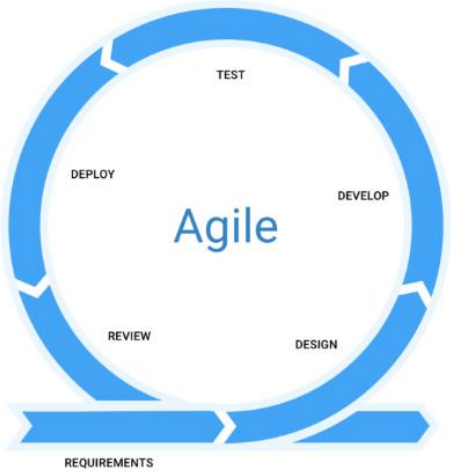


Figure 3.1 Agile Methodology

To guarantee the happiness of the customers, the cycle will be repeated as frequently as is practically practicable. It will produce speedy, continuous, compact, and beneficial software to the customer so that they may experience the program that is being built. It is possible to make incremental improvements to the software by giving users access to early builds before they are released to the public. Agile methods are being widely accepted in the software world recently. However, not all products can benefit from this approach. The Agile methodology has several advantages and disadvantages as shown in the table below.

Table 3.1 Pros and Cos of Agile Methodology

Advantage	**Disadvantage**
Waste fewer resources because always working on up-to-date tasks.	Lack of donation
Adapt to change and respond faster.	Long-term project suffer from incremental delivery
Low cost and save time	Confusing result as the project is continuous cycle that never end

3.2.1 Plaining Phase

In this first stage of the Agile methodology, the functionality of the application, including its constraints and limitation, will be laid down in Project Requirement. Other than that, a survey form was created to collect the user requirement. The total sample is 18 persons. The purpose of the survey form is to collect the demographic background and the requirement of the proposed web-buzz vision consultation application in order to have a detailed definition of the system requirements. The Google survey form and the responses from the 18 respondents will be attached in **Appendix A**.

Section A: Demographic Background

The questions in this section aim to determine the acceptance of telemedicine service use, identify awareness of the strabismus problem in Malaysia and investigate the popularity of the virtual vision consultation application.

Question 1

Based on the result in question 1, we can conclude that half of the respondents were preferring to use telehealth applications and the other half were prefer in-person visits. From the analysis, 50% of them chose the “Telehealth” option and 50% of the respondents chose the “In-person visit” option which represented 9 respondents and 9 respondents respectively. This result can tell us that the popularity and acceptability of telehealth systems still do not meet the high demand in Malaysia. People may tend to look at telehealth as an alternative to in-person care rather than a necessary replacement.

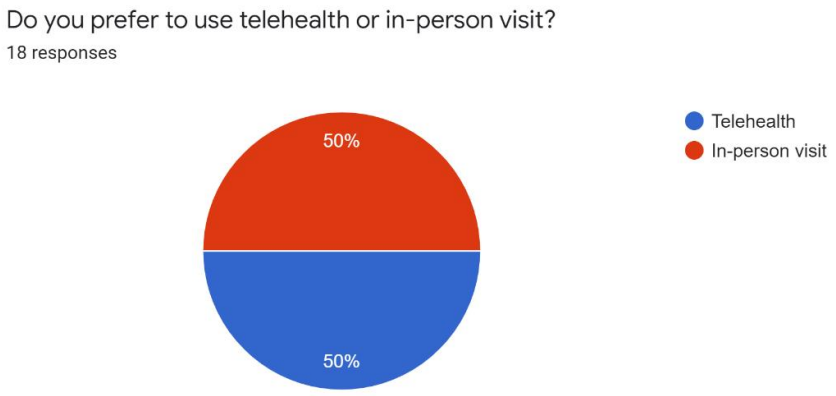


Figure 3.2 Do you prefer to use telehealth or in-person visit

Question 2

Based on the result in question 2, we can conclude that most of the respondents agree that telehealth consultation can bring convenience for them. From the analysis, 66.7% of them chose the “Yes” option and 33.3% of the respondents chose the “No” option which represented 12 respondents and 6 respondents respectively. This result can tell us that the people agree that telehealth consultation can bring them convenient in their daily life such as easy access to specialists, lower cost and reduced expose to covid-19 pandemic.

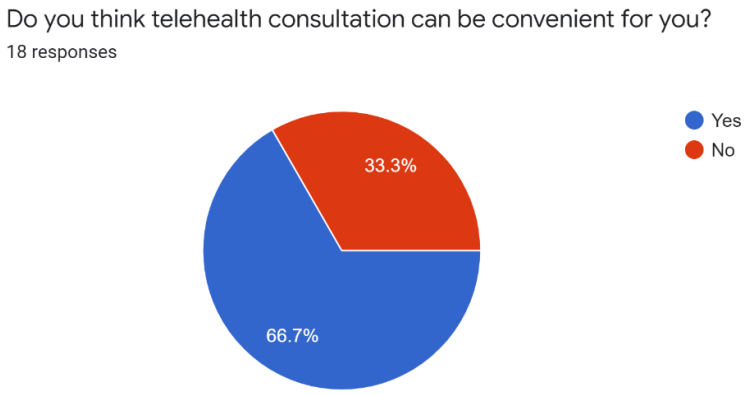


Figure 3.3 Do you think telehealth consultation can be convenient for you

Question 3

Based on the result in question 3, we can conclude that most of the respondents have no idea what strabismus is. From the analysis, 83.3% of them chose the “Yes” option and 16.7% of the respondents chose the “No” option which represented 15 respondents and 3 respondents respectively. This result can tell us that most of the respondents had no knowledge about strabismus. To be specific, there is a need for the proposed application exist so that it may help in increasing the knowledge of strabismus among them.

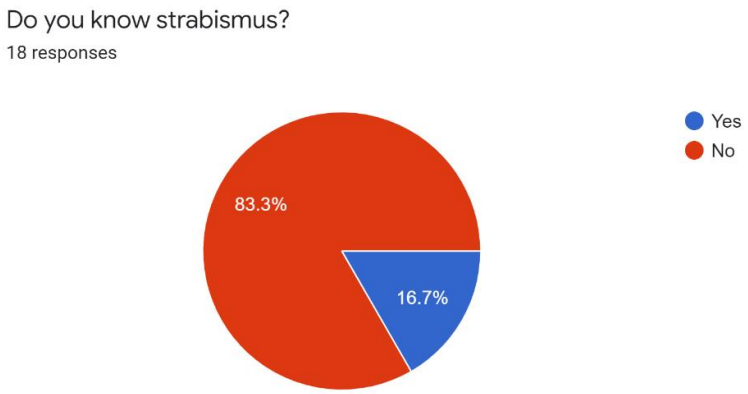


Figure 3.4 Do you know Strabismus

Question 4

Based on the result in question 4, we can conclude that most of the respondents were aware of the seriousness of strabismus in Malaysia. From the analysis, 83.3% of them chose the “Yes” option and 16.7% of the respondents chose the “No” option which represented 15 respondents and 3 respondents respectively. This result can tell us that it is needed to increase the awareness of the strabismus among the people in Malaysia as this can cause a further serious disorder. This awareness shall make them to think twice before doing some stuff that can harm their eye.

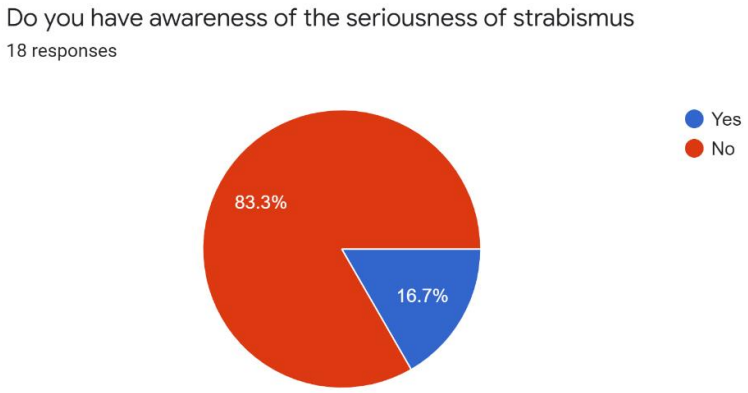


Figure 3.5 Do you have awareness of the seriousness of strabismus

Question 5

Based on the result in question 5, we can conclude that most of the respondents do not use the binocular vision consultation system before. From the analysis, 83.3% of them chose the “Yes” option and 16.7% of the respondents chose the “No” option which represented 15 respondents and 3 respondents respectively. This result can tell us most of the respondents have no knowledge in strabismus so that they do not explore this type of system.

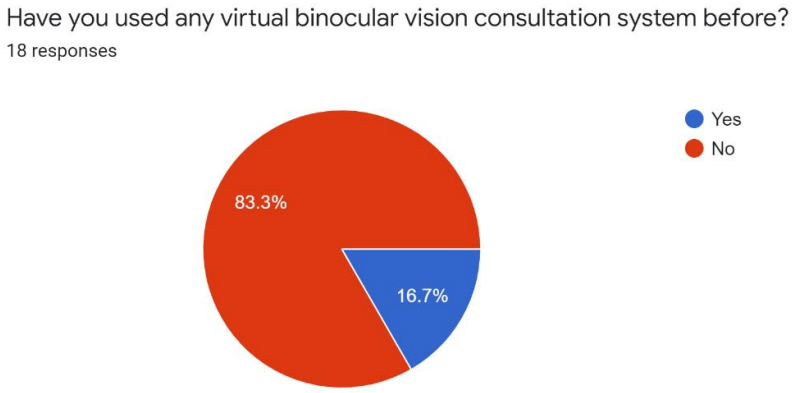


Figure 3.6 Have you used any virtual binocular vision consultation system before

Question 6

Based on the result in question 6, we can conclude that most of the respondents agree that a virtual binocular vision consultation system can help in increasing the awareness of strabismus. From the analysis, 77.8% of them chose the “Yes” option and 22.2% of the respondents chose the “No” option which represented 14 respondents and 4 respondents respectively. The reason for this result most probably is because they think by using the proposed application, they can have a better knowledge to increase their awareness of strabismus by looking at the system since the proposed application provide the basic knowledge of strabismus.

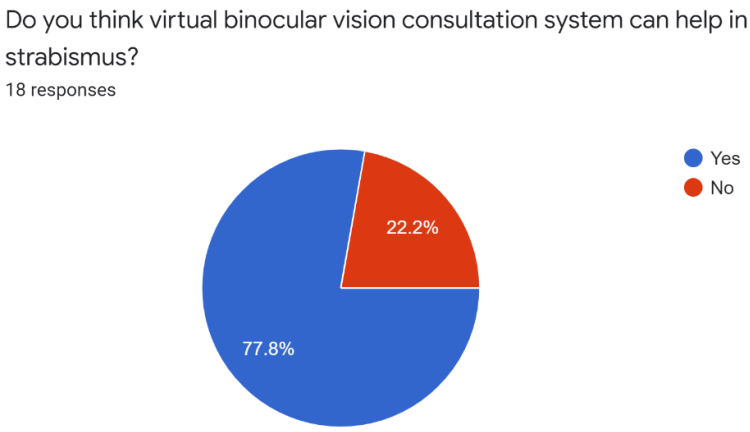


Figure 3.7 Do you think virtual binocular vision consultation system can help in increasing the awareness of strabismus

Section B: Feature requirement

Question 7

Based on the result in question 7, we can conclude that most of the respondents do not want the proposed application to have an advertisement. From the analysis, 88.9% of them chose the "No" option and 11.1% of the respondents chose the "Yes" option which represented 16 respondents and 2 respondents respectively. This result can tell us that most of the respondents will not be willing to be disturbed by the advertisement while using the application.

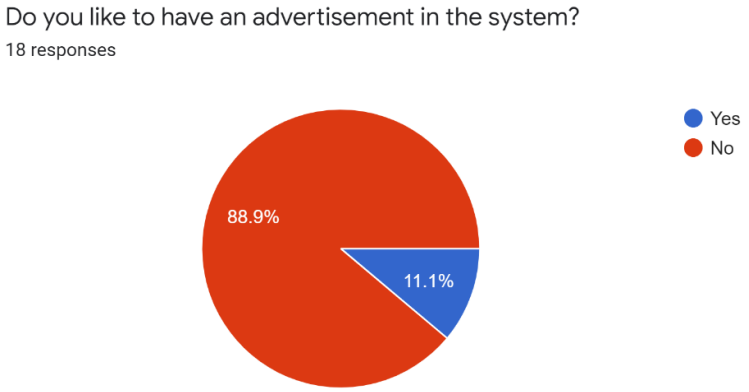


Figure 3.8 Do you like to have an advertisement in the system

Question 8

Based on the result in question 8, we can conclude that most of the respondents want the proposed application to have a user manual. From the analysis, 77.8% of them chose the “Yes” option and 22.2% of the respondents chose the “No” option which represented 14 respondents and 4 respondents respectively. This result can tell us that most of the respondents prefer to have a user manual to guide them how to use the proposed application.

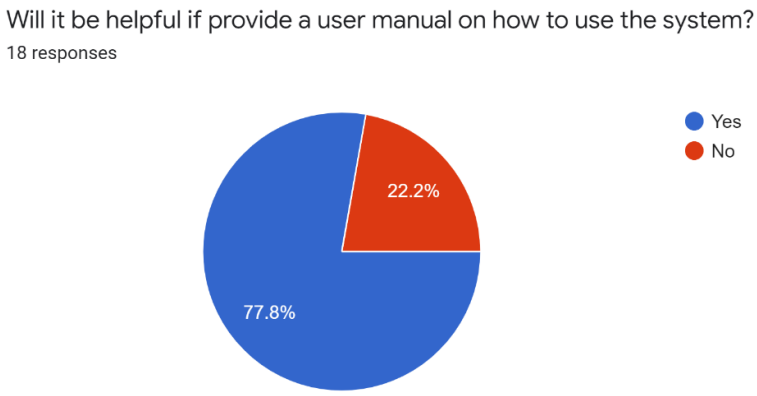


Figure 3.9 Will it be helpful if provide a user manual on how to use the system

Question 9

Based on the result in question 9, we can conclude that most of the respondents want to know more about the information of strabismus. From the analysis, 94.4% of them chose the “Yes” option and 5.6% of the respondents chose the “No” option which represented 17 respondents and 1 respondent respectively. This result can tell us that most of the respondents want to enhance their knowledge about the strabismus so that they can take care of their eyes to prevent further serious disorders.

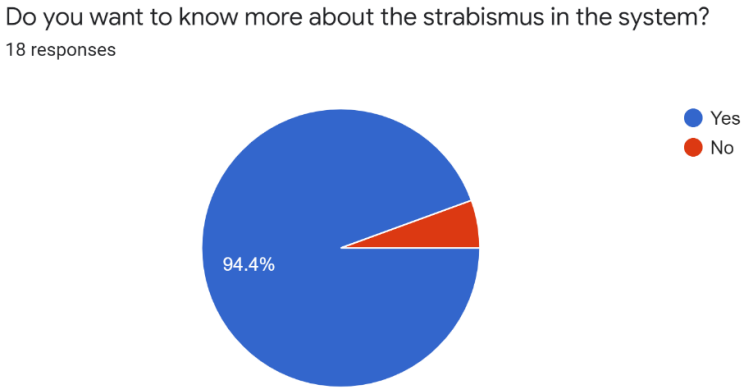


Figure 3.10 Do you want to know more about the strabismus in the system

Question 10

Based on the result in question 10, we can conclude that most of the respondents prefer to have forum feature for them to ask questions and get feedback from the doctor. From the analysis, 94.4% of them chose the “Yes” option and 5.6% of the respondents chose the “No” option which represented 17 respondents and 1 respondent respectively. This result can tell us that most of the respondents want to have a medium for them to ask questions on the doctor instead of having a consultation with the doctor.

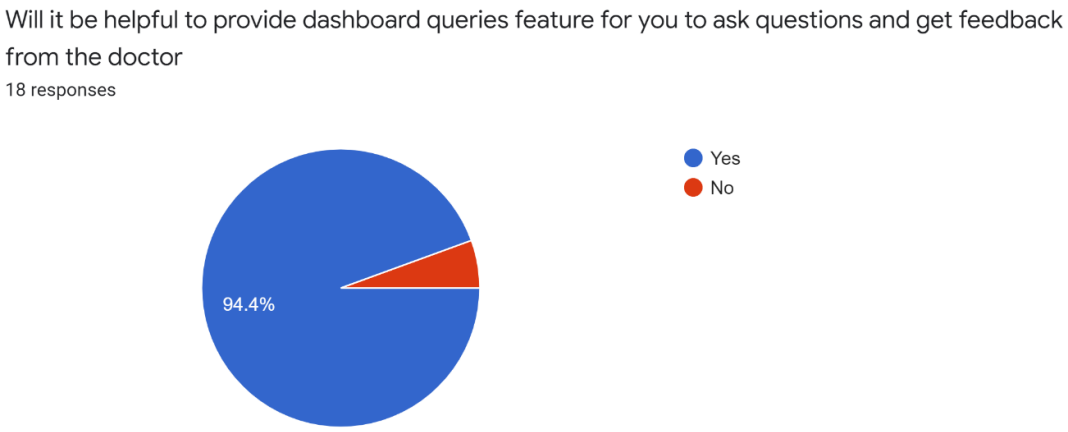


Figure 3.11 Will it be helpful to provide dashboard queries feature for you to ask questions and get feedback from the doctor

Question 11

Based on the result in question 11, we can conclude that most of the respondents prefer to have a dashboard queries feature that has all the histories of questions and answer asked by all users. From the analysis, 88.9% of them chose the “Yes” option and 11.1% of the respondents chose the “No” option which represented 16 respondents and 2 respondents respectively. This result can tell us that most of the respondents want to have the histories of the asked questions so that they can refer back to the questions if the questions same with what they going to ask.

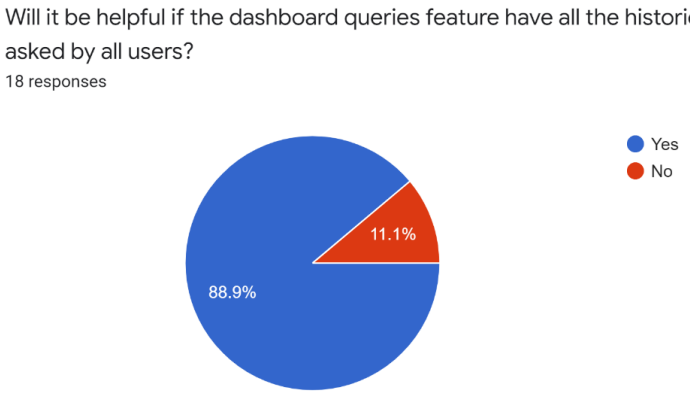


Figure 3.12 Will it be helpful if the dashboard queries feature have all the histories of questions and answer asked by all users

Question 12

Based on the result in question 12, we can conclude that most of the respondents prefer to have an in-app video conferencing feature. From the analysis, 94.4% of them chose the “Yes” option and 5.6% of the respondents chose the “No” option which represented 17 respondents and 1 respondent respectively. By referring to the pic chart, the respondents were glad to see the proposed application has the feature of in-app video conferencing. This feature enables the user to directly meet with the doctor without wasting time by opening the third-party app.

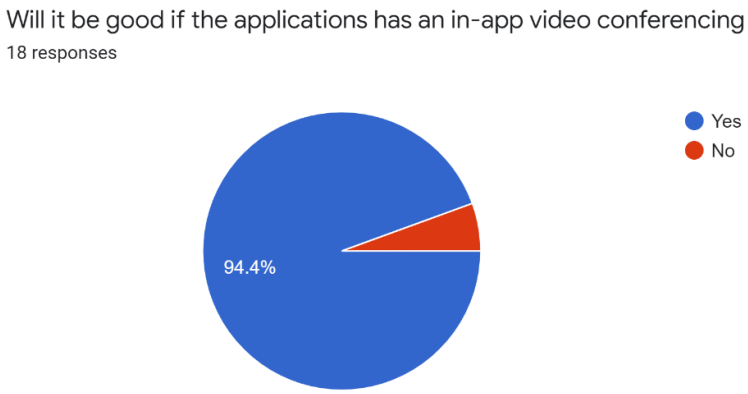


Figure 3.13 Will it be good if the application has an in-app video conferencing feature

Question 13

Based on the result in question 13, we can conclude that most of the respondents prefer to have an automatic chatbot feature. From the analysis, 94.4% of them chose the "Yes" option and 5.6% of the respondents chose the "No" option which represented 17 respondents and 1 respondent respectively. By referring to the pic chart, the respondents were glad to see the proposed application has the feature of a chatbot. This feature enables the user to ask certain basic questions and get reply by bot.

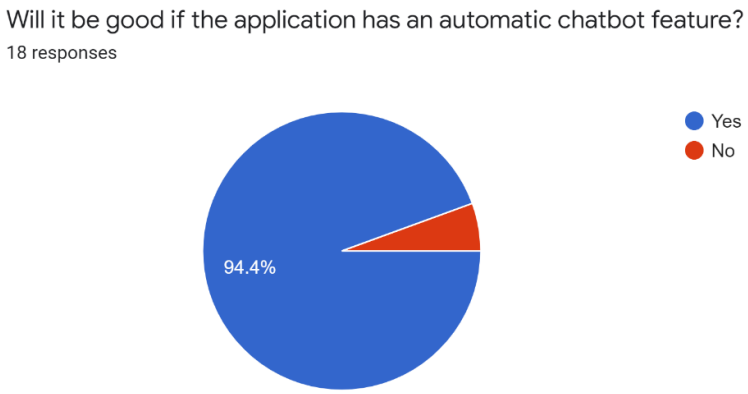


Figure 3.14 Will it be good if the application has an automatic chatbot feature

3.2.2 Designing Phase

In this stage, all the design of the Web-buzz Vision Consultation Application will be developed based on the project requirement that collected from Phase 1. The proposed design will include Context diagram, Activity diagram, Use case diagram & description and storyboard. An activity diagram is constructed to explain the behaviour of the program, and a context diagram will describe the flow of data between the system and external entities. Both diagrams are built in conjunction with one another. Other than that, the prototype is designed to let client know what each page of interface looks like and understand the flow of this proposed system.

3.2.3 Development Phase

In this stage, the hardware and software listed in table 3.2 and 3.3 below will be used to create the database and the actual code to fulfil the project requirement and proposed design which gained from the phase 1 and phase 2.

Table 3.2 Hardware Specification

Hardware	**Specification**
Lenovo Yoga 520	Laptop with RAM16 GB DDR4, 2400MHz. Windows 11, Intel® Core™ i5-8250U CPU @ 1.60GHZ 1.80GHZ. NVDIA GeForce 940MX

Table 3.3 Software Specification

Software	**Specification**
Github	A repository for managing and collaborating on different versions of code. It facilitates remote collaboration on tasks involving several people.
Visual Studio Code	A code editor used to code and develop the proposed system.

3.2.4 Testing Phase

In this stage, the Web-Buzz Vision Consultation Application will be completed throughout the development and coding phases will be tested to ensure that the final system fulfils all the project requirement. The Web-Buzz Vision Consultation Application will be tested by using User Acceptance Test (UAT). If the testing results show no mistakes and are bug-free, the process will go on to the deployment step.

3.2.5 Deployment Phase

In this stage, the User Acceptance Testing is tested successfully and a complete and finalized web-buzz vision consultation application will be released and launched to the end-users. At the same time, collect the feedback from the users to decide the next implementation to meet the customer's satisfaction of this proposed application.

3.2.6 Review Phase

After all previous stages have been completed, this phase will review the Web-Buzz Vision Consultation application 's progress to identify the hardness and trouble that occurred during the all the phases. With the reviewing phase, it can be clearer about the future problems as more understand more about the workflow. Other than that, accept the stakeholder feedback and work into the requirement of the next new iteration.

3.3 Project Requirement

3.3.1 Functional Requirement

Functional requirements describe the activities and services that must provide. Table 3.2 below is the point of the functional requirement of doctor and system while Table 3.3 below is showing the functional requirement of patient

Table 3.4 Functional Requirement of doctor

Functional requirement of system and doctor
1. The system should provide a web-based video conferencing feature to enable live video sessions between the doctor and patient.
2. The system should enable the doctor to feed in information related to consultations such as a prescription note.
3. The system should generate an e-description with details including patient details, lead doctor details, appointment date, appointment time, type and prescriptions note.
4. The system should be available to generate a booking history for patients.
5. The system should allow doctors to see the appointment requests of patients.
6. The system should be able to store the record of the patients in the form of text.
7. The system should allow Doctor to view the list of all the patient's details information
8. The system should allow Doctor to view the patient's previous record

Table 3.5 Functional requirement of patient

Functional requirement of patient
1. The system should allow users to log in with their account name and password
2. The system should enable patients to enter necessary data like name, location, email and contact
3. The system should enable patients to update the information as described in the mandatory information included
4. The system should allow patients to view the patient previous booking history
5. The system should allow patients to make an appointment with doctor through video conferencing
6. The system should allow patients to ask queries on the forum

3.3.2 Non-Functional Requirement

Online user Documentation and Help

i. The system should provide a web page that explains how to navigate the site.

ii. This page should be accessible from all other pages.

Supportability

i. The system website shall be viewable from Google Chrome, Internet Explorer 4.0, or later

Usability

i. The system must be usable by the users for which it was designed.

ii. The number of web pages navigated to access another feature from the top page should not exceed 15.

Efficiency

i. The system should not make wasteful use of system resources

3.3.3 Constraints and Limitations

i. English language only provided for the GUI

ii. Response time differs by speed connectivity and performance

iii. Limited time to develop the project

3.3.4 Context Diagram

Before starting development of proposed application, a context diagram will be designing to establish the limits of the software system as shown as Figure 3.15 below. A single process on the context diagram will represent the whole system. In any process model, the context diagram is the top-level Data Flow Diagram (DFD) that illustrates all the external entities that receive information from or give information to the application.

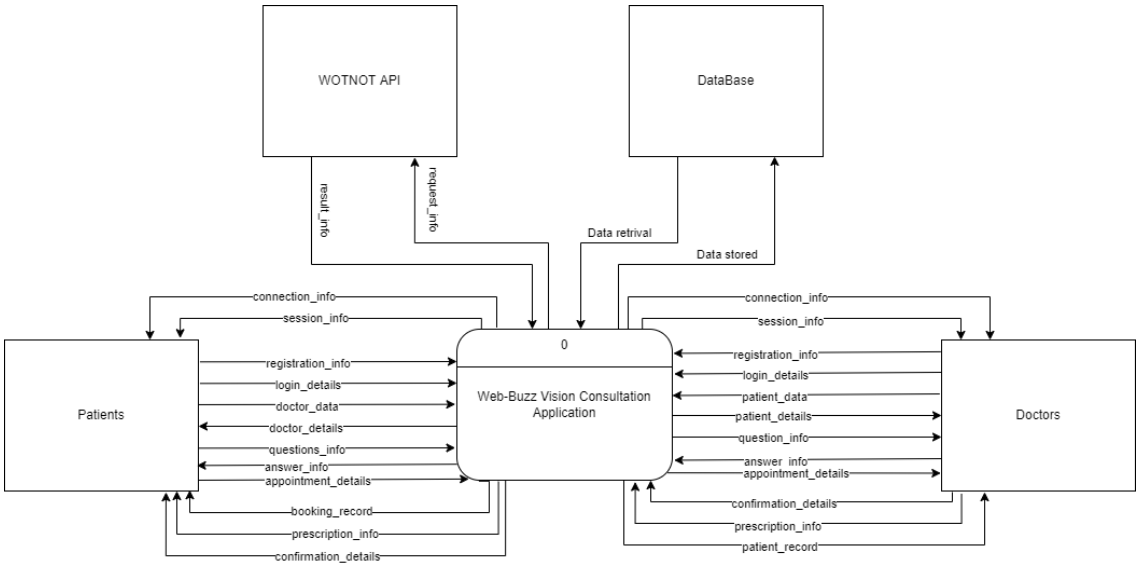


Figure 3.15 Context Diagram

3.3.5 Use Case Diagram & Description

The Figure 3.16 below shows the use case diagram of this proposed system. Use case diagram explains the functionality of the system and the actor that involve in the system. In this system, there are 3 actors. The four actors are Patients, Doctor and WOTNOT API. The system has 8 Module which are Manage Registration, Login, Manage Profile, Manage Users, Manage Forum, Manage Virtual Appointment, Manage Chatbot, and Manage Prescription Record.

Figure 3.16 Use Case Diagram

Manage Registration

Figure 3.17 below is shown the Use case diagram of Manage Registration while Table 3.6 below shows the Use case description of registration.

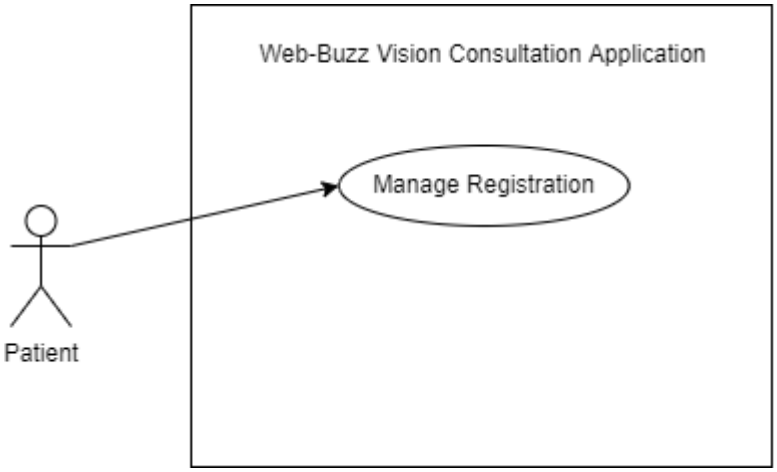


Figure 3.17 Use Case Diagram of Manage Registration

Table 3.6 Registration Use Case Description

Brief Description	In order to access more features of the system, a new user must register a username, email, role, and password
Actor	Patient
Pre-Conditions	-
Basic Flow	1. The use case starts when a user indicates that he wants to register. 2. The system requests a username, email, role, and password. 3. The user enters a username, email, role, and password. 4. The system checks that the email does not duplicate any existing registered email. [A-1] 5. The system requests a name (*), email address (*), role (*), and password (*). Items marked by (*) are required. [A-2] 6. The user enters the information. 7. The system determines the user's role and access level and stores all user information.

	8. The system starts a login session and displays a welcome message based on the user's preferences.
Alternative Flow	[A-1] Duplicate existing email 1. The system displays an error message 2. The use case goes back to step 2 in basic flow [A-2] Incomplete information 1. The system sends the “Please fill out this field” message 2. The use case continues to step 6 in the basic flow
Exception Flow	-
Post Condition	The user can now obtain data and perform functions according to his registered access level.

Login

Figure 3.18 below is shown the Use case diagram of Login while Table 3.7 below shows the Use case description of login.

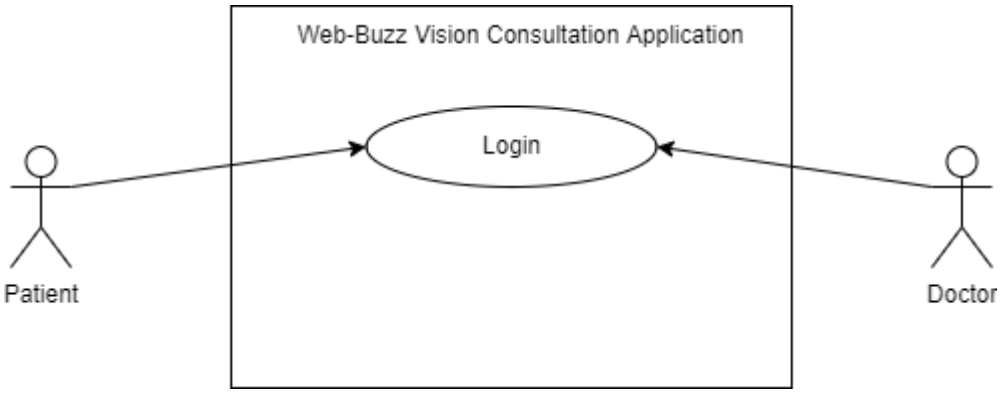


Figure 3.18 Use Case Diagram of Login

Table 3.7 Login Use Case Description

Brief Description	In order to get personalized or restricted information, a user must log in so that the system can determine his access level.
Actor	Doctor and Patient
Pre-Conditions	The user is registered/ user data is stored in database.
Basic Flow	1. The use case starts when a user indicates that he wants to log in. 2. The system requests the username, role, and password. 3. The user enters his username, role, and password.

	4. The system verifies the username, role, and password against all registered users. 5. The system starts a login session and displays a welcome message based on the user's preferences.
Alternative Flow	[A-1] Username, role, and password invalid 1. The system displays “The username, role, and password do not match” message 2. The use case goes back to step 3 in basic flow
Exception Flow	-
Post Condition	The user can now obtain data and perform functions according to his registered access level.

Manage User

Figure 3.19 below is shown the Use case diagram of Manage User while Table 3.8 below shows the Manage User Use case description.

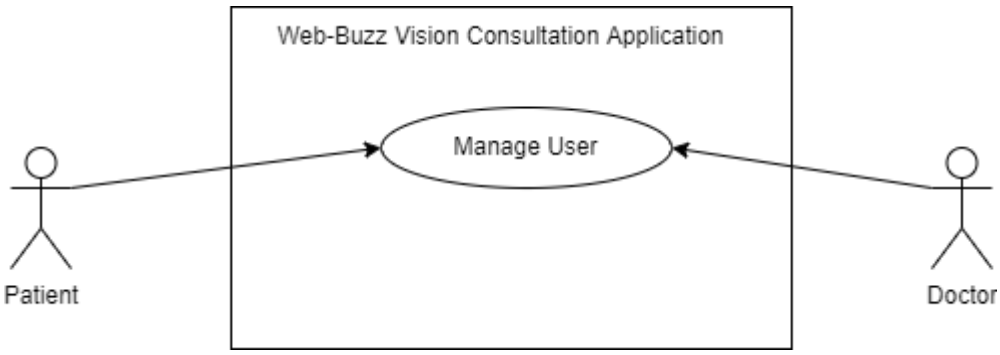


Figure 3.19 Use Case Diagram of Manage User

Table 3.8 Manage User Use Case Description

Brief Description	This use case describes how users can use the manage user function
Actor	Doctor and Patient
Pre-Conditions	The doctor and patient are registered.
Basic Flow	1. The use case begins when the user goes to the user list page[A-1] 2. The user is able to: a. View All User b. View Particular User 3. The user clicks particular <<User Name>> link[E-1] 4. A details information of user's card will appear

	5. The use case ends
Alternative Flow	[A-1] View User 1. System displays all information of all users 2. The use case continues to step 2 in the basic flow
Exception Flow	[E-1] Invalid Clicking Link 1. System not given authorize to patient to look other patient detail information. 2. System not able to direct to User Name card.
Post Condition	Doctor and Patient information card is successfully displayed along with privilege information.

Manage Forum

Figure 3.20 below is shown the Use case diagram of Manage Forum while Table 3.9 below shows the Manage Forum Use case description.

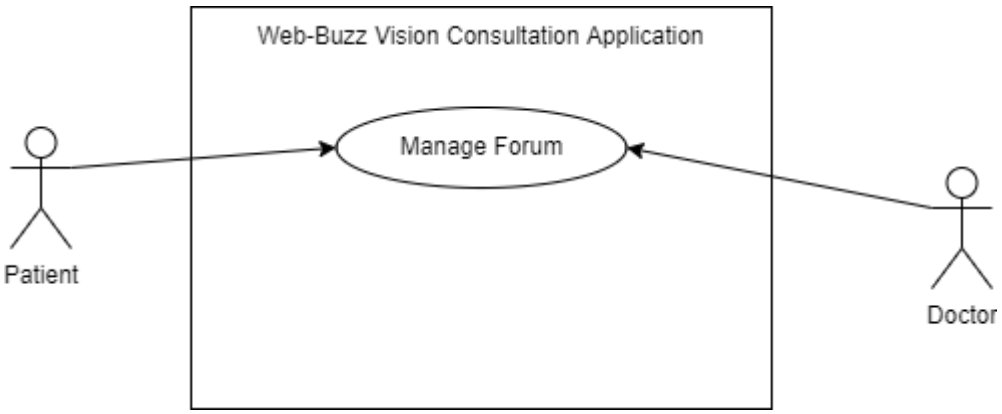


Figure 3.20 Use Case Diagram of Manage Forum

Table 3.9 Manage Forum Use Case Description

Brief Description	This use case is initiated by the doctor and patient. The patient can send questions to the application and get responses from the doctor through the forum feature.
Actor	Doctor and patient
Pre-Conditions	The users have logged in to their account
Basic Flow	Patient 1. The use case begins when the patient goes to <<forum>> interface. 2. The system prompts the patient to input question 3. The patient writes down the question by text or upload picture. 4. The patient clicks the “Submit” button 5. The system sends the question to doctor interface

	6. The system receives the answer from the doctor and posts it to the user's forum interface 7. The use case ends Doctor 1. The use case begins when the doctor goes to the <<forum>> interface. 2. Doctor can view and answer the questions from the patient 3. Doctor click <<SUBMIT>> button 4. The use case ends
Alternative Flow	-
Exception Flow	-
Post Condition	Doctor has given authorize to answer while Patient given authorize to ask question after logging into system

Manage Virtual Appointment

Figure 3.21 below is shown the Use case diagram of Manage Virtual Appointment while Table 3.10 below shows the Use case description of Manage Virtual Appointment.

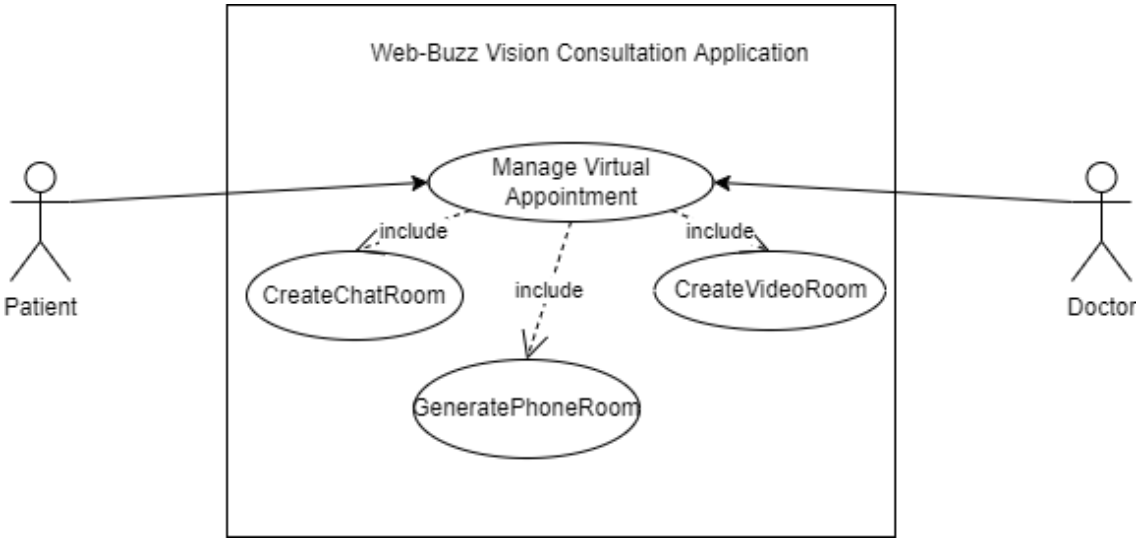


Figure 3.21 Use Case Diagram of Manage Virtual Appointment

Table 3.10 Manage Virtual Appointment Use Case Description

Brief Description	This use case describes how users can use the manage appointment function
Actor	Patient and Doctor
Pre-Conditions	The users have logged in to their account
Basic Flow	1. The use case begins when the patient goes to the booking page or appointment page 2. The patient is able to: a. Add Appointment [A-1] b. Delete Appointment [A-2] c. View Appointment [A-3] d. Edit Appointment [A-4] 3. The doctor is able to:

	a. Reject Appointment [A-5] b. Approve Appointment [A-6] 4. The user clicks <<CONFIRM>> button[E-1] 5. The use case ends
Alternative Flow	[A-1] Add Appointment 1. The patient selects an option to book an appointment 2. The system display booking form on page 3. The patient enter patient id 4. The patient enter doctor name 5. The patient enter patient name 6. The patient enter email 7. The patient enter age 8. The patient enter contact number 9. The patient enter location 10. The patient selects a date 11. The patient selects a time 12. The patient selects a type of booking 13. The patient enter the reason of booking 14. The system displays the appointment base on the date and appointment time selected 15. The system sends a notification to doctor 16. The doctor clicks <<Reject>> or <<Accept>> button 17. The use case continues to step 5 in basic flow [A-2] Delete Appointment 1. The patient clicks the <<appointment>> button on dashboard page or navigation bar. 2. The system displays all the appointment lists

	3. The patient selects the particular appointment that needs to be deleted. [E-1] 4. The patient selects the removal option 5. The system display Appointment have been cancelled by patient message to doctor 6. The use case continues to step 5 in basic flow [A-3] View Appointment 1. The system displays all the appointment list 2. The user clicks <<VIEW>> button on particular appointment 3. The system displays the particular appointment record 4. The use case continues to step 5 in basic flow. [A-4] Edit Appointment 1. The system displays all the appointment list 2. The patient clicks <<EDIT>> button on particular appointment 3. The system displays the particular appointment record 4. The patient is able to edit the appointment 5. The patient clicks <<UPDATE>> button to save the appointment. 6. The system displays a successful UPDATE notification to patient 7. The use case continues to step 5 in basic flow.

	[A-5] Reject Appointment 1. The system displays all the appointment list 2. The doctor clicks <<REJECT>> button on particular appointment 3. The system displays the particular appointment record 4. The doctor is able to Reject the appointment 5. The doctor selects <<REJECT>> in drop down menu to reject the appointment. 6. The system sends a reject notification to patient 7. The use case continues to step 5 in basic flow [A-6] Approve Appointment 1. The system displays all the appointment list 2. The doctor clicks <<APPROVE>> button on particular appointment 3. The system displays the particular appointment record 4. The doctor is able to Approve the appointment 5. The doctor selects <<APPROVE>> in drop-down menu to approve the appointment. 6. The system sends a approve notification to patient. 7. The system changes the <<APPROVE>> and <<REJECT>> button to <<ADD>> prescription button. 8. The use case continues to step 5 in basic flow.

Exception Flow	E1: Invalid input 1. The entered data is invalid, only the alphabet is accepted 2. Patient and doctor enter again the data by text 3. The use case goes back to step 3 in the basic flow for patient E2: Invalid delete button 1. The doctor clicks <<Reject>> button 2. The system displays Your appointment has been cancelled by doctor message to patient 3. The system does not pop up a <<DELETE>> button in patient's appointment page. 4. The use case continues to step 5 in basic flow.
Post Condition	-

Manage Prescription Record

Figure 3.22 below is shown the Use case diagram of Manage Prescription Record while Table 3.11 below shows the Manage Prescription Record Use case description.

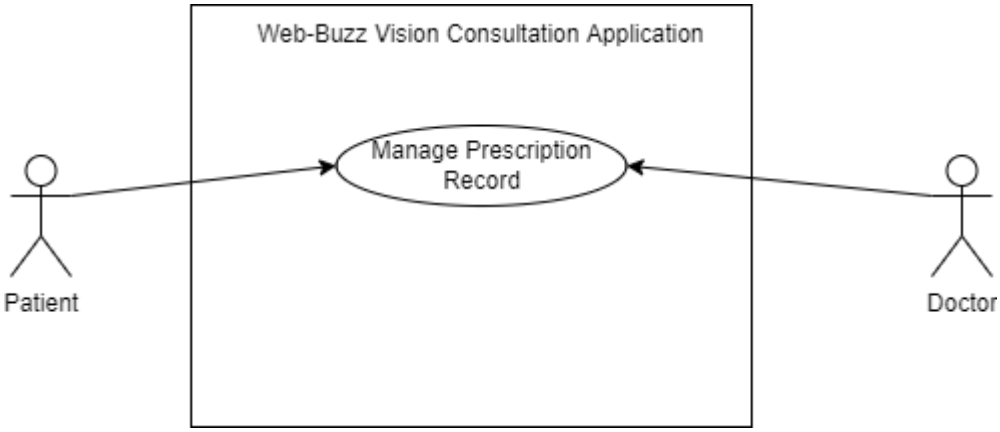


Figure 3.22 Use Case Diagram of Manage Prescription Record

Table 3.11 Manage Prescription Record Use Case Description

Brief Description	This use case describes how doctor can add a patient's medical history and patient can view the prescription record.
Actor	Doctor and Patient
Pre-Conditions	The users have logged in to their account
Basic Flow	1. The use case begins when the user goes to Prescription page[A-1] [E-1] 2. The system displays the description record to user. 3. The use case ends
Alternative Flow	[A-1] 1. The system prompts the doctor to input prescription details having (diagnosis) 2. The doctor inputs the details information. 3. The doctor clicks the <<SUBMIT>> button. 4. The system sends the prescription record to patient.

Exception Flow	[E-1] Reject Appointment 1. The doctor clicks the reject appointment button. 2. The system displays the appointment has been cancelled to patient. 3. The system changes the status to “REJECT” 4. The system not given permission to doctor to add prescription record. 5. The use case goes back to step 3 in basic flow
Post Condition	If the case is successful, the actor is now able to add the patient’s medication history from his account. If the case remains unsuccessful system state remains unchanged.

Manage Profile

Figure 3.23 below is shown the Use case diagram of Manage Profile while Table 3.12 below shows the Manage Profile Use case description.

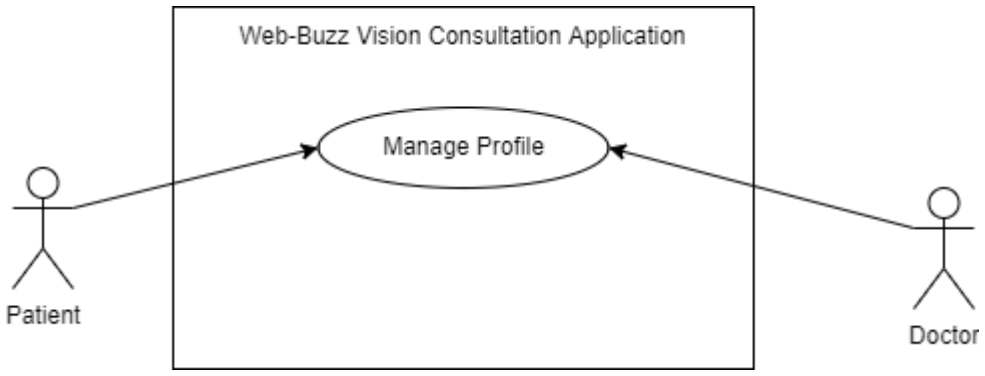


Figure 3.23 Manage Profile of Use Case Diagram

Table 3.12 Manage Profile of Use Case Description

Brief Description	This use case describes how users can manage profile
Actor	Doctor and Patient
Pre-Conditions	The users have logged in to their account.
Basic Flow	1. The use case begins when the user goes to Profile page[A-1] 2. The system displays the profile information to user. 3. The use case ends
Alternative Flow	[A-1] Edit Profile 1. The system displays all the data of profile of user. 2. The user enter the detail information. 3. The user clicks <<UPDATE>> button to save the data.

	4. The system displays a successful UPDATE notification to user 5. The use case continues to step 2 in basic flow.
Exception Flow	-
Post Condition	If the case is successful, the actor is now able to update user's data to database

Manage Chatbot

Figure 3.24 below is shown the Use case diagram of Manage Chatbot while Table 3.13 below shows the Manage Chatbot Use case description.

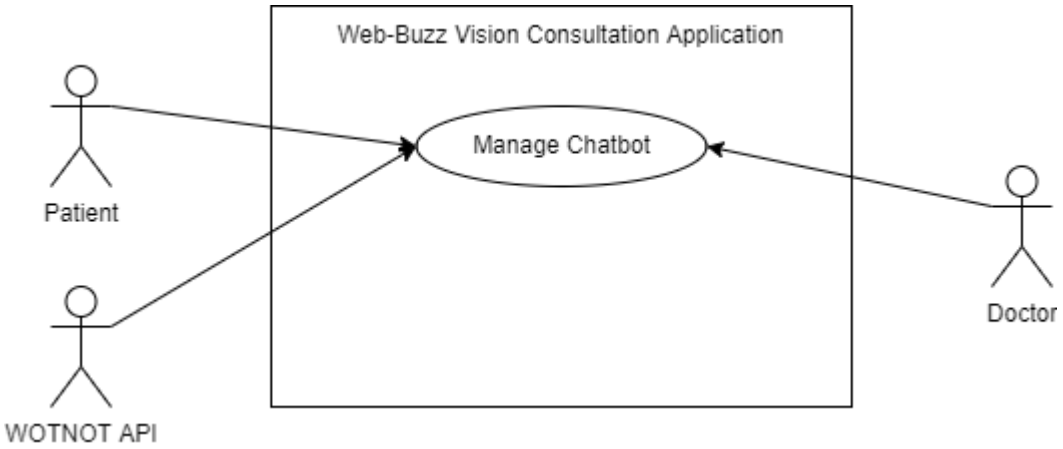


Figure 3.24 Manage Chatbot of Use Case Diagram

Table 3.13 Manage Chatbot of Use Case Description

Brief Description	This use case describes how users can manage chatbot
Actor	Doctor, Patient. And WOTNOT API
Pre-Conditions	The users have to enter and active in website
Basic Flow	1. The users need to enter the web-buzz vision consultation application's website link. 2. The WOTNOT API chatbot prompt the user to click the button with several options. 3. The users can click any button based on their needs. [A-1] 4. The WOTNOT API chatbot will give response to the button that users are chosen. 5. The use case ends.

Alternative Flow	[A-1] Drop Email Button 1. The users click the <<DROP US EMAIL>> button. 2. The WOTNOT API prompts users to enter name, email, and phone. 3. The WOTNOT API display send successfully notification to users. 4. The WOTNOT API will sends an email to doctor/admin.
Exception Flow	-
Post Condition	If the case is successful, the doctor/admin is now able to give response to the users queries.

3.3.6 Activity Diagram

The activity diagram starts by asking users whether they having account for the system. If user have no account, it will go to account registration page or else user need to sign in to the system as shown as Figure 3.25 below.

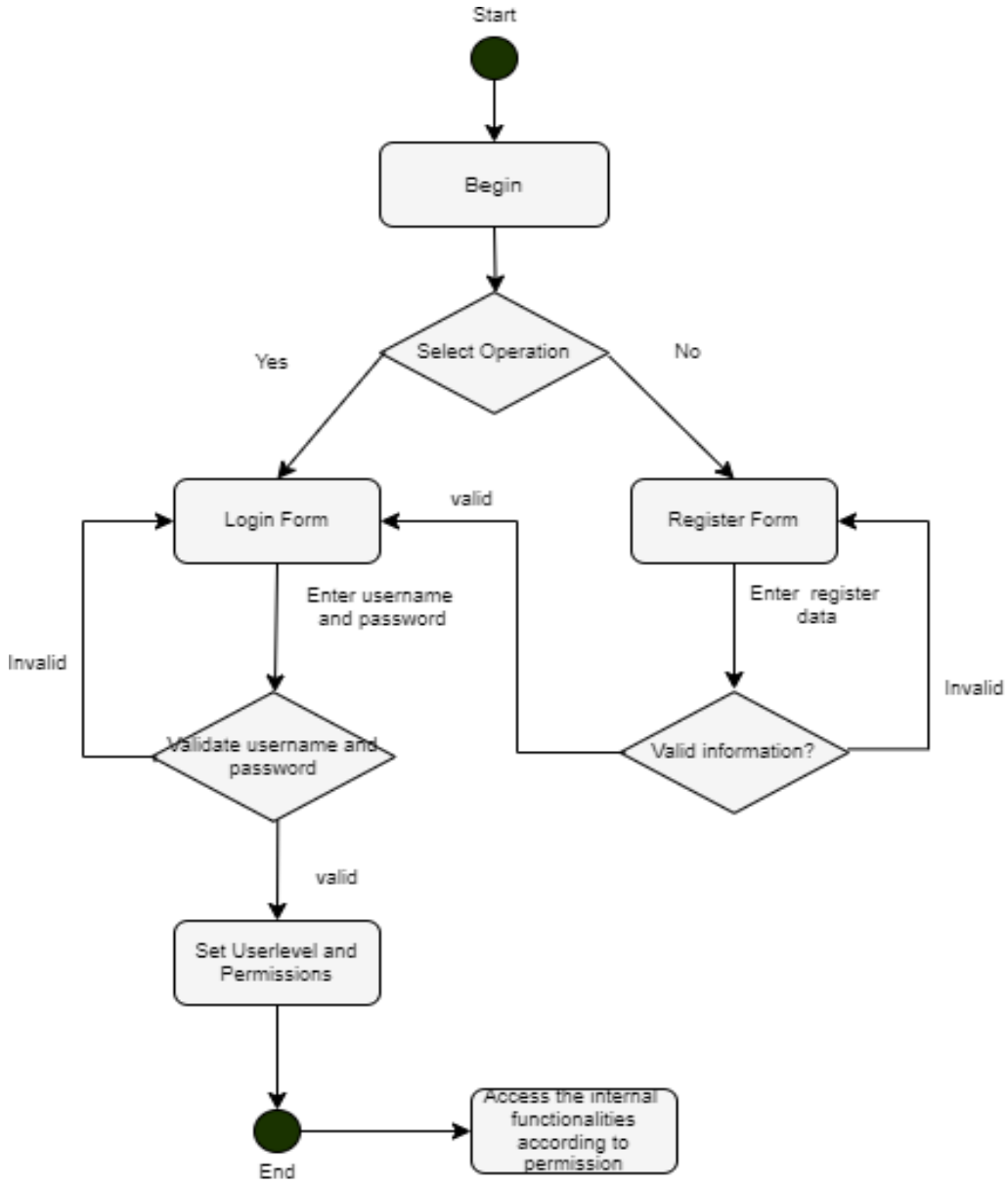


Figure 3.25 Login Activity Diagram of Web-Buzz Vision Consultation Application

After sign in successfully, it will redirect to the dashboard page of the system. User will need to select action from the navigation bar. The action from the navigation bar will lead to the feature respectively as shown as Figure 3.26 below. For example, if the user chooses the Prescription option, the system will redirect the page to Prescription page where it will display all the prescription record including the remark written by doctor.

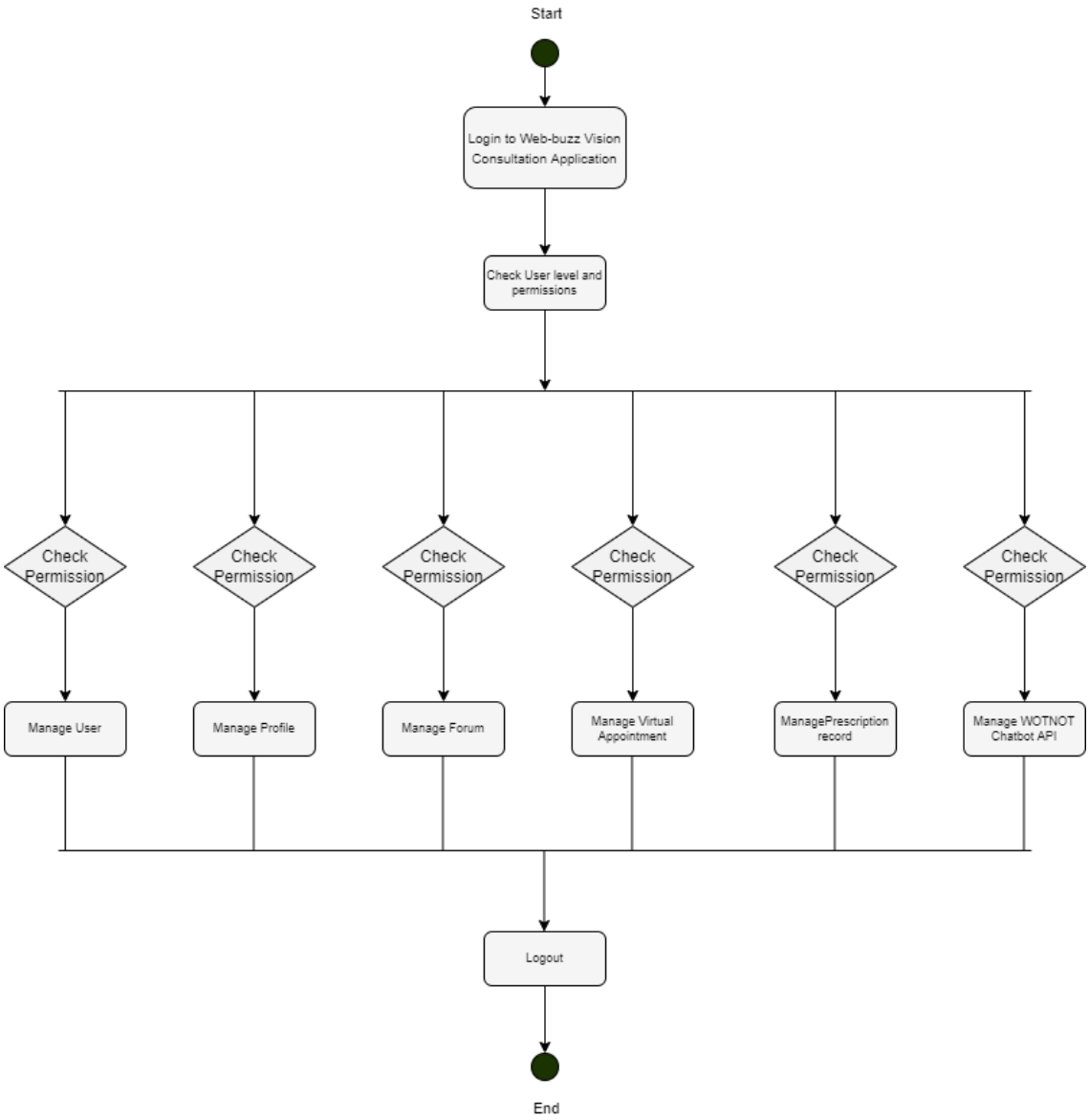


Figure 3.26 Activity Diagram of Web-Buzz Vision Consultation Application

3.4 Data Design

3.4.1 Erd

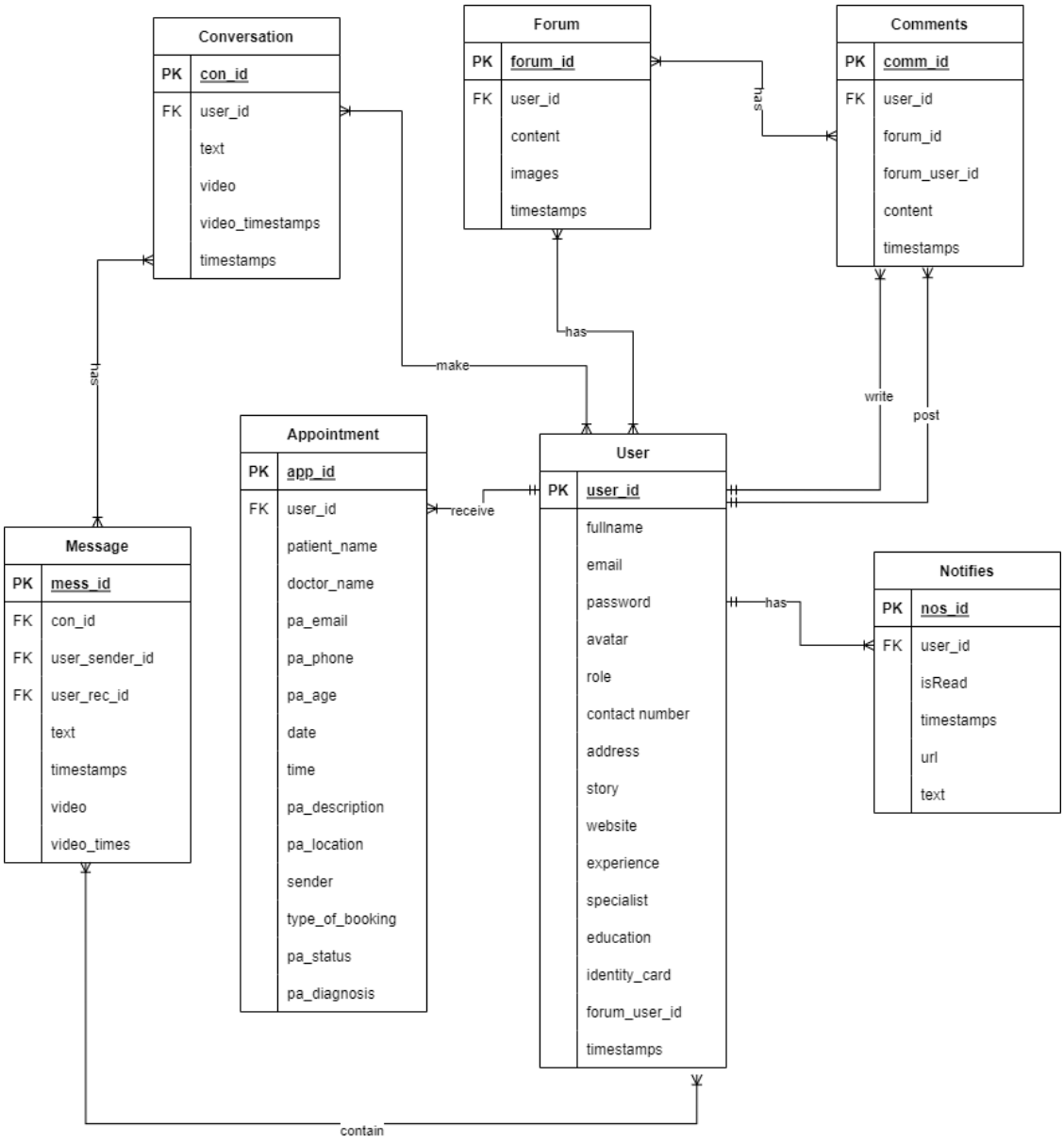


Figure 3.27 ERD of Web-Buzz Vision Consultation Application

3.4.2 Data Dictionary

Table 3.14 Database Dictionary of User

Field Name	Description	Data Type	Constraint	Example
user_id	User id	ObjectId (MongoDB Data Type)	PK	63c173757d6e8f0c4411ce67
fullname	User name	String (MongoDB Data Type)		TangXinZhe
email	User's email	String (MongoDB Data Type)		Winfredtang68@gmail.com
password	User's password	String (MongoDB Data Type)		Winfredtang123
avatar	User's avatar	String (MongoDB Data Type)		https://res.cloudinary.com/fyptang/image/upload/v1668528618/avatar/defaultuser_o4rb9k.png
role	User's role	String (MongoDB Data Type)		user
contact_number	User's contact number	String (MongoDB Data Type)		011-10891234

address	User's address	String (MongoDB Data Type)		7,Jalan 3 Taman Triang indah
story	User's description	String (MongoDB Data Type)		Eye bloody
website	User's website	String (MongoDB Data Type)		https://kalam.ump.edu.my/login/index.php
experience	User's experience	String (MongoDB Data Type)		5 Years
specialist	User's specialist	String (MongoDB Data Type)		orthodologist
education	User's education level	String (MongoDB Data Type)		University Malaysia Pahang
Identity_card	User's identity card	String (MongoDB Data Type)		99111091234
timestamps	User's created account time and updated time	Date (MongoDB Data Type)		2023-01 15T06:16:42.723+00:00

Table 3.15 Database Dictionary of Appointment

Field Name	Description	Data Type	Constraint	Example
app_id	Appointment id	ObjectId (MongoDB Data Type)	PK	63c24c427d6e8f0c4411d4bd
user_id	User Id	ObjectId (MongoDB Data Type)	FK	63c173757d6e8f0c4411ce67
patient_name	Patient Name	String (MongoDB Data Type)		Amelia
doctor_name	Doctor Name	String (MongoDB Data Type)		Dr.William
pa_email	Patient‘s email	String (MongoDB Data Type)		amelia@gmail.com
pa_phone	Patient’s phone number	String (MongoDB Data Type)		011-10981234
pa_age	Patient’s age	Number (MongoDB Data Type)		32
date	Appointment date	String (MongoDB Data Type)		2023-01-26

time	Appointment Time	Time (MongoDB Data Type)		03:14
pa_description	Patient's description	String (MongoDB Data Type)		Why my eye bloody?
pa_location	Patient's current location	String (MongoDB Data Type)		Kota Damansara
sender	Patient's sender id	String (MongoDB Data Type)		63c173757d6e8f0c4411ce67
type_of_booking	Type of Booking	String (MongoDB Data Type)		Video Call
pa_status	Status of the appointment	String (MongoDB Data Type)		APPROVE
pa_diagnosis	Diagnosis of the patient	String (MongoDB Data Type)		Avoiding to look at phone or laptop frequently

Table 3.16 Database Dictionary of Message

Field Name	Description	Data Type	Constraint	Example
mess_id	ID of Message	ObjectId	PK	63c3983c13b196bb5de9a770
con_id	ID of Conversation	ObjectId	FK	63c3983c13b196bb5de9a770
user_sender_id	ID of Sender	ObjectId	FK	63c173757d6e8f0c4411ce67
user_rec_id	ID of Recipent	ObjectId	FK	63c173757d6e8f0c4411ce67
text	Message	String		Good afternoon
timestamps	Created Time and Updated Time	Date		2023-01 15T06:16:42.723+00:00
video	Video	Booolean		true
video_times	The Time of Video Consultation	String		5

Table 3.17 Database Dictionary of Notifies

Field Name	Description	Data Type	Constraint	Example
nos_id	Notifies Id	ObjectId	PK	63c24d417d6e8f0c4411d4e5
user_id	User Id	ObjectId	FK	63c24d417d6e8f0c4411d4e5
isRead	Notification	Boolean		true
timestamps	Created Time and Updated Time	String		2023-01 15T06:16:42.723+00:00
url	URL Link for direct go to that page.	String		/profile/63c1a94e7d6e8f0c4411cfc6
text	The Notification Display Message	String		Booking Successsfully

Table 3.18 Database Dictionary of Comments

Field Name	Description	Data Type	Constraint	Example
comm_id	Notifies Id	ObjectId	PK	63c24d417d6e8f0c4411d4e5
user_id	User Id	ObjectId	FK	63c24d417d6e8f0c4411d4e5
forum_id	Forum Id	ObjectId	FK	63c24d417d6e8f0c4411d4e5
timestamps	Created Time and Updated Time	Date		2023-01 15T06:16:42.723+00:00
content	Content of the Comment	String		Kindly contact me for futher discussion

Table 3.19 Database Dictionary of Forum

Field Name	Description	Data Type	Constraint	Example
forum_id	Notifies Id	ObjectId	PK	63c24d417d6e8f0c4411d4e5
user_id	User Id	ObjectId	FK	63c24d417d6e8f0c4411d4e5
images	Image	String		https://res.cloudinary.com/fyptang/image/upload/v1673768459/lakbcoqts7heqfnixkvv.jpg
timestamps	Created Time and Updated Time	Date		2023-01 15T06:16:42.723+00:00
content	Content of the Forum	String		Kindly contact me for futher discussion

Table 3.20 Database Dictionary of Conversation

Field Name	Description	Data Type	Constraint	Example
conn_id	Notifies Id	ObjectId	PK	63c24d417d6e8f0c4411d4e5
user_id	User Id	ObjectId	FK	63c24d417d6e8f0c4411d4e5
text	Text for the conversation	String		Fighting together
timestamps	Created Time and Updated Time	Date		2023-01 15T06:16:42.723+00:00
video	Is it used video feature?	Boolean		false
video_timestamps	Video Consultation Created Time and Video Consultation Cancelled Time	Date		2023-01 15T06:16:42.723+00:00

3.5 Prototype

This web-buzz vision consultation application consists of two different users. Before the users need to access the functionality of the system, they need to click the button to verify whether they are patient or doctor. This proposed system will only prompt patient to be register because the doctor's data already insert in the database as shown as Figure 3.28 below.

Figure 3.28 Log in interface

Figure 3.29 below represent the whole storyboard of the perspective view of patient. After login to the system, the system will display the dashboard interface. The system will present the other feature with beautiful icon to make this interface look more attractive and cleaner. At the right bottom side, the system will display a circle shape which is chatbot feature. From the left side of navigation bar, there have 6 more option for patient to choose.

The Second option count from top is User List feature. The system will display all the user list in this including Doctor and also Patient. Patient can click the name of the user to direct a new page to the clicked user detail information. Patient can have a better understanding to the user as well. However, only Doctor detail information can be clicked and viewed due to the privilege and security purpose for other patient's information. In this stage, patient is able to click the add button and booking button in order to have a chat and video call with the doctor. A Booking form will pop-out for patient to fill in. The system will prompt the user to provide all the necessary information for booking such as Doctor's Name, Appointment date, time and booking type. The booking type consists of chat, phone call and videocall. Patients can pick the type that tailored to their needs. It will take around 5 second to 10 second to fill the form. As a result, patient can have a consultation with doctor in different medium. However, only the type of booking appointment that have been accepted by the doctor can be used. In other word, if the doctor declines the video conference appointment, the patient will be unable to use the video call feature. After clicking the confirm button, the system will directly the page to Appointment page.

In this interface, it will show out all the booking record in details. In this stage, patients still can able to edit, view, and cancel the appointment by clicking the each buttons respectively at the Action column. A status column along with a text pending will appear. Its means that patient has successfully book the appointment with the particular doctor and need to wait for doctor to approve it. If the Doctor decline the appointment, the status will change from pending to reject and vice versa.

Then, the next page is Chat interface. Patient can have a conversation with Doctor but limited to Chat feature only. Doctor is the only one who can organise a phone or video call to the user based on the appointment record.

Moreover, the next page is Forum page. It is completely free to use without any additional rules such as message and video call. Patient can ask questions in forum and also see the history question that have been answered by doctor.

Finally, when the patient clicks the Prescription button, the system will direct them to Prescription page which contain doctor name, appointment ID, appointment ID, appointment Time, Type of Strabismus and Prescription note.

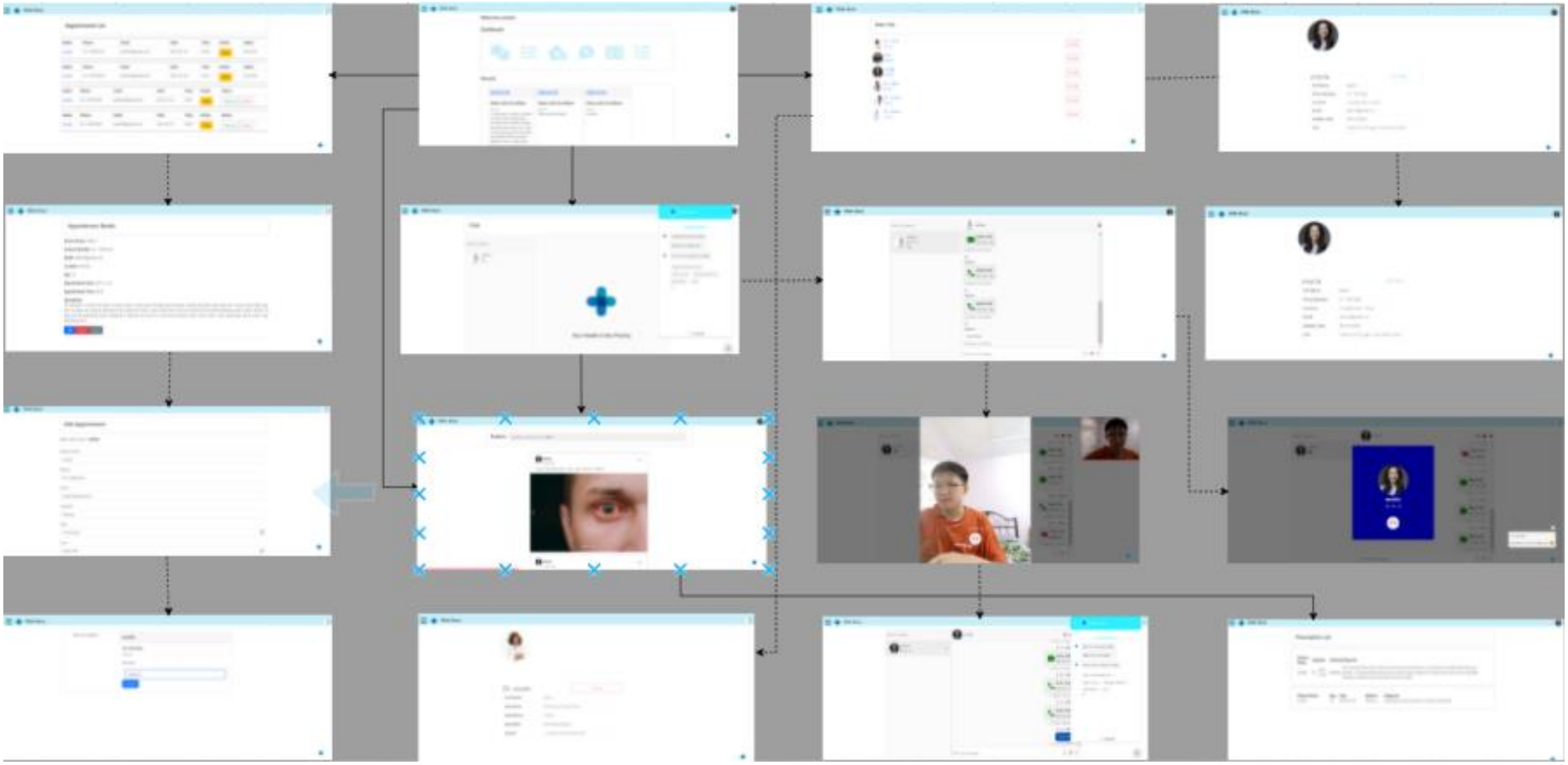


Figure 3.29 Storyboard of Patient

Figure 3.30 below depicts the entire storyboard of the Doctor's viewpoint view. The dashboard interface will be displayed when you log in to the system. The critical distinction between the Doctor and the Patient is that the Doctor can refuse or accept the appointment made by the Patient at the appointment page. Following the doctor's acceptance, a new Prescription button will appear, allowing the doctor to write a prescription note after meeting with the patient. The second difference is the doctor does not have the Prescription interface, doctor only can add the prescription to the particular patient after consultation. Besides, two extra features will be provided in the chat interface. Doctor has given authotization to pick/organize a phone or video call to patient. The Forum interface is the last difference. The doctor may read all of the questions and select which ones to respond. The system will not compel the doctor to respond all the question in the Forum.

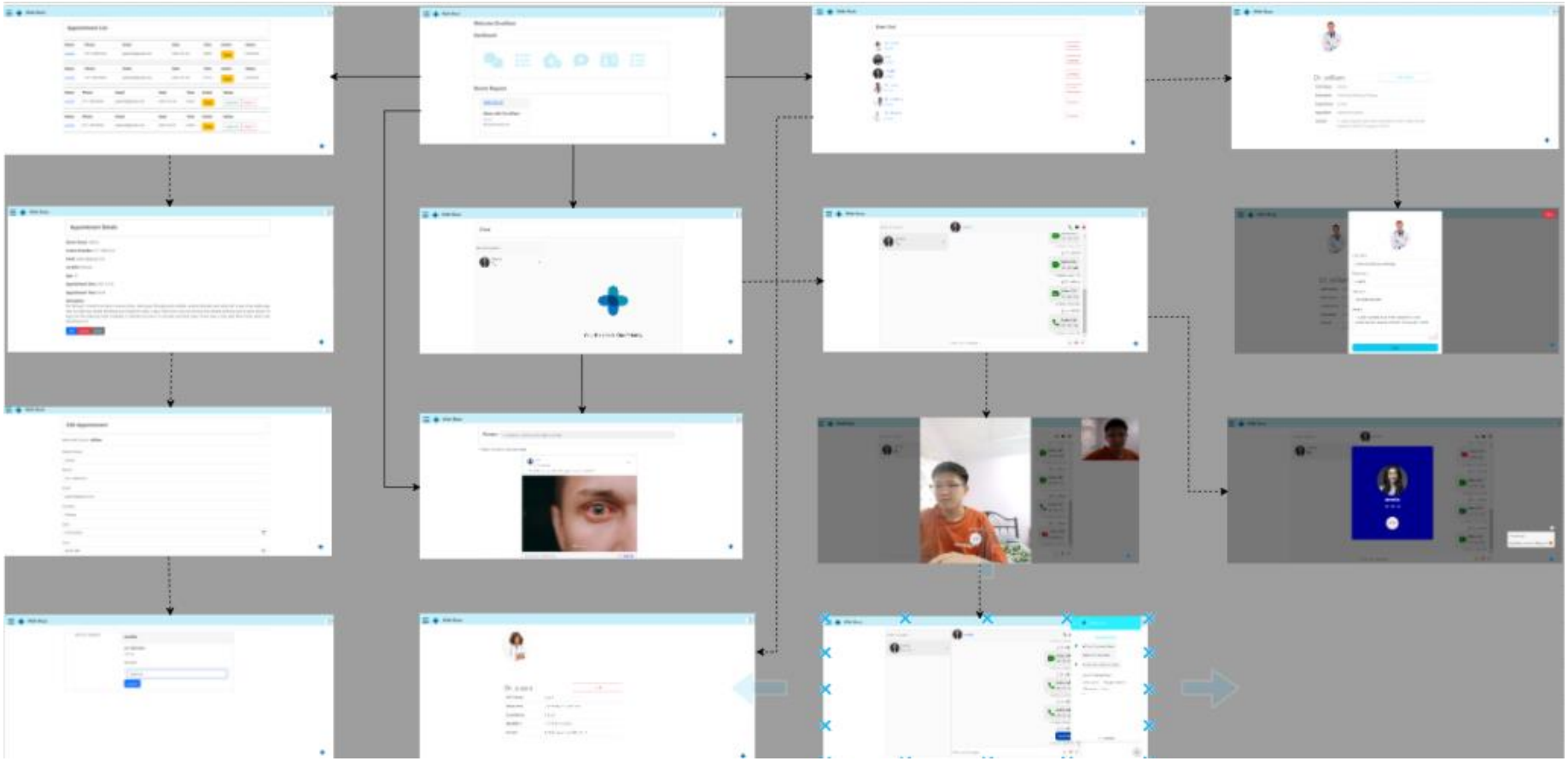


Figure 3.30 Storyboard of Doctor

3.6 Testing Plan

The User Acceptance test (UAT) will be conducted to test a Web-buzz vision consultation application in the testing plan. It aims to ensure that the system will satisfy the requirements and functionalities given from the stage 1 gathering requirement in the Agile methodology. The testing plan will be conducted based on the Gantt Chart provided in Appendix B. The functionality of the system will be tested in the test case, input, expected result, actual result, and test status. Table 3.21 below shows the Example of UAT form.

Table 3.21 UAT Form

No.	Module	Activities	Status		Comments
			Yes	No	
1.	Login	User registration			
2.		User login			
3.		User Logout			
4.		Password retrieval			
5.	Appointment	Booking appointment			
6.		Cancel Appointment			
7.		Accept Appointment			
8.		Reject Appointment			
9.		Add prescription			
10.	History	View record			
11.		Booking status			

12.	User List	Doctor list			
13.		Patient list			
14.		Add Doctor/Patient			
15.	Message	Send message			
16.		Receive message			
17.	Video Call	Live video			
18.		Emotional detection			
19.		Capture image			
20.	Forum	Ask question			
21.		Reply question			
22.	Prescription	View prescription			
23.		Download prescription			
24.	Chatbot	Functionality of chatbot			

This test has been performed by:

Name :

Signature :

Date :

3.7 Potential Use of Proposed Solution

Web-buzz Vision Consultation application is a great system providing convenience and safety to all the users. Since COVID-19 hasn't reached the end, and now the new pandemic monkeypox is spreading around the world. Currently, it has infected almost 18 countries in the world. Not only that, if we look nearer, Malaysia has reported a significant rise in hand, and foot mouth disease on 8 May 2022. As we know, these three diseases have one common point preventing them which is less to touch. Therefore, by using the proposed system, patients can meet with doctors anytime anywhere without increasing the possibility of contraction of the disease. Besides, due to these diseases, the hospital either government or private has overcrowding and keeping up emergency services. Therefore, it is hard for us to walk into a hospital and have a face-to-face session. The case of delays in appointments also has risen significantly during the pandemic. Thus, it comes to a problem since the treatment of strabismus cannot be delayed. Therefore, by using the proposed system, patients can attend the appointment by using the video conferencing feature in the proposed system. On the other hand, this proposed system also brings a significant benefit to doctors as record the data and saves in the system. Therefore, the doctor no needs to record the treatment record manually at the same time give treatment to patients.

3.8 Gantt Chart

A Gantt chart can help to visualize the project timeline and whether they are tracking to the proper constraint as shown in the table 3.21 below. The Figure of Gantt Chart can be seen in Appendix B.

Table 3.22 Table of Gantt Chart

No	Task	Duration(Day)	Start Date	End Date
	Web-Buzz Vision Consultation Application		09/3/2022	
	Requirement	41	09/3/2022	18/3/2022
1.	Meeting with Supervisor	1	09/3/2022	09/3/2022
2.	Identify the requirement, problem, objective	6	10/3/2022	15/3/2022
3.	Meeting with Supervisor	1	16/3/2022	16/3/2022
4.	Submission of Chapter 1	1	17/3/2022	17/3/2022
5.	Correction of Chapter 1	3	18/3/2022	20/3/2022
6.	Comparison of existing system	11	21/3/2022	31/3/2022
7.	Meeting with Supervisor	1	01/4/2022	01/4/2022

8.	Correction of Chapter 1 and 2	2	02/4/2022	03/4/2022
9.	Identify the functional, non-functional, limitation and constraints	5	04/4/2022	08/4/2022
10.	Collect user requirement	10	9/4/2022	18/4/2022
11.	Submission of Chapter 1 until a part of Chapter 3	1	15/4/2022	15/4/2022
	Design	44	26/4/2022	08/6/2022
12.	Meeting with Supervisor	1	26/4/2022	26/4/2022
13.	Proposed design and Data design	28	27/4/2022	24/5/2022
14.	Meeting with Supervisor	1	25/5/2022	25/5/2022
15.	Correction of Part of Chapter 3	2	26/5/2022	27/5/2022
16.	Design Prototype	6	28/5/2022	02/6/2022
17.	Submission of Chapter 1-3	1	03/6/2022	03/6/2022
18.	Meeting with Supervisor	1	04/6/2022	04/6/2022

19.	Finalize the PSM 1	4	05/6/2022	08/6/2022
	Development	65	17/10/2022	20/12/2022
20.	Software installation	2	17/10/2022	18/12/2022
21.	Develop the system	63	19/10/2022	20/12/2022
	Test	5	21/12/2022	25/12/2022
22.	User Acceptance Test	5	21/12/2022	25/12/2022
	Deploy	31	26/12/2022	25/1/2023
23.	Collect feedback	22	26/12/2022	16/1/2023
24.	Documentation	8	17/2/2023	24/1/2023
25.	Submission of PSM Report	1	25/1/2023	25/1/2023

CHAPTER 4

IMPLEMENTATION, RESULT AND DISCUSSION

4.1 Introduction

This chapter will be the discussion on the implementation and development of the proposed web-buzz application. Detailed and accurate information on the proposed web-based application will be provided as the solution to the problem stated in Chapter 1. The functionalities will also be discussed with the description provided Development Environment System Output and Result.

4.2 Development Environment

This web-buzz vision consultation application is separated into two parts which are Reactjs and Nodejs. When it comes to creating user interfaces, Reactjs is one of the most widely used frontend JavaScript frameworks. With React, developing dynamic user interfaces is a breeze. React effectively updates and renders the right components when data changes by creating a single view for each state of my system. As a result of using declarative views, my code will be more stable and less of a mystery. It's possible to build complicated user interfaces out of modular, state-managing components that are themselves contained. I can simply remove states from the DOM and route rich data through my system since the component functionality is implemented in JavaScript rather than a template.

Nodejs is being used for the backend part. The purpose is to focuses on the server-side of my system. It can help me to communicate with the Mongo dB database information to the browser. Since most of the application require data that comes from

database, therefore, Nodejs become the interaction with React (Frontend) to get and update data behind the system.

Socket.io is being used to handle the real-time communication between client and client of my web-based application. It can enable low latency, bidirectional and event-based communication between a client and server. Besides, these are the tools that I used to develop web-buzz application.

MongoDB is being used to handle the database of my web-based application due to its flexibility, schema-less model and flexible query model. It is expressive and adaptable because it employs documents that can include sub-documents in complicated hierarchies. It can also map objects from any computer language, making it simple to develop and maintain. With MongoDB, my web-based application is given the authority and obligation to interpret various attributes present in the documents of a collection.

WOTNOT is being implemented to handle the conversation between client and bot. It is a chatbot implemented for a specific reason such as increasing lead generation or customer service. It can scale my support of my web-based application with WOTNOT chatbot that answer mundane queries or even eliminate manual and mundane tasks of answering repetitive customer support queries with FAQ bots.

Table 4.1 Tools use for developing the web-buzz application

No	Tool	Purpose
1	Microsoft Visual Studio Code	To develop the web-based application through coding and scripting
2	Github	Track changes of my code across versions

4.3 Result & System Output

This system is proposed to develop a web application which able to identify the current limitation of the Vision Consultation application. However, the user interface also is a significant part of the development process. It plays a role to attract more users before they know the system as well. A good interface makes the user's experience simple and straightforward, requiring the least amount of work on the user's behalf to get the most intended result. In this stage, several user interfaces will be shown below.

Figure 4.1 below shows the signup interface of the Web-Buzz Vision Consultation Application, the user needs to click the registration tab which is located at top of the square. Then, the screen will pop out and prompt several privacy information for the user to key in such as Full name, username, email address, password, and the role of the user. To ensure security purposes, users need to enter a correct email format and at least 6 characters for the password. If not, an error and alert will appear to remind the user as shown in Figure 4.2 and Figure 4.3. Moreover, an error message will be displayed if the user did not input anything and then click the submit button (Figure 4.4).

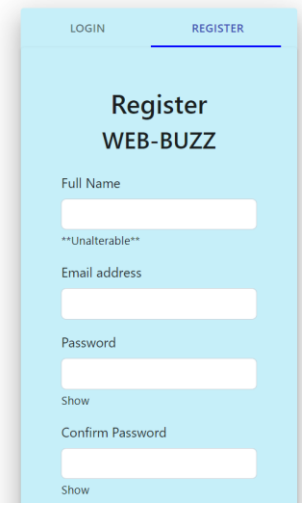


Figure 4.1 Register Page

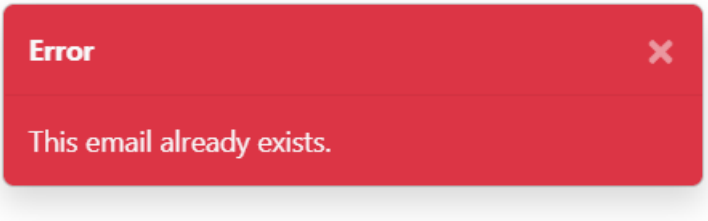


Figure 4.2 Error Message for Email Registered Before

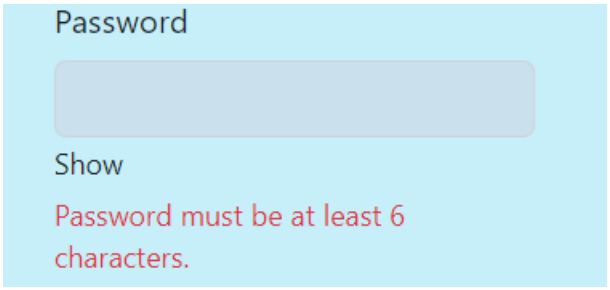


Figure 4.3 Error Message for No Input Correct Format

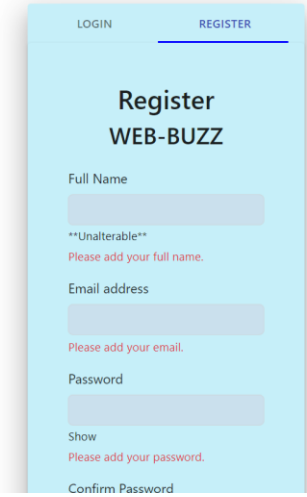


Figure 4.4 Error Message for No Input When Registered

Figure 4.5 below shows the login interface of the Web-Buzz application. As usual, the user needs to click the Login tab which located at the top in order to go to the login interface. The user needs to insert the email address used during sign-up, the password, and the role to log in. In this stage, the user needs to key in everything including the role of the user therefore the submit button can be touched and vice versa.

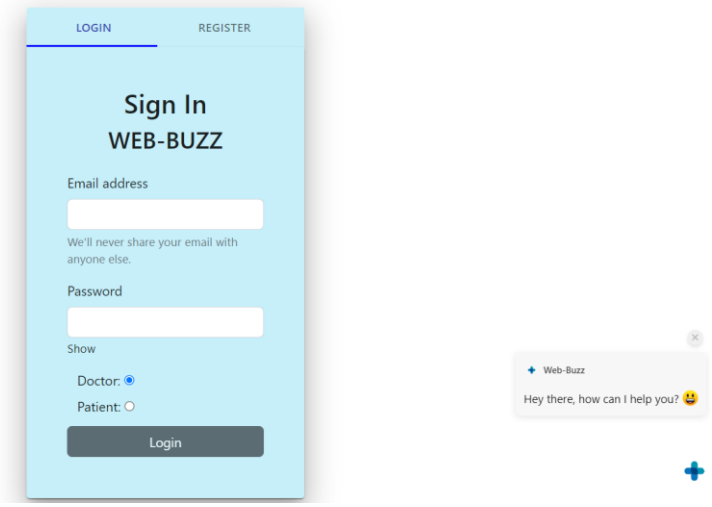


Figure 4.5 Login Page

The Figures below are the home page of the system. This interface is the first page after the user has successfully login to the system. Both patient and users have different page of the dashboard. Figure 4.6 and Figure 4.7 shows the home page of the doctor with Website and Mobile Responsive Website respectively. At the begining, it will indicate a welcome notification to the doctor. A Dashboard column with different icons will display at the middle and Recent Request column will display at the bottom. At the dashboard column, when user click the respective icon, it will direct user to that page. At the Recent Request page, it will display the recent appointment that is booked by patient. Therefore, doctor can click the Date which is indicated as a blue underline to access to the appointment detail. After Doctor change the approve or reject the appointment, the appointment will not longer display at recent Request Column.

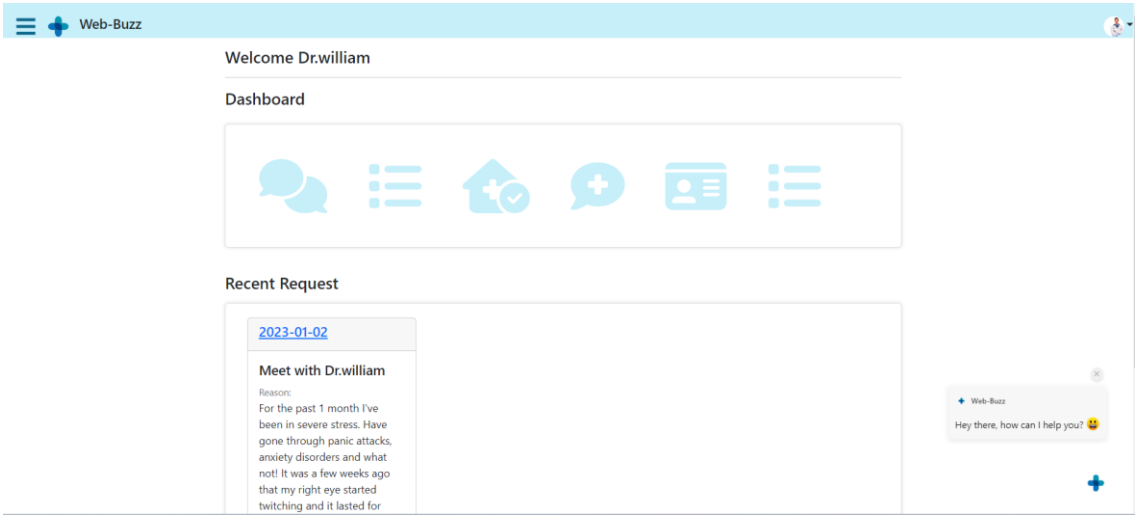


Figure 4.6 Home Page for Doctor on the Website

Figure 4.7 Home Page for Doctor with Mobile Responsive Websit

The Figure below show the dashboard page of Patient. Figure 4.8 and Figure 4.9 are show the first part of the home page with website and mobile responsive website respectively while Figure 4.10 and Figure 4.11 display the second part of the home page with website and mobile responsive website page in mobile. Same as the doctor's page, it has dashboard column which consists of the several icon to redirect user to that particular page after clicking it. The different things are the Record and Location. Record column displays the record of the patient with max 4 booking. After the number of 4, even the patient have been booked one more times, the record still remain the 4 bookings. In short, it is a quick record to remind patient what the previous record that they booked. Besides, the location column displays a particular location in a map which is the exact location that the Hospital located with. This is implemented to enhance the credibility and help patient to find them.

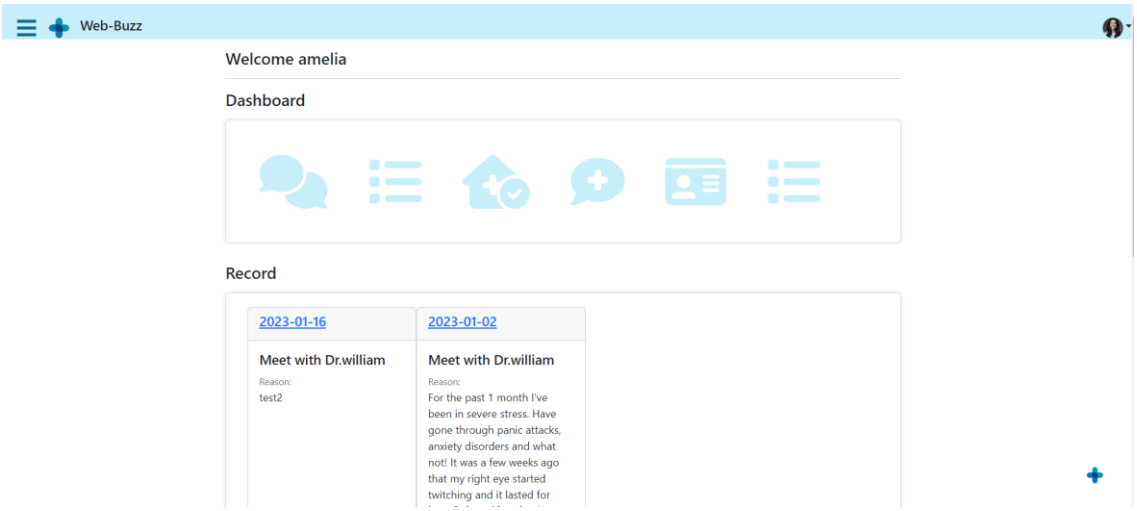


Figure 4.8 Home Page Part 1 for Patient in Website

Figure 4.9 Home Page Part 2 for Patient in Mobile Responsive Website

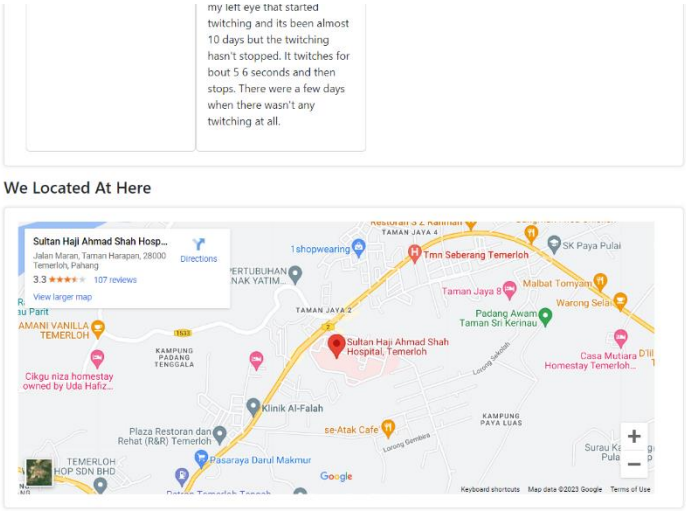


Figure 4.10 Home Page Part 2 for Patient in Website

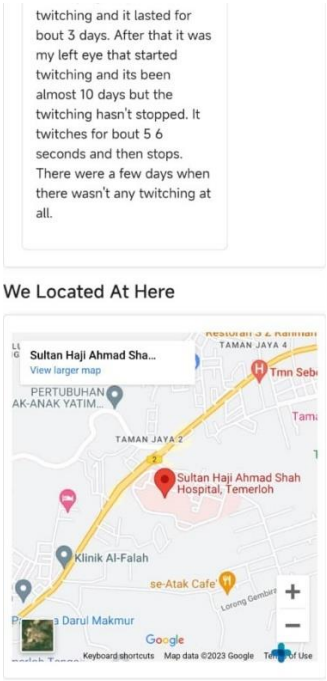


Figure 4.11 Home Page Part 2 for Patient in Mobile Responsive Website

There will be a top header bar along with the navigation icon, system icon, profile icon. After user click the profile icon, a drop-down menu with a profile function, dark mode function and also logout function will pop out as shown as Figure 4.12 below. At

first, the system will clear the cache and redirect user to login page by clicking the "Logout" function.

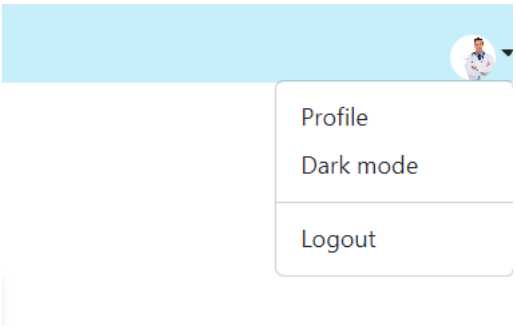


Figure 4.12 Drop Down Menu

The Figures below is the profile page after the user clicks it. Both patient and doctor have different profile pages along with different information that need to be displayed. Figure 4.13 and Figure 4.14 below are the profile page for doctor in website and mobile responsive website respectively while Figure 4.15 and Figure 4.16 are the profile page for patient in website and mobile responsive website respectively

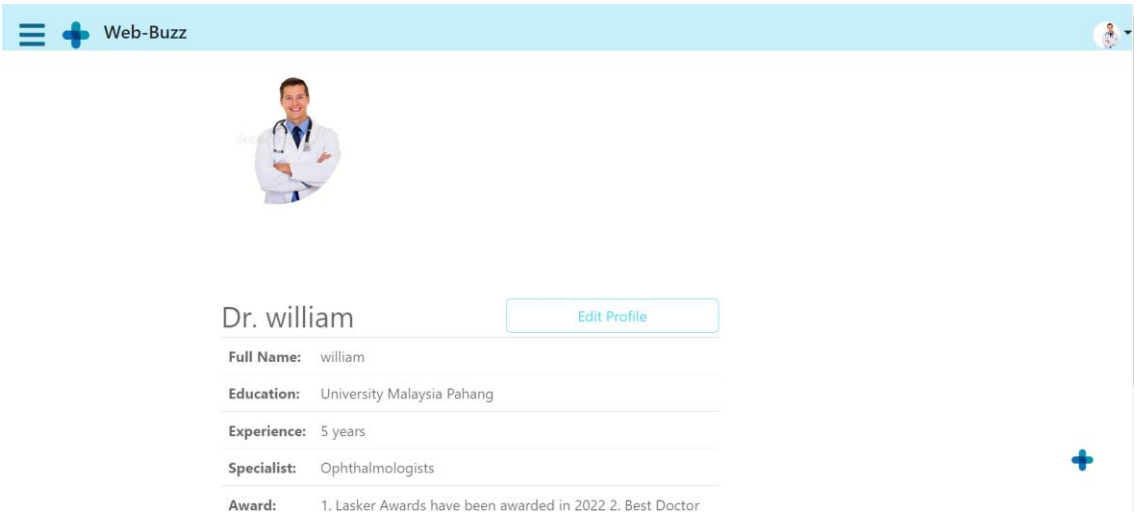


Figure 4.13 Profile Page for Doctor in website

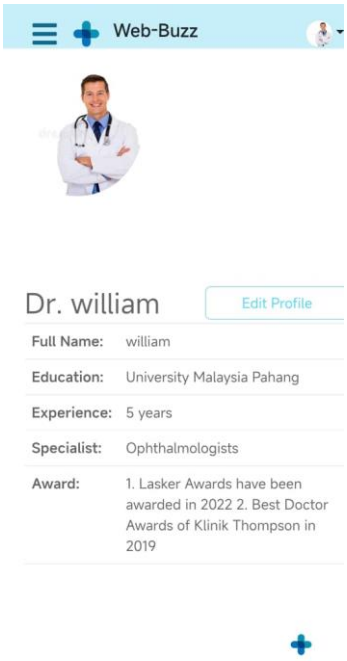


Figure 4.14 Profile Page for Doctor in Mobile Responsive Website

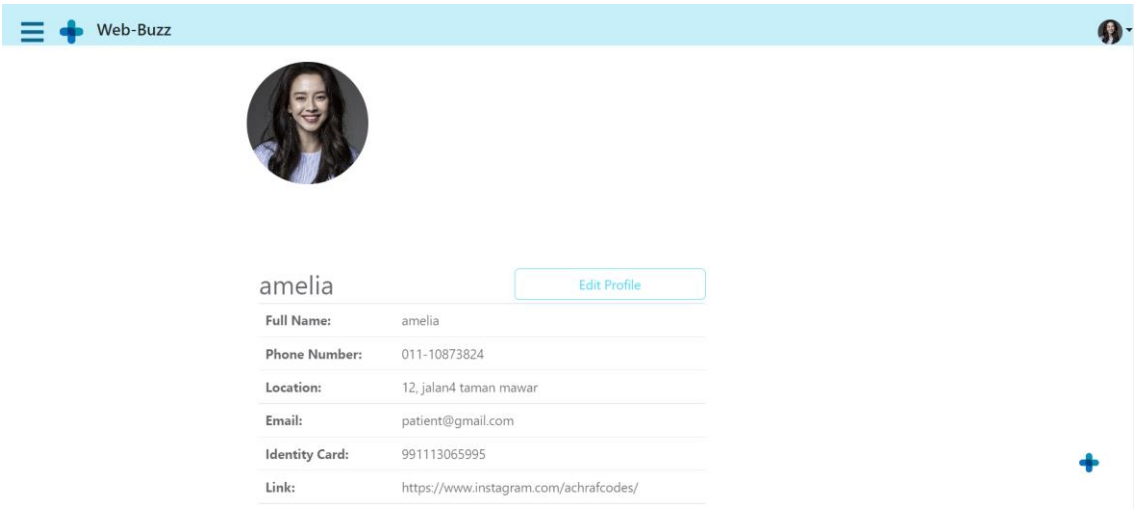


Figure 4.15 Profile Page for Patient in Website

Figure 4.16 Profile Page for Patient in Mobile Responsive Website

Both Doctor and Patient are able to edit profile by clicking the “EDIT” button. It will pop out a square box as shown as Figure 4.17 and Figure 4.18. Then, user can change their profile picture by clicking the “Change” button and selecting the image desired in local machine as shown as Figure 4.19 and Figure 4.20 below. After the image and information selection, click the “Save” button and the new profile is changed successfully and a notification will be sent at the top right corner of the profile page as shown as Figure 4.21 and Figure 4.22 below.

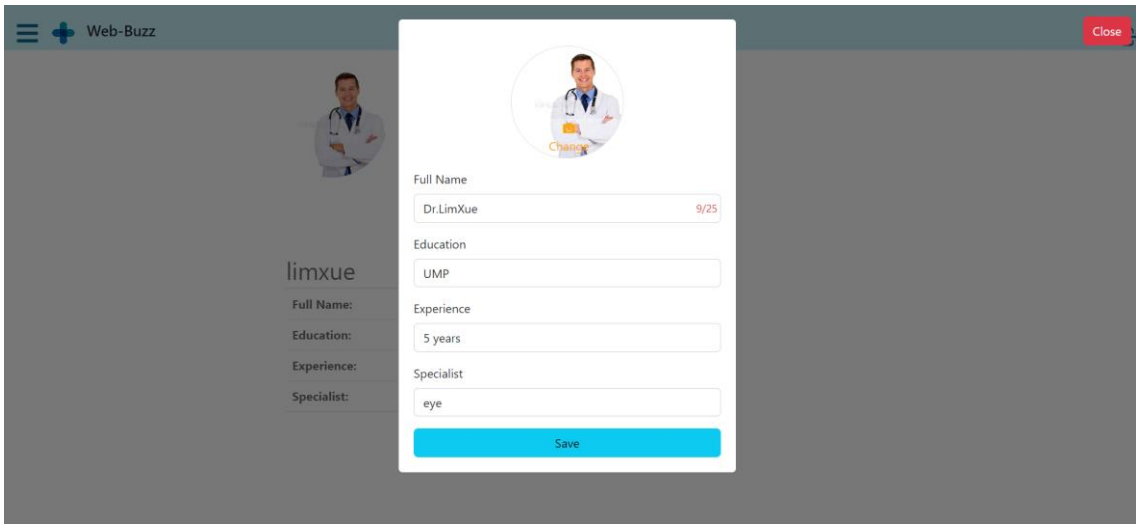


Figure 4.17 Edit Profile in website

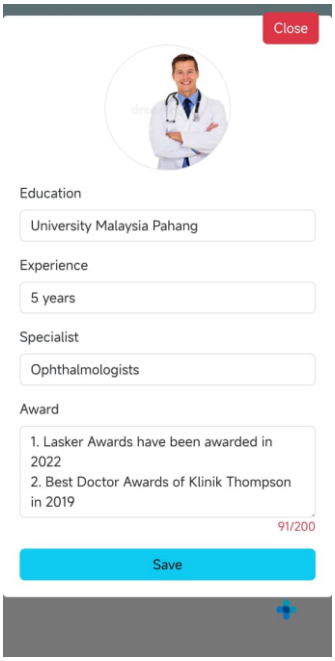


Figure 4.18 Edit Profile in Mobile Responsive Website

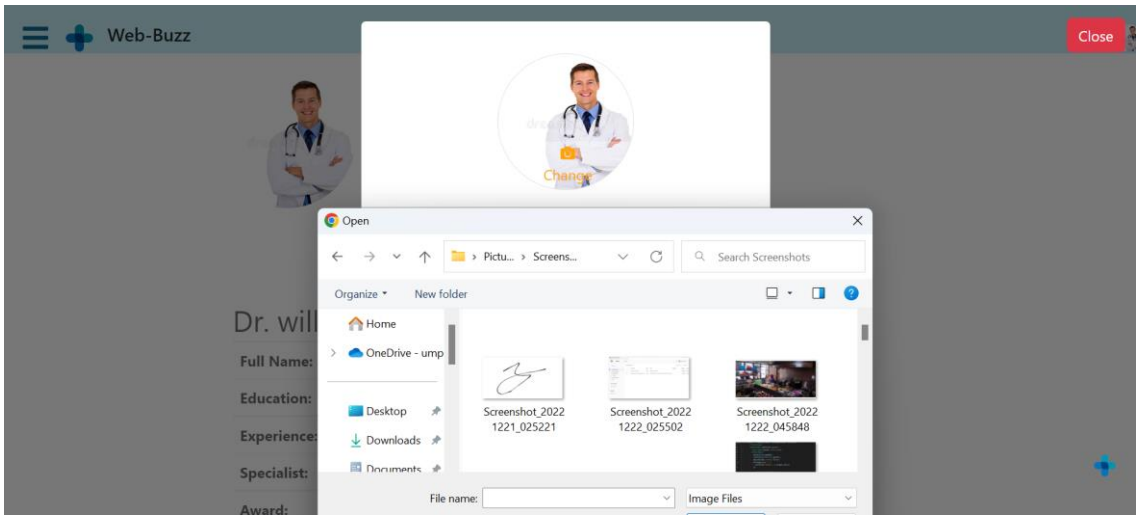


Figure 4.19 Image Selection in website

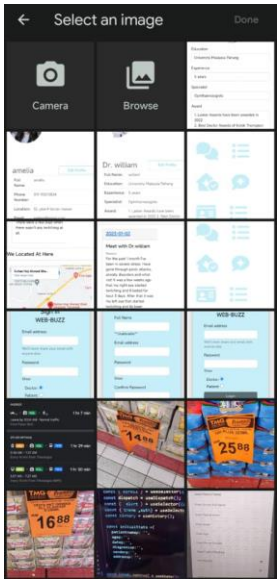


Figure 4.20 Image Selection in Mobile Responsive Website

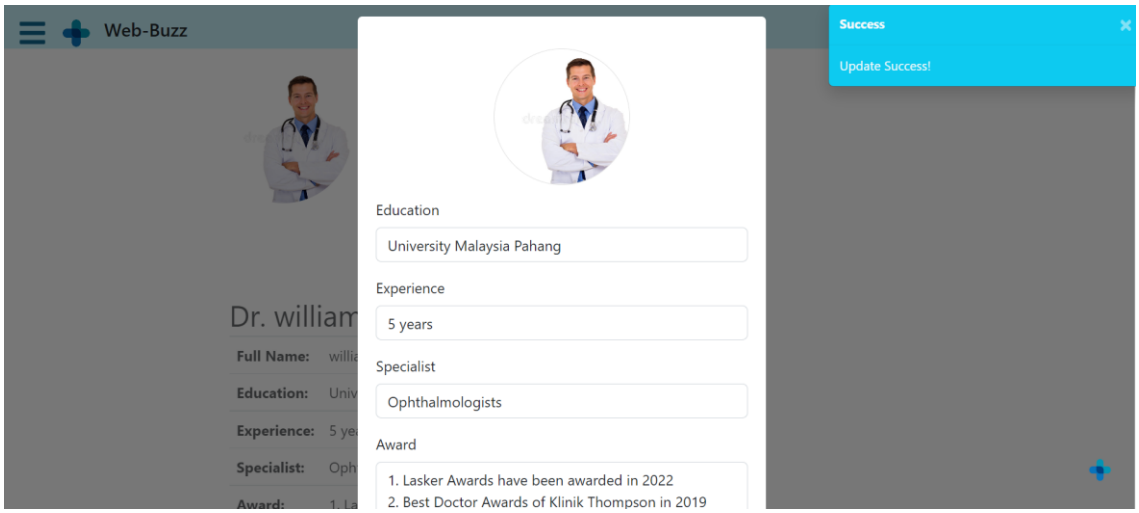


Figure 4.21 Edit Success Notification in website

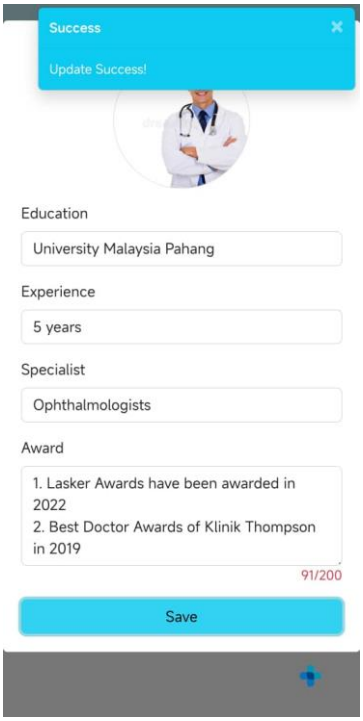


Figure 4.22 Edit Success Notification in Mobile Responsive Website

Back to the dropdown menu in home page, the second option is dark mode. This feature is used to change the background light theme to dark theme to protect the eye of users during night as shown as Figure 4.23 and Figure 4.24 below.

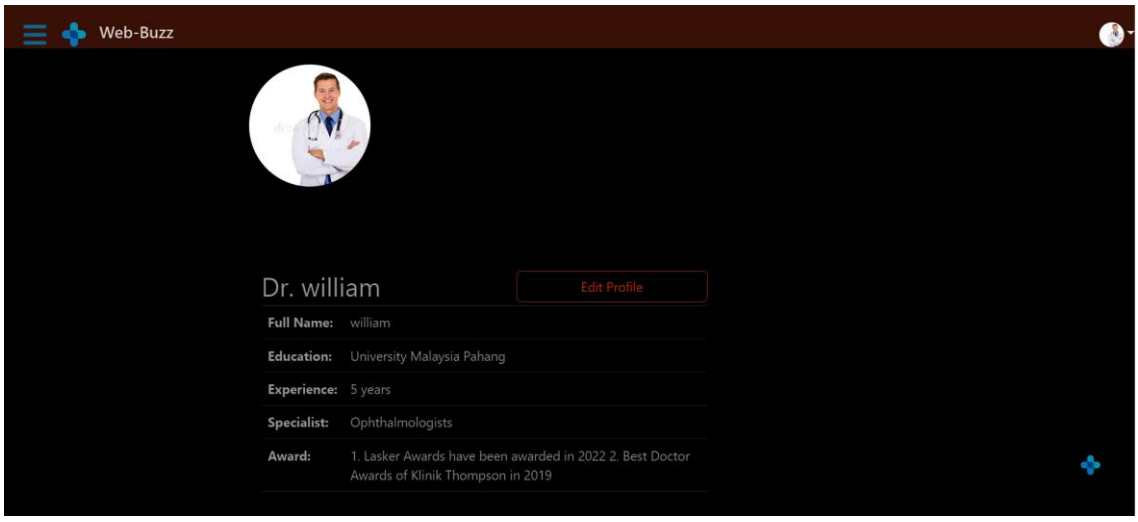


Figure 4.23 Example Dark Mode in Website

Figure 4.24 Example of Dark Mode in Mobile Responsive Website

The Figures below represent the navigation bar of this system. It is the initial point of contact the visitors have with you to direct them to specific pages. The navigation bar in the system is responsive, animated and awesome. Different user will have different navigation bar. Patient will have one more feature which is “PRESCRIPTION” feature. The Figure 4.25 and Figure 4.26 is shown in Figure below.

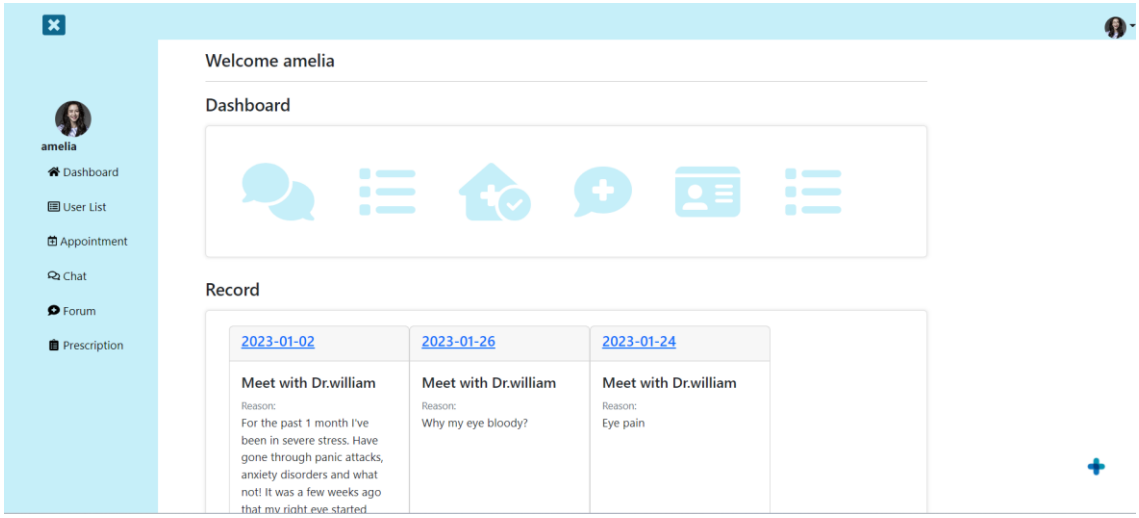


Figure 4.25 Navigation Bar on the Website

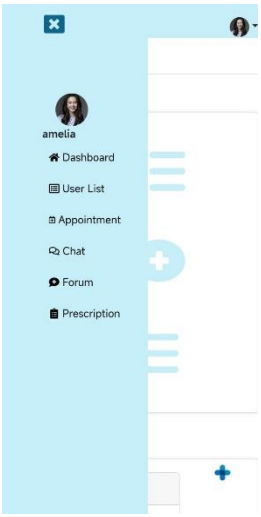


Figure 4.26 Navigation bar on the Mobile Responsive Website

The Figures below represent all the user list. Each authorization user will display at this page. Both Doctor and Patient will display the same amount of user. The only different is Doctor can view all the detail information of users listed at this page including doctor and patient for further treatment purpose while Patient is restricted to view at other patient detail information for security purpose. Figure 4.27 and Figure 4.28 display the user list page of Doctor in website and mobile responsive website respectively while Figure 4.29 and Figure 4.30 represent the user list page of Patient in website and mobile responsive website. As shown as the Figure 4.29 and Figure 4.30, the other patient will be indicated as black colour and are not able to click to protect patient stole the other patient's privacy data.

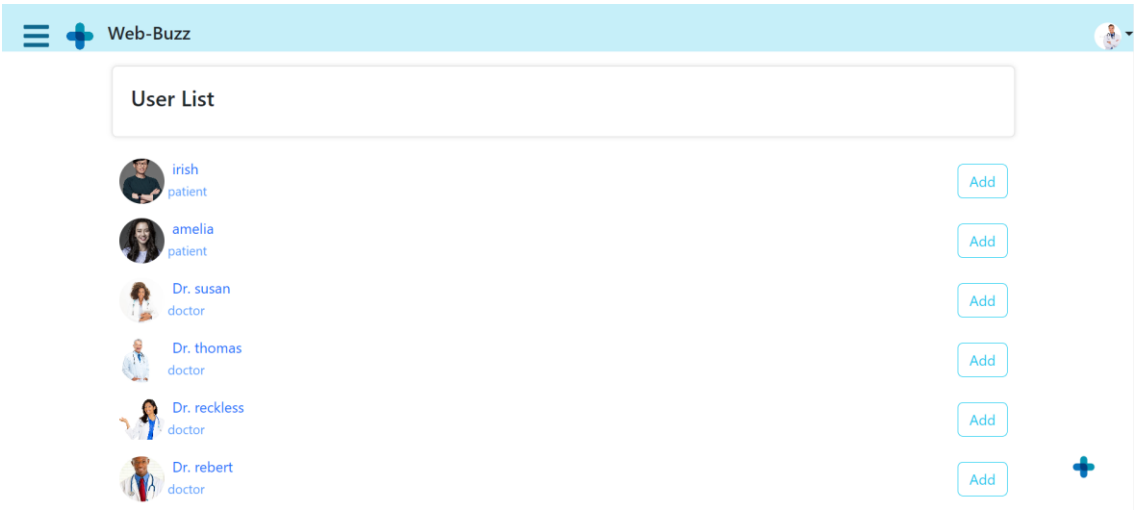


Figure 4.27 User List Page of Doctor in Website

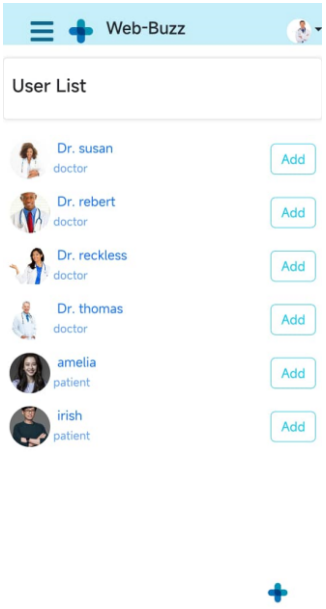


Figure 4.28 User List Page of Doctor in Mobile Responsive Website

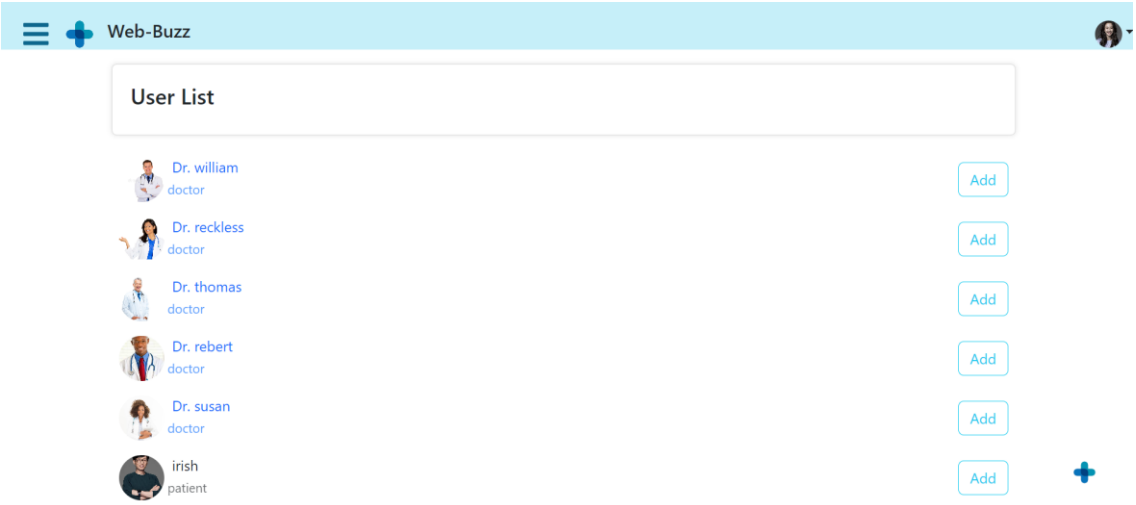


Figure 4.29 User List Page of Patient in Website

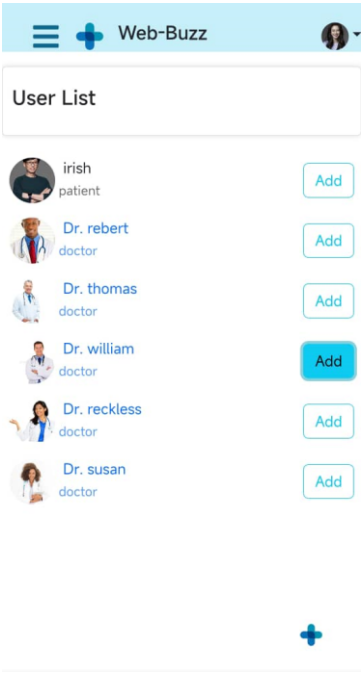


Figure 4.30 User List Page of Patient in Mobile Responsive Website

At above user list page, patients are able to book appointment with the particular doctor by clicking the name as indicated as blue colour. The detail information of the doctor will appear along with the “ADD” button and “BOOKING” button. The function of “ADD” function is used to add the user as contact so user can interact with each other in Chat and visible in Forum. Next, the purpose of “BOOKING” button is used to book appointment with the particular doctor as shown as the Figure 4.31 and Figure 4.32.

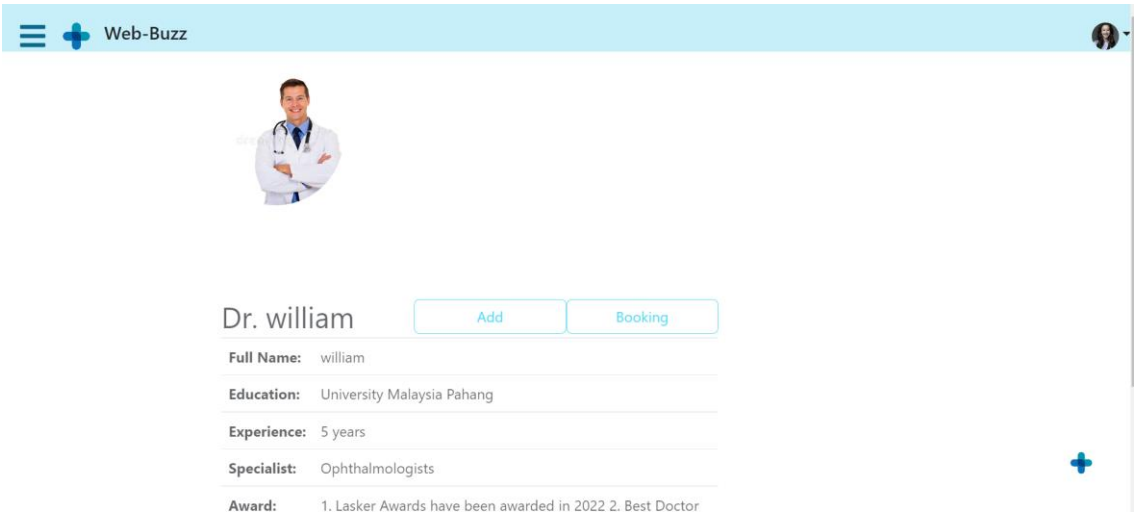


Figure 4.31 Example of Chosen Selected Doctor in Website

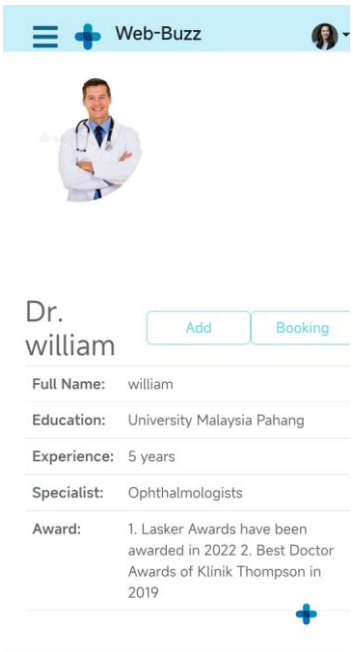


Figure 4.32 Example of Chosen Selected Doctor in Mobile Responsive Website

Patient able to book with doctor by clicking the “BOOKING” button. Figures below is the booking page with doctor. There have several questions need to be filled in. After finished the form, click the “BOOKING” button located at the middle bottom as shown as Figure 4.33 and Figure 4.34.

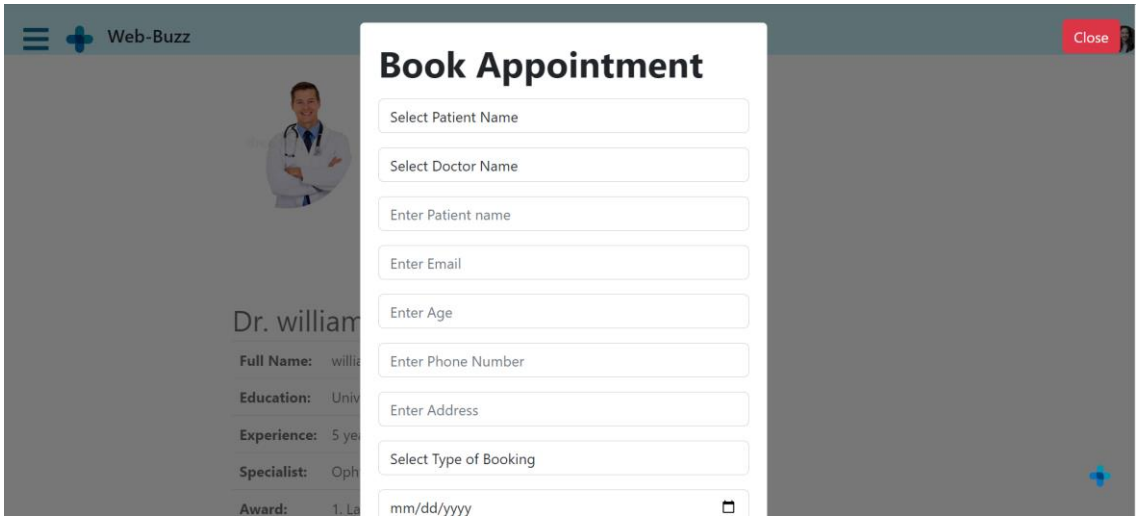


Figure 4.33 Booking page for Patient in Website

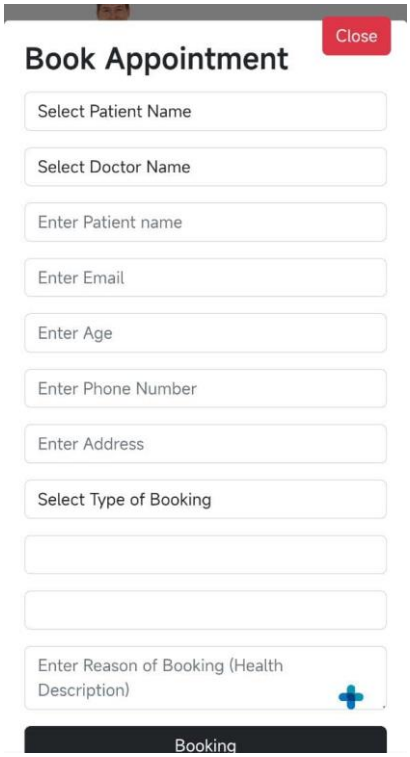


Figure 4.34 Booking page for Doctor in Mobile Responsive Website

After Booking successfully, Doctor will receive the appointment in their appointment list. Doctor able to view back the detail of appointment by clicking the "VIEW" button as shown as Figure 4.35 and Figure 4.36 below. At the same time, Doctor have the permission to "APPROVE" and "REJECT" the appointment as shown as Figure 4.37 and Figure 4.38.

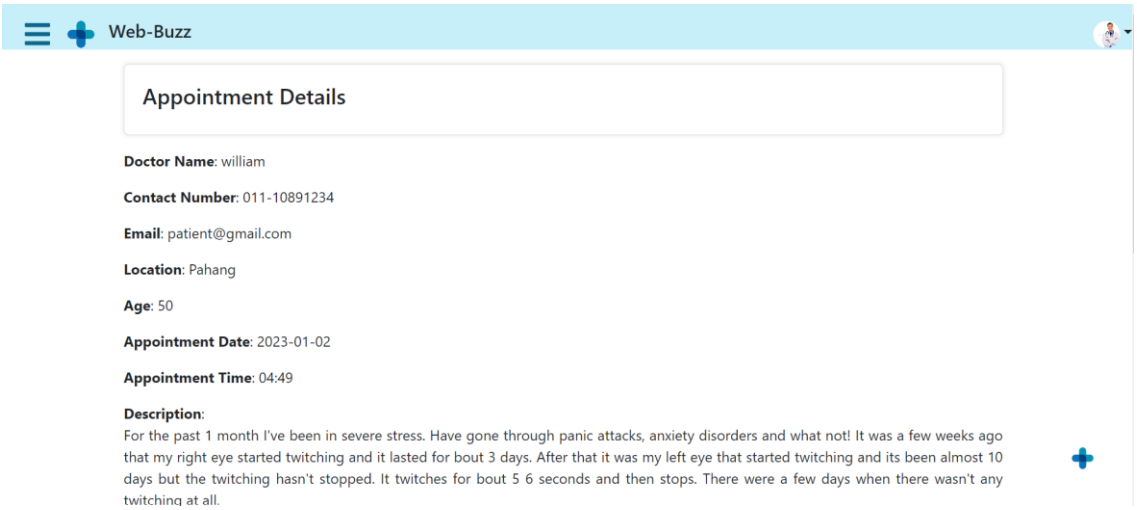


Figure 4.35 Detail Information of Appointment in Website

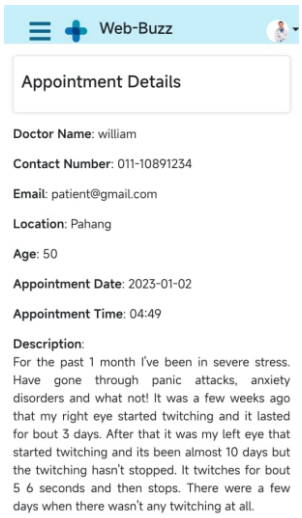


Figure 4.36 Detail Information of Appointment in Mobile Responsive Website

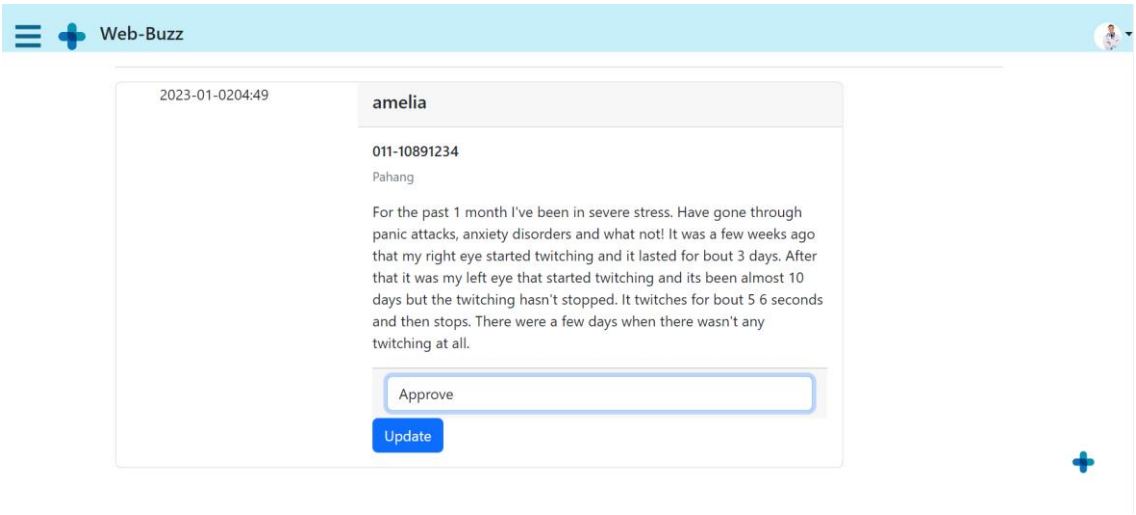


Figure 4.37 Appointment's Status in Website

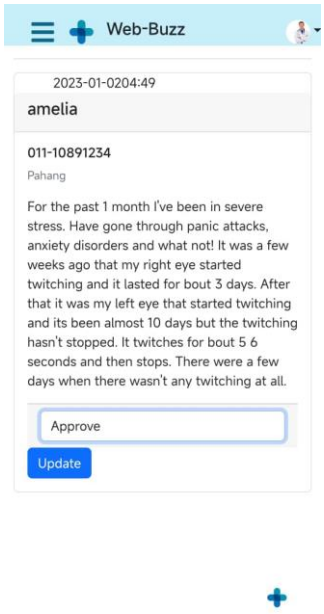


Figure 4.38 Appointment's Status in Mobile Responsive Website

After Doctor Approve the appointment, the "APPLY" button will change to "ADD" button for doctor to add the prescription to the patient as shown as Figure 4.39 below. Then, it will change to SUCCESS with a unclick text "SUCCESS" after doctor "ADD" the diagnosis to the particular patient as shown as Figure 4.40 and Figure 4.41 below.

Name	Phone	Email	Date	Time	Action	Status
amelia	011-10891234	patient@gmail.com	2023-01-02	04:49	View	Add

Figure 4.39 Example of Appointment's Progress in Website

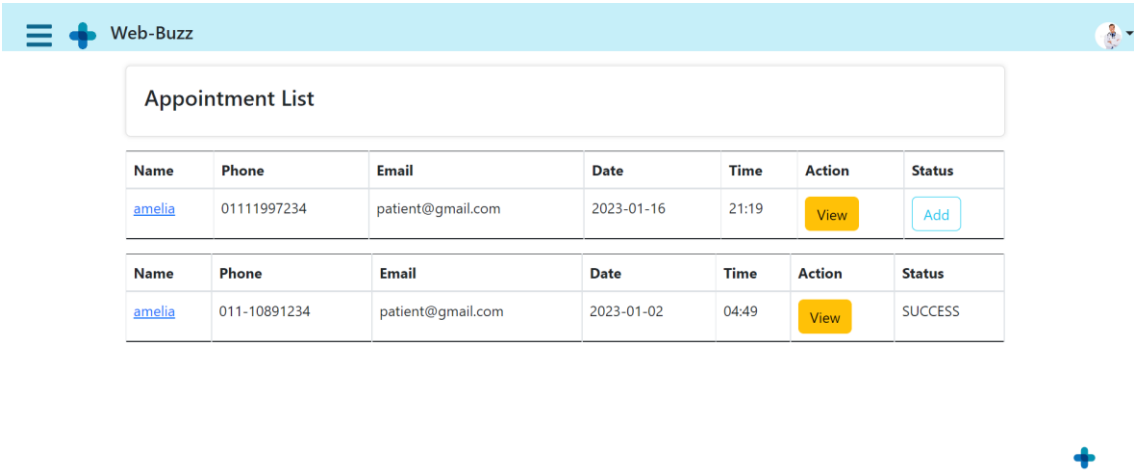


Figure 4.40 Example of Appointment's Progress in Website

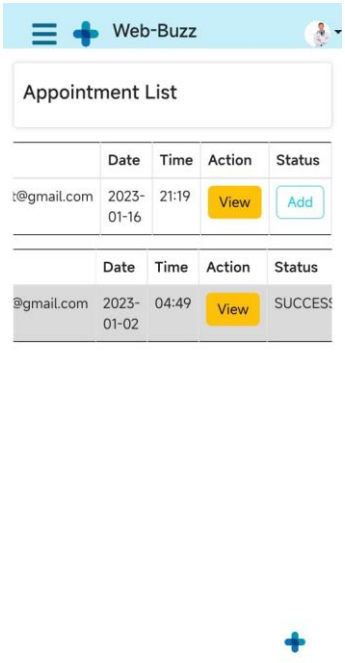


Figure 4.41 Example of Appointment's Progress in Mobile Responsive Website

From the perspective of the Patient, they can look through the full booking record in the table list, which is totally different from the Home Page since there is a limit of 4 on the home page. Not only that, Patients are able to “VIEW”, “EDIT”, and “DELETE” the appointment that they made before as shown in Figure 4.42 and Figure 4.43 below. The status will change with the approval of the Doctor. There have 3 stages of status. When the Patient first time booked an appointment, the status displayed as “PENDING” as shown in Figure 4.44 below. After the Doctor approves the appointment, the status will change from “PENDING” to “APPROVE” as shown in Figure 4.45 below. However, if the Doctor rejects the appointment, the status will change from “PENDING” to “REJECT” as shown in Figure 4.46 below. The last stage is the “SUCCESS” stage, which is the stage after the Doctor meets with the Patient and writes the prescription for the Patient, the status will change from “APPROVE” to “SUCCESS” as shown in Figure 4.47 below.

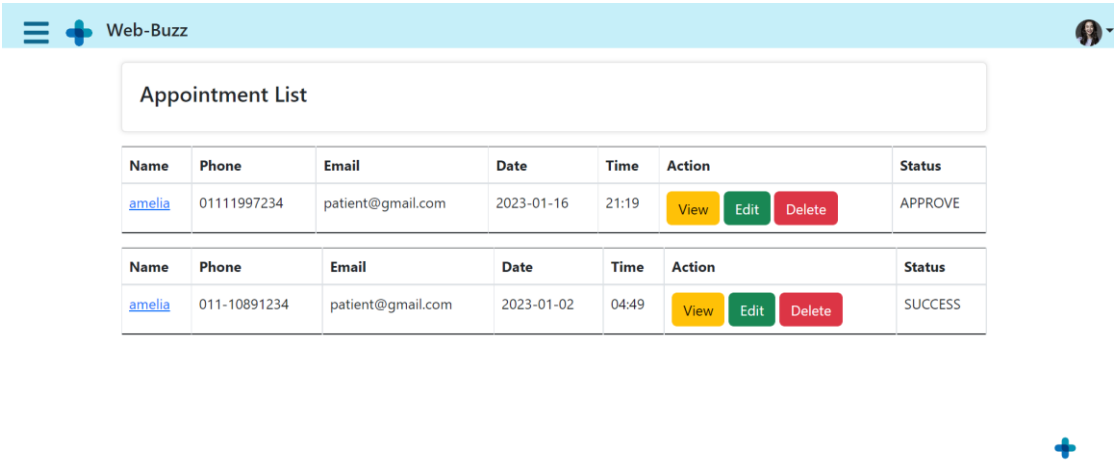


Figure 4.42 Appointment List of Patients on the Website

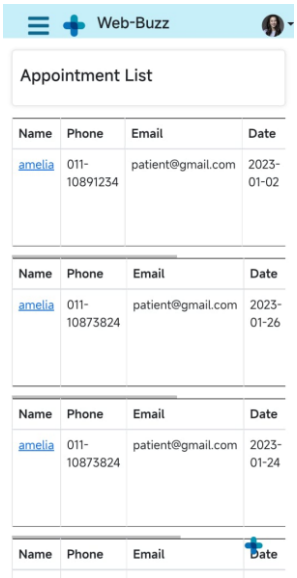


Figure 4.43 Appointment List of Patients on the Mobile Responsive Website

Name	Phone	Email	Date	Time	Action	Status
amelia	011-10873824	patient@gmail.com	2023-01-26	03:14	View Edit Delete	PENDING

Figure 4.44 Example of "PENDING" status

Name	Phone	Email	Date	Time	Action	Status
amelia	011-10873824	patient@gmail.com	2023-01-26	03:14	View Edit Delete	APPROVE

Figure 4.45 Example of "APPROVE" status

Name	Phone	Email	Date	Time	Action	Status
amelia	011-10873824	patient@gmail.com	2023-01-24	04:22	View Edit Delete	REJECT

Figure 4.46 Example of "REJECT" status

Name	Phone	Email	Date	Time	Action	Status
amelia	011-10873824	patient@gmail.com	2023-01-26	03:14	View Edit Delete	SUCCESS

Figure 4.47 Example of "SUCCESS" status

Going into detail in the Action column, there has 3 "Button" which are "VIEW", "EDIT" and "DELETE". At first, the "VIEW" button will direct the user to a new edit page. Patients can look deeper like what the information they filled in can have permission to "EDIT" and "DELETE" the appointment as shown in Figure 4.48 and Figure 4.49 below. Secondly, if the Patients click the "EDIT" button. The system will direct them to edit the page as shown in Figure 4.50 and Figure 4.51 below. Thirdly, the delete page will come out if the patient clicks the "DELETE" button. It will first direct the patient to a delete page for further thinking instead of directly deleting it for carelessness as shown in Figure 4.52 and Figure 4.53.

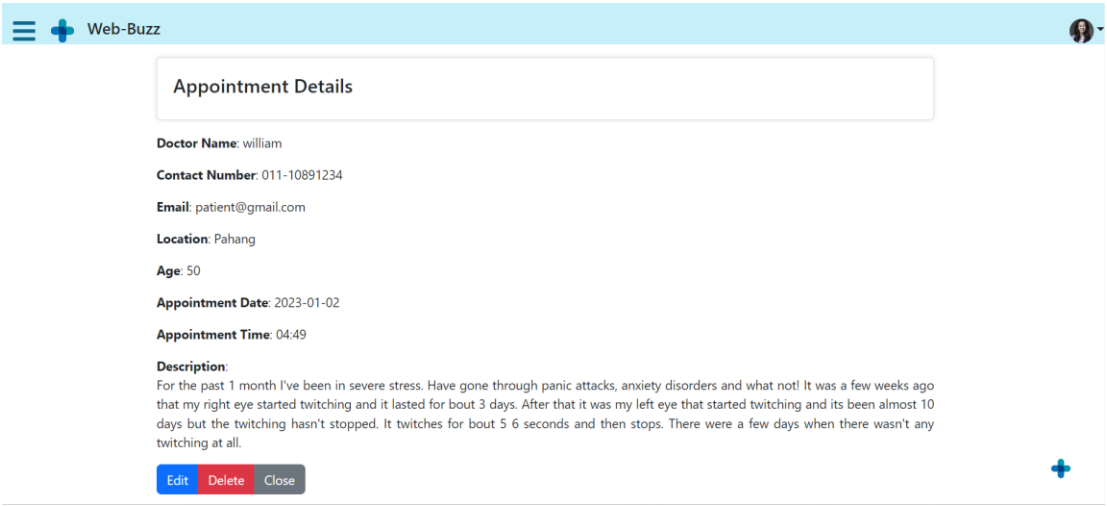


Figure 4.48 View Page of Patient on the Website

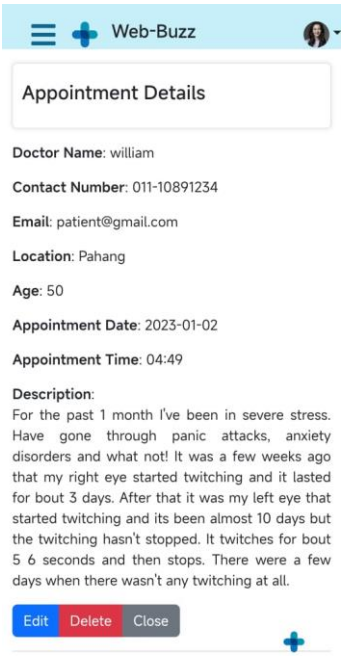


Figure 4.49 View Page of Patient on Mobile Responsive Website

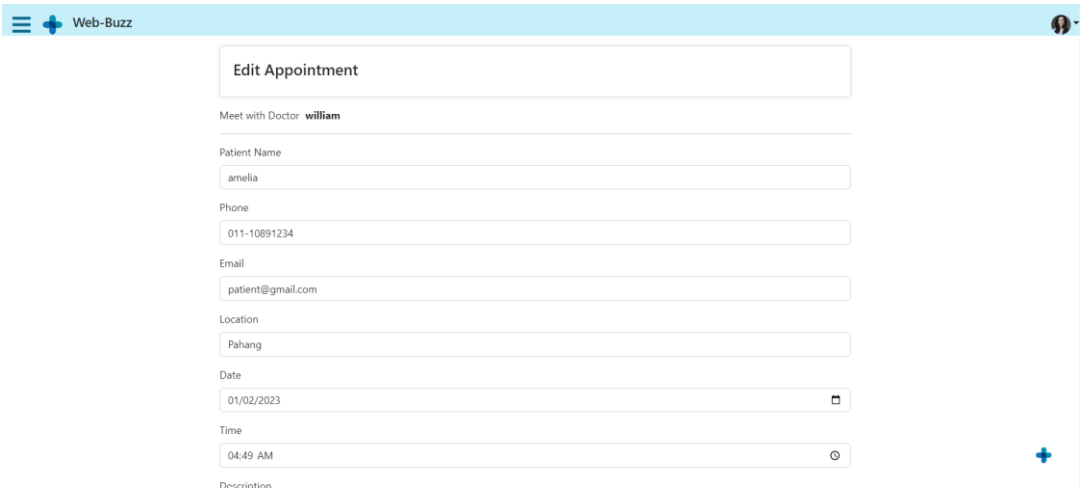


Figure 4.50 Edit Page of Patient on Website

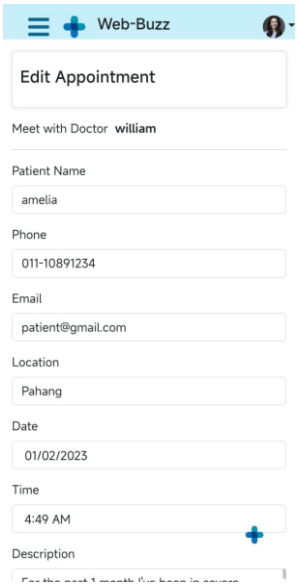


Figure 4.51 Edit Page of Patient on Mobile Responsive Website

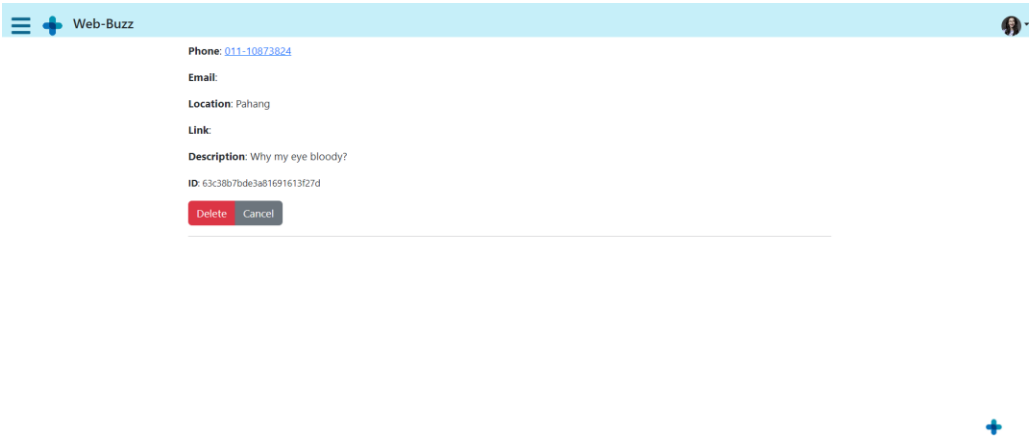


Figure 4.52 Delete Page of Patient on Website

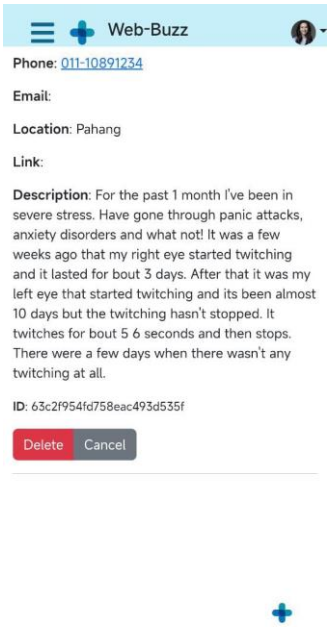


Figure 4.53 Delete Page of Patient on Mobile Responsive Website

Back to the left navigation bar, the next touchpoint is "CHAT". It is the communication feature for Doctors and Patients to have a consultation. The left side will display a search function while the right side will represent the Logo of this web-buzz application along with a "Your Health is Our Priority" text. The search function on the left side will filter all the keywords that the user enters and match the keyword with the user's database. Both Doctor and Patient have the same view here. If there have usernames consisting of the letter "a", it will display them as shown in Figures 4.54, 4.55, and 4.56 below.

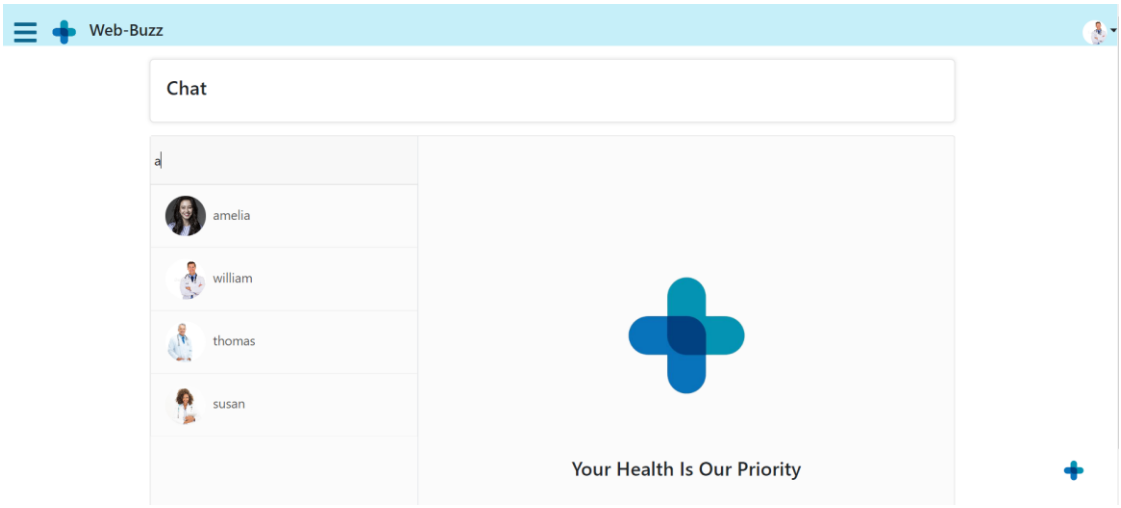


Figure 4.54 Chat Page on the Website

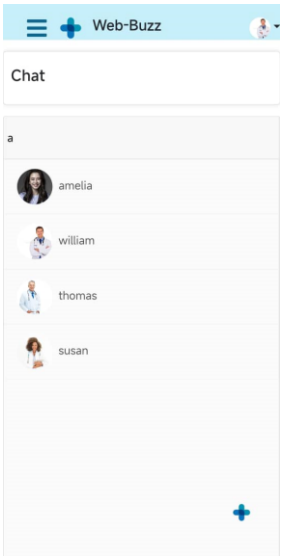


Figure 4.55 Chat Page on Mobile Responsive Website

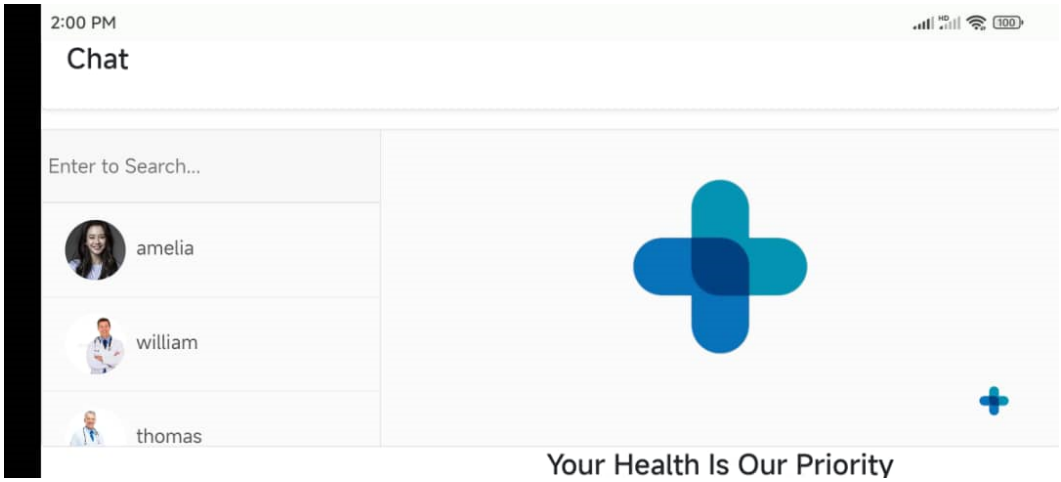


Figure 4.56 Chat Page on Mobile Responsive Website in Horizontal

From the perspective of the Doctor, the Doctor has permission to choose a way to either a phone call, video call, or chat with the patient. The left side of this page is the search function for doctors to search for the username of the patient. From the perspective view of the Patient, the Patient is not given permission to video call and phone call with Doctor privately in order to protect the freedom and security of the doctor. However, Patients can receive calls from doctors. Besides, the Web-Buzz application also provides picture messaging allowing patient and doctor's communication to be precise and specific and evoke authentic engagement. Figure 4.57 and Figure 4.58 represent the Chat page for the Doctor while Figure 4.59 and Figure 4.60 represent the Chat Page for the Patient.

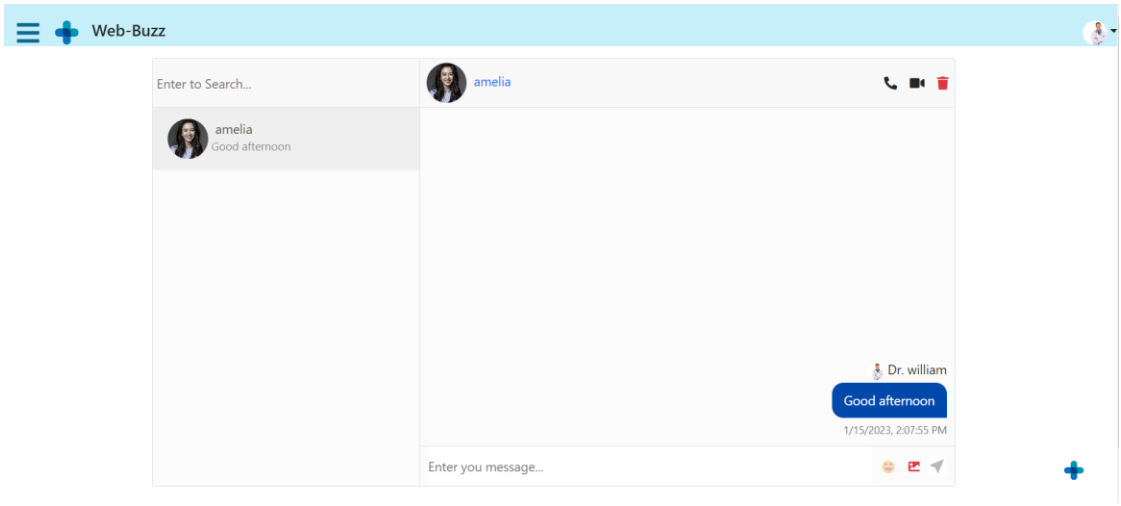


Figure 4.57 Chat Page for Doctor on the Website

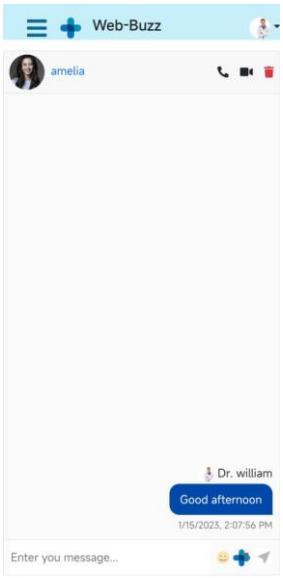


Figure 4.58 Chat Page for Doctor on the Mobile Responsive Website

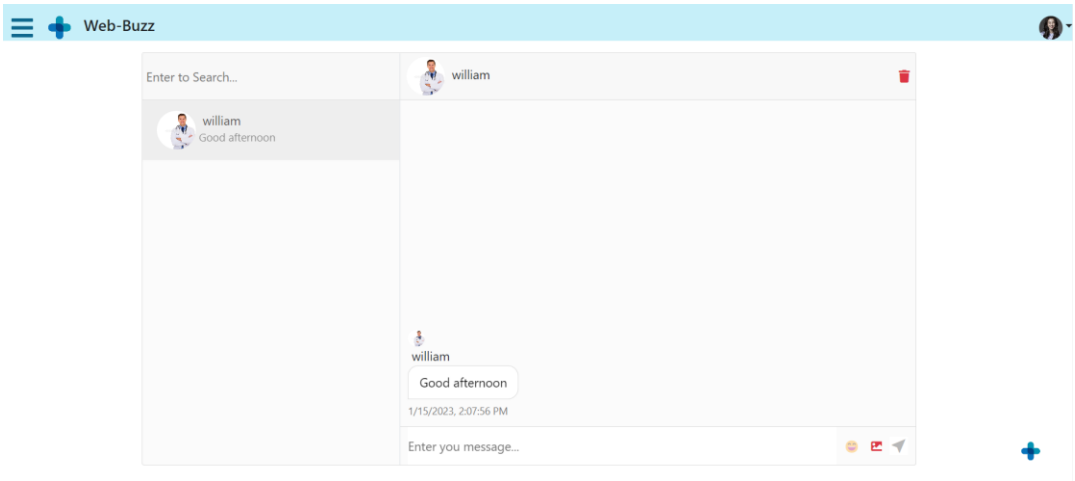


Figure 4.59 Chat Page for Patient on the Website

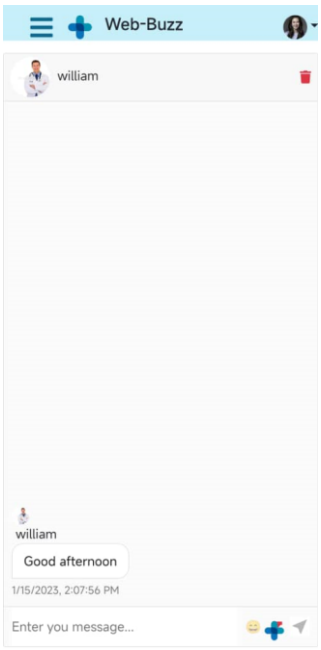


Figure 4.60 Chat Page for Patient on the Mobile Responsive Website

Going deeper on the chat page, when the doctor clicks the video call icon. A blue screen will be appearing on both doctor's and the patient's screens. The difference is on the patient's page, it can decide to reject or accept the video call. The same square screen will display the information that lets the users know who is calling them. It will pop out a screen to notify the user. Figure 4.61 represent the Doctor calling on Website the user while Figure 4.62 represent the Receiving call on Mobile Responsive Website

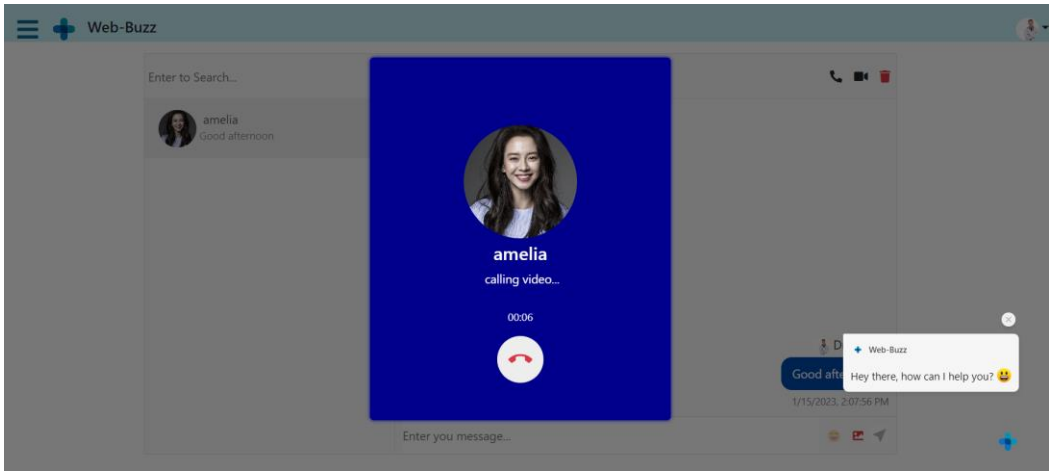


Figure 4.61 Doctor Calling the Patient on the Website

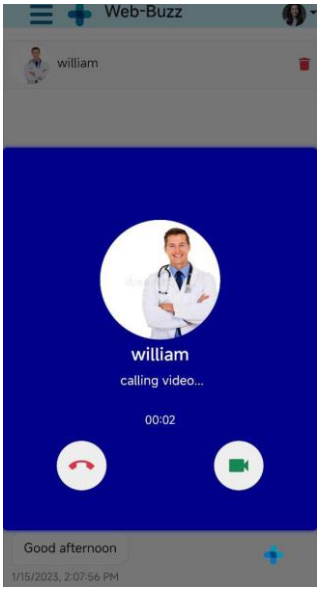


Figure 4.62 Patient Receiving Call on Mobile Responsive Website

After the Patient accepts the call, the sender will display a small screen at the right top while the receiver will display a large screen in the middle. The sender and receiver will change based on who is calling and who is receiving the calling. The icon at the bottom end is the end video call icon. The end video call will end directly when the user clicks the end call icon. Figure 4.63 shows the calling environment on the website while Figure 4.64 shows the calling environment on Mobile Responsive Website.

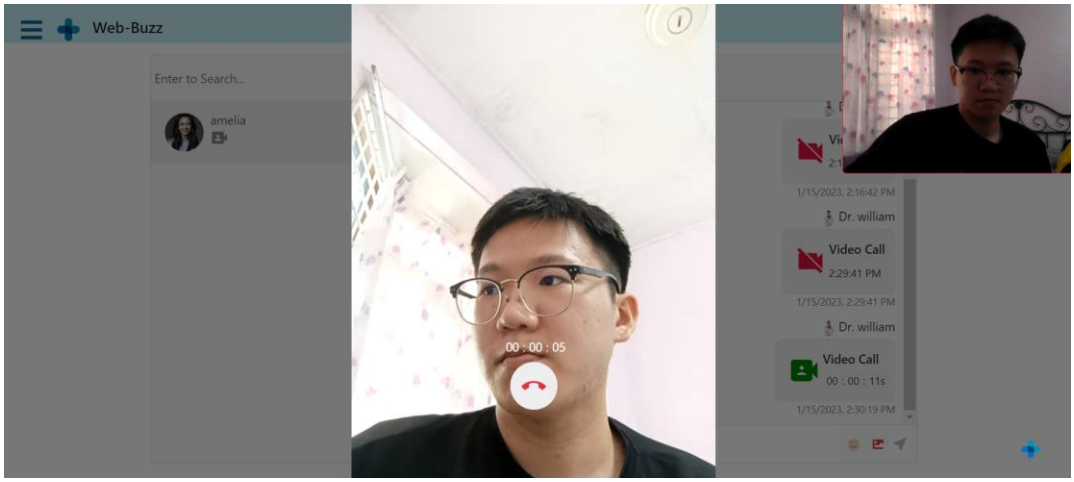


Figure 4.63 Example of a video call on the Website

Figure 4.64 Example of a video call on the Mobile Responsive Website

The figures below are the phone call feature. As usual, the same blue screen will appear along with information like time counting, username, and functional icon. After the Patient accepts the phone call, a pop-out screen along with the call duration and end call icon will display. Figure 4.65 represent the phone call on the Website while Figure 4.66 represent the phone call on the Mobile Responsive Website.

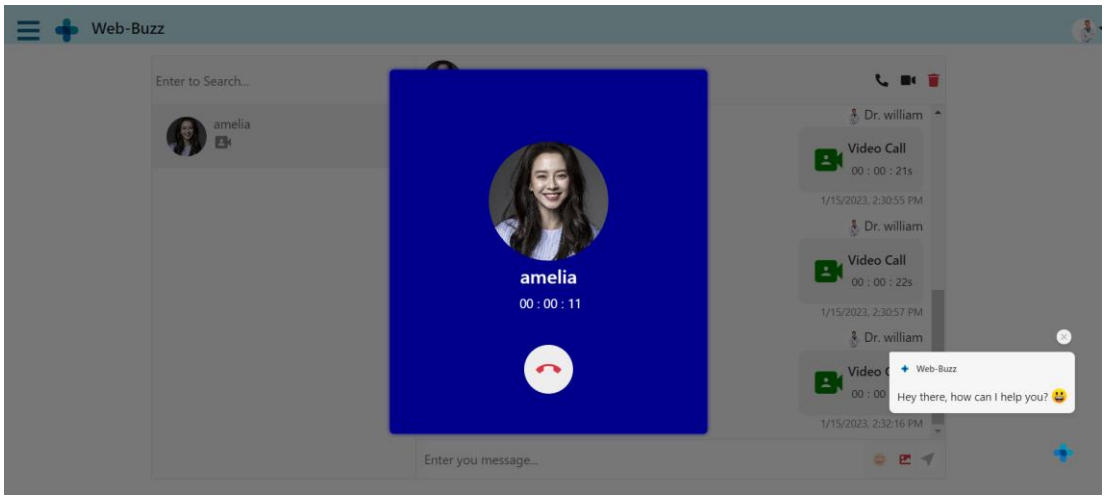


Figure 4.65 Sample of Phone Call on the Website

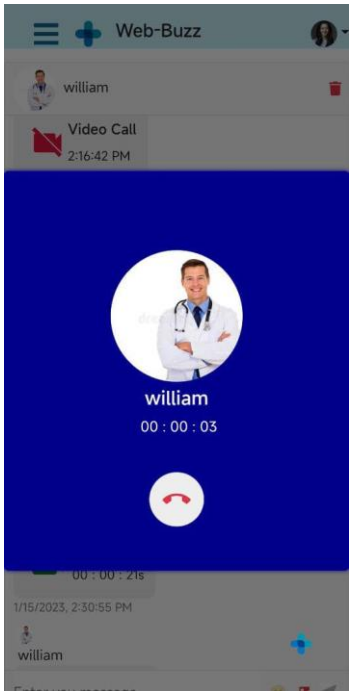


Figure 4.66 Sample of Phone Call on Mobile Responsive Website

After the call either video or phone ends, the web-buzz application will be calculated the time they spend and automatically display it in the chat box as shown in Figure 4.67 below.

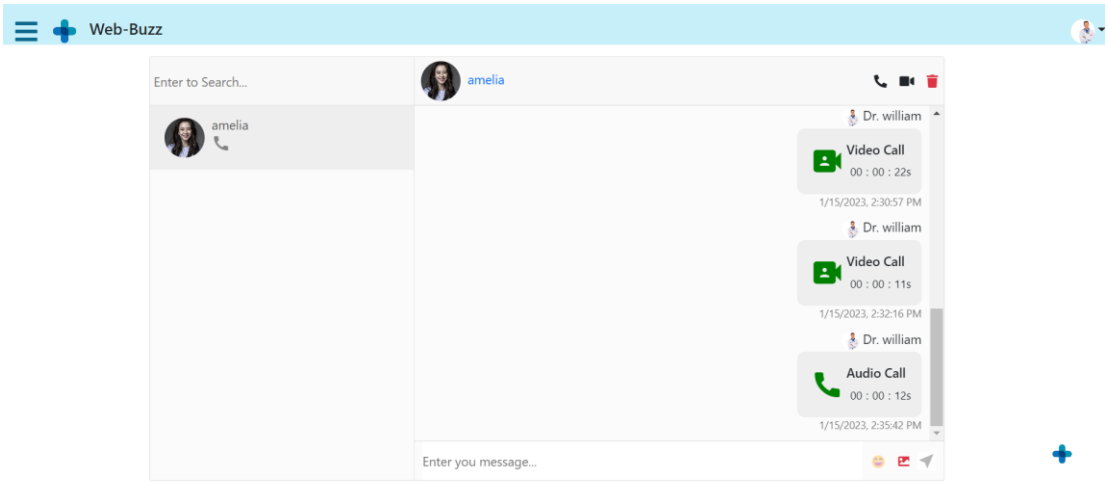


Figure 4.67 History of Calling

The figures below are the forum feature. If there is not any forum occur, it will mention “No Question” there, at the same time, Patients have permission to ask any question while Doctor doctors only can answer the question as shown in Figure 4.68 and Figure 4.69 below. To protect the privileged information of all users, the name and profile picture will display as unknown in other users’ view as shown in Figure 4.70 below.

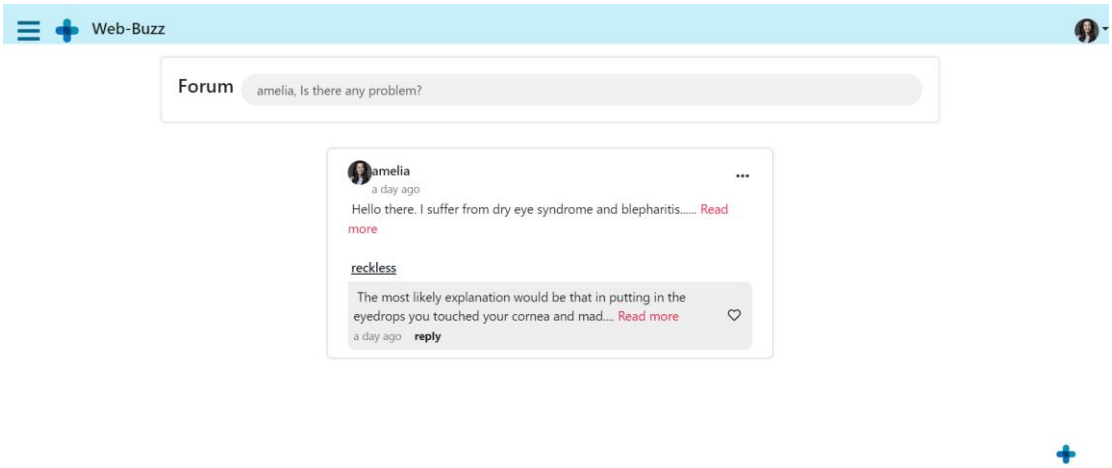


Figure 4.68 Example Forum Page of Patient on the Website

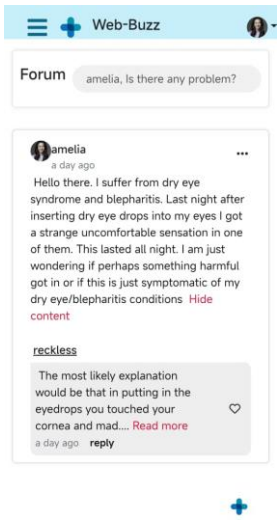


Figure 4.69 Forum Page of Patient on the Mobile Responsive Website

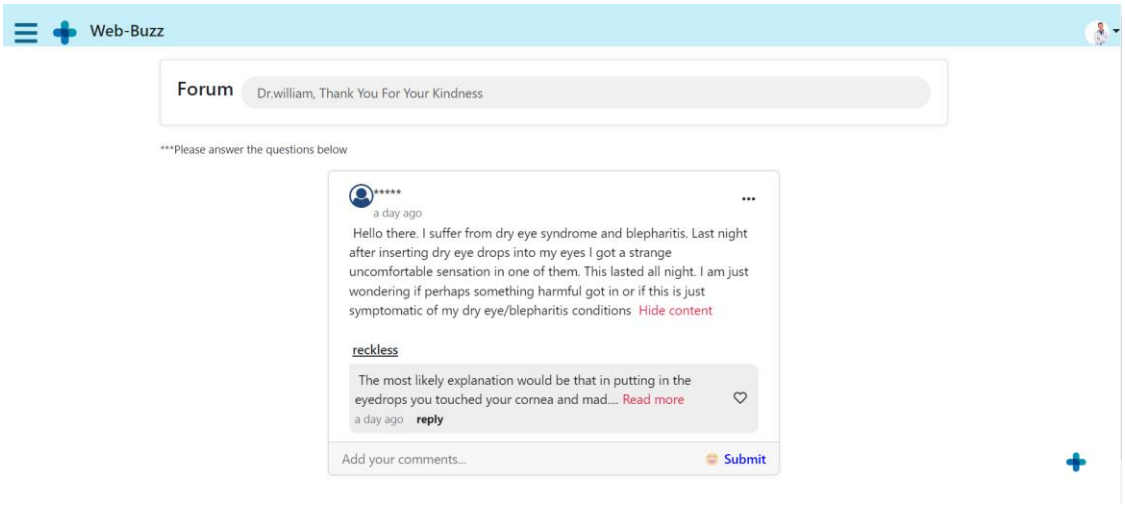


Figure 4.70 Forum on the Mobile Responsive Website

From the perspective of the Patient, the patient can create a question by clicking the grey button at the top. A pop-out screen with camera and gallery icons will appear. Patients can choose to upload multiple pictures with a camera function or photo gallery. After clicking the camera, a box with the current view will appear, and the patient needs to click the capture button to capture the photo as shown in Figure 4.71 and Figure 4.72 below. On the other hand, the Patient can upload photos as shown in Figure 4.73 below. After the patient post the question along with the photo, the forum will be shown in Figure 4.74 and Figure 4.75 below. However, Doctor is not allowed to ask any questions.

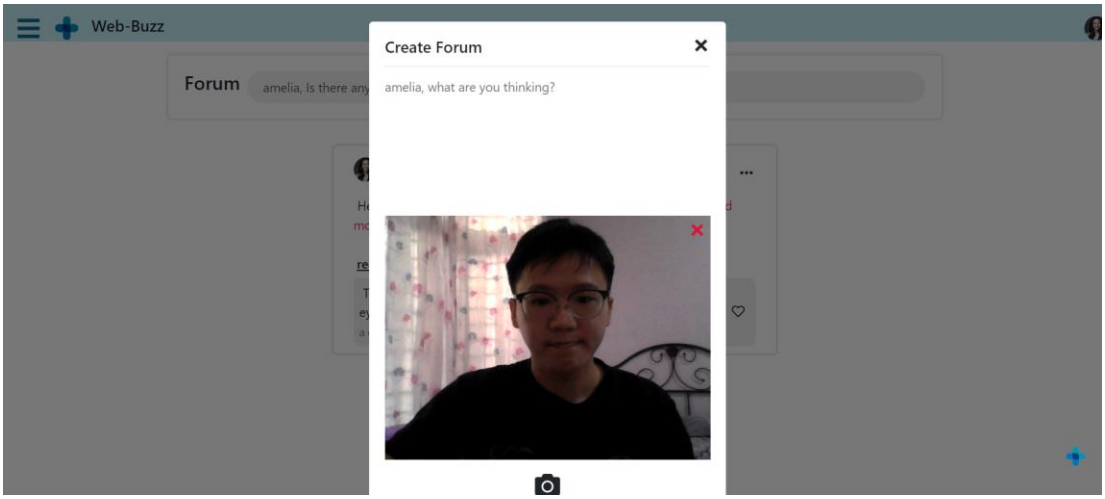


Figure 4.71 Example of Camera function in Forum on the Website

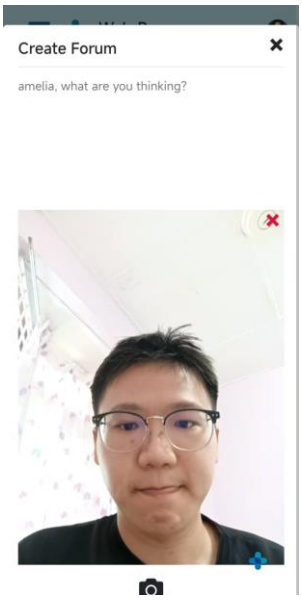


Figure 4.72 Example of Camera function in Forum on the Mobile Responsive Website

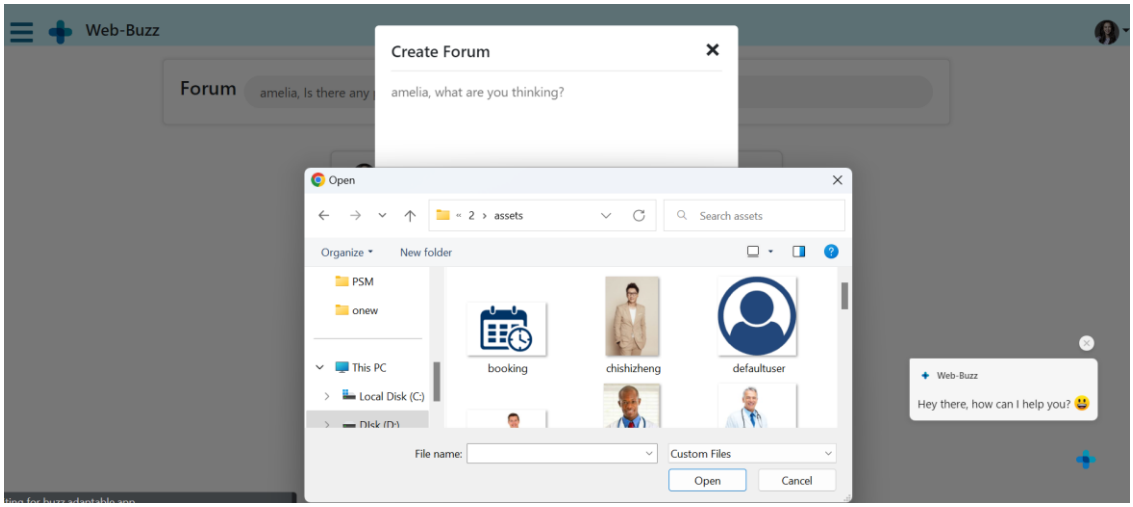


Figure 4.73 Example of Upload function in Forum on the Website

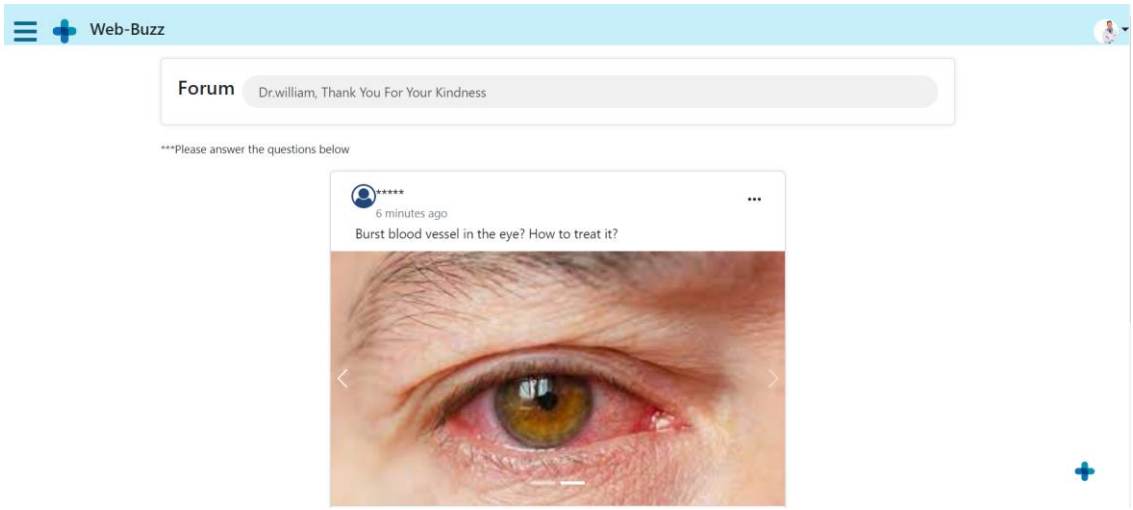


Figure 4.74 Example of in Forum on the Website

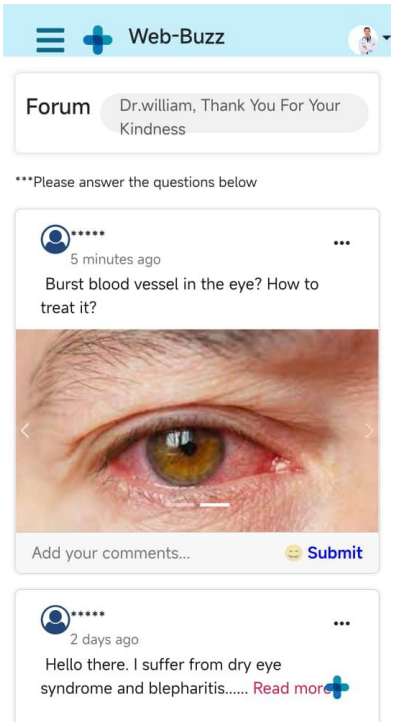


Figure 4.75 Example of in Forum on the Mobile Responsive Website

The figures below represent the description page on the patient's side. After the Doctor "ADD" the prescription to the Patient, detailed information about that prescription will display in the list. Patients are able to look back at the details of all the things and also the diagnosis that the doctor recommended as shown in Figures 4.76 and 4.77 below.

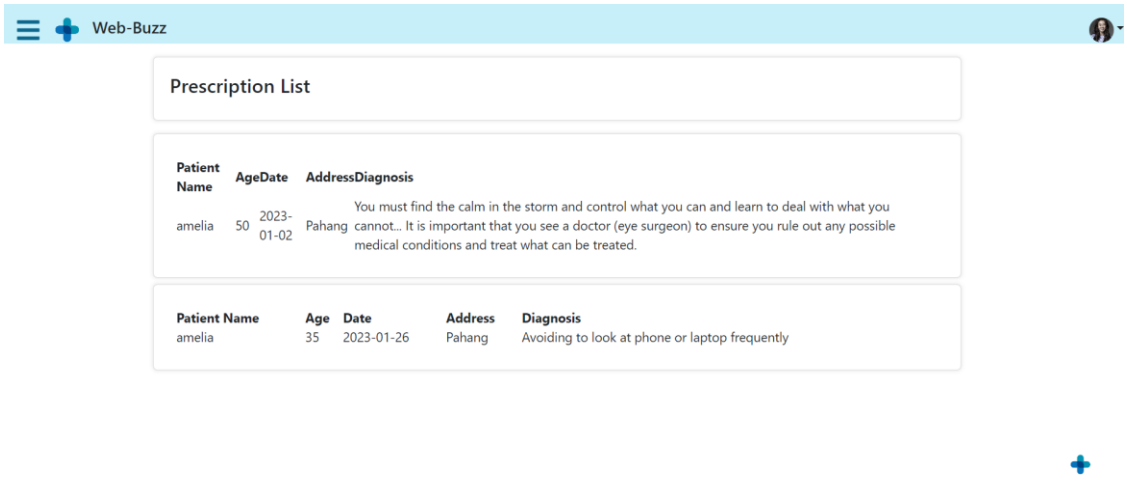


Figure 4.76 Prescription List of Patient on the Website

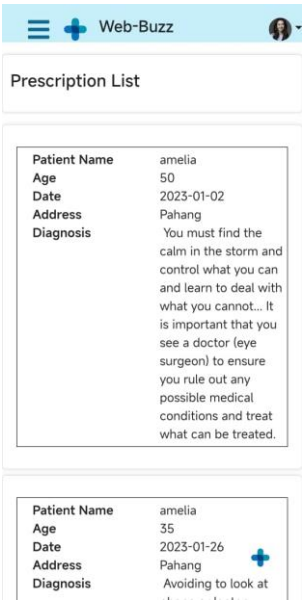


Figure 4.77 Prescription List of Patient on the Mobile Responsive Website

Chatbot feature is implemented to bring convenience to the user. To avoid the unfamiliar user interacting with this website, the chatbot will pop out the feature in button to let customers understandable this web-buzz application (Figure 4.78, Figure 4.79). For example, if the patient tends to book an appointment with the doctor. However, the navigation bar does not have the booking sector. Therefore, patients can get the idea from the chatbot (Figure 4.80). Besides, patients can learn and understand more about the strabismus through this chatbot by clicking the other button (Figure 4.81). Moreover, patients can also choose to drop an email to the admin of the hospital by clicking the "Drop an Email" button (Figure 4.82). After submitting the request form, the email will send to the admin as shown in Figure 4.83 below.

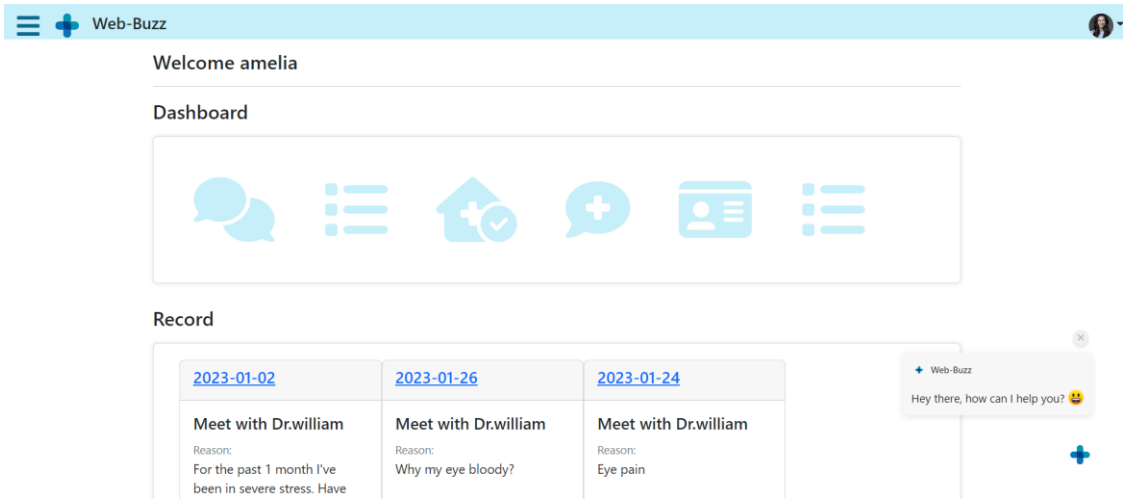


Figure 4.78 Chatbot Pop-Out Feature

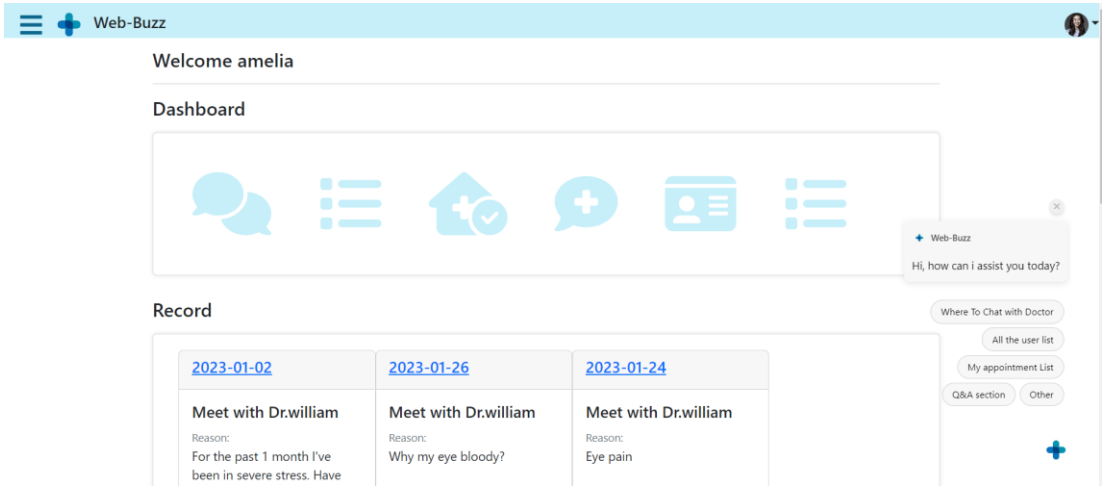


Figure 4.79 Chatbot Pop-Out Feature with Buttons

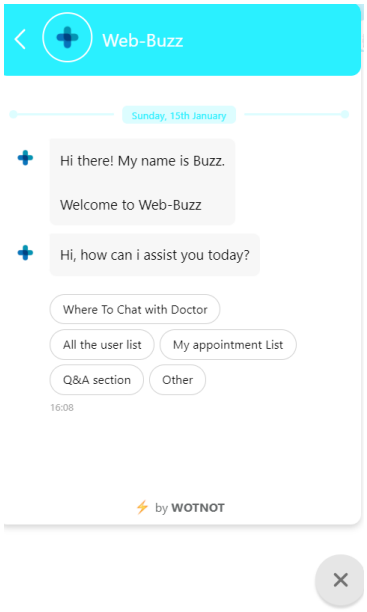


Figure 4.80 Example of Chatbot

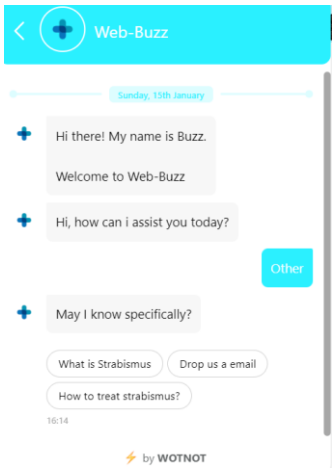


Figure 4.81 Advanced Question in Chatbot

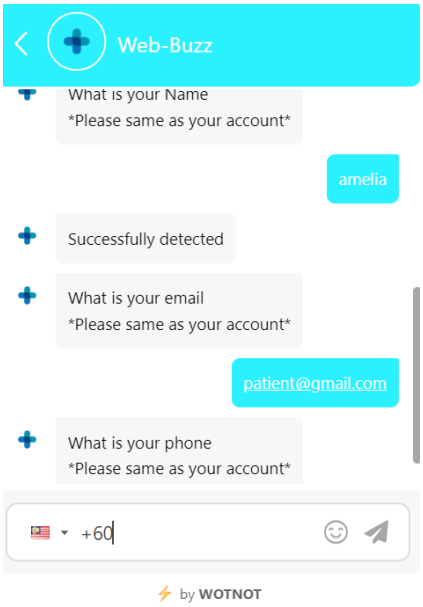


Figure 4.82 Example of Drop Email Feature in Chatbot

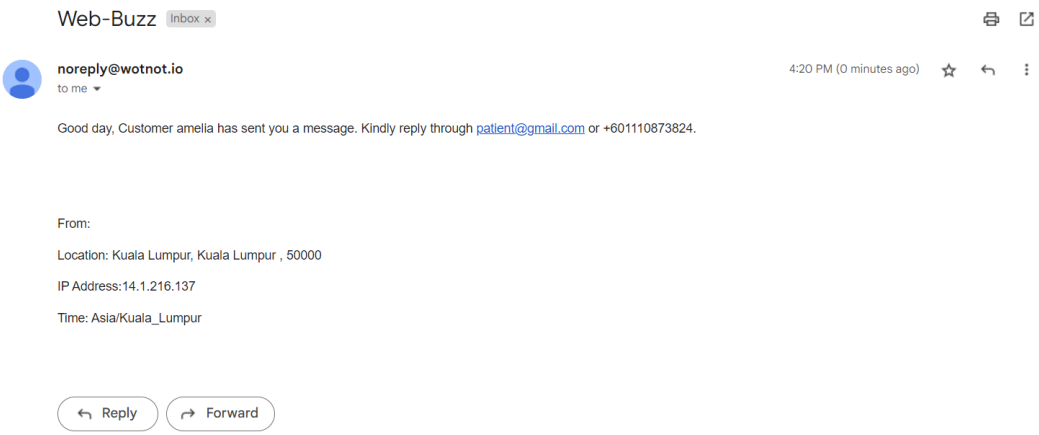


Figure 4.83 Example of Received Email from Patient on Admin Side

4.4 Implementation works behind the application

The chatbot in this web-based application is integrated using WotNot (Figure 4.84). It is Menu/ button-based Chatbot. This chatbot is glorified decision tree hierarchies that are presented to the user in the form of buttons. It is like the automated phone menus we all deal with on a regular basis, demanding the user to make many choices in order to get to the ultimate response. In this chatbot, I design the necessary buttons that are suitable for web-buzz web application such as FORM, EMAIL, FORM, and so on. Besides, this chatbot is required online to perform. In short, it means that I need to deploy my web-buzz application to the server therefore I can use this chatbot. In order to apply this chatbot to the website, I need to implement the script to my coding as shown in Figure 4.85 below.

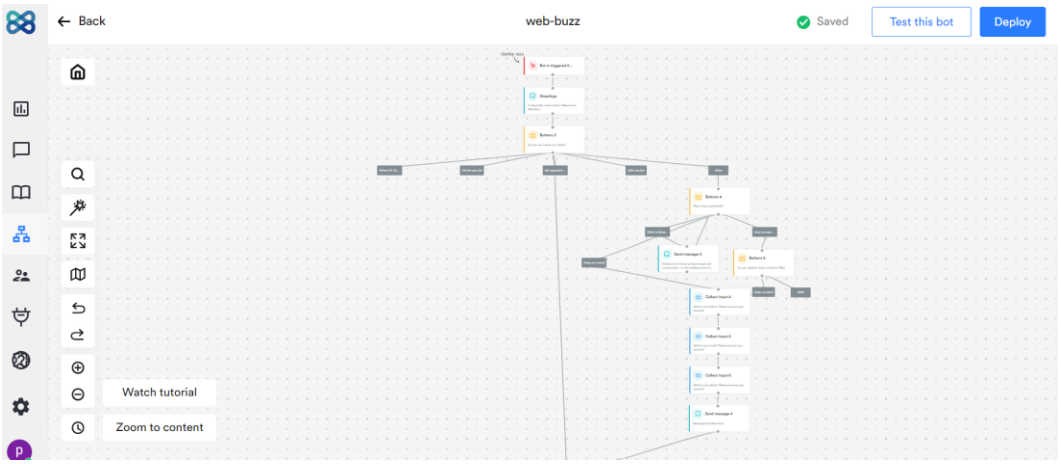


Figure 4.84 Designing the Chatbot

```
    <script src="https://cdn.jsdelivr.net/npm/popper.js@1.16.1/dist/umd/popper.min.js"></script>
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@4.5.3/dist/js/bootstrap.min.js"></script>

    <link
      href="https://fonts.googleapis.com/icon?family=Material+Icons"
      rel="stylesheet"
    />
    <link
      href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.2/css/all.min.css"
      rel="stylesheet"
    />

    <title>Web-Buzz</title>
  </head>
  <body>
    <script> const socket = io();</script>
    <noscript>You need to enable JavaScript to run this app.</noscript>
    <div id="root"></div>
    <script src="https://app.wotnot.io/chat-widget/8DyLtkxNmPF4174546395618vBm3YIKt.js" defer></script>
  </body>
</html>
```

Figure 4.85 Implemented script on coding

4.5 Testing Report (UAT)

Testing will be performed based on the Agile process once the application has been created to find any errors or defects. User Acceptance Testing (UAT) will be used for the evaluations by Doctor at Pusat Kesihatan University Malaysia Pahang. The goal of the testing is to guarantee that the delivered application satisfies the specifications given in the UAT form.

Each test case is planned and built in accordance with the interfaces in the web-buzz vision consultation application, and the functionalities, text fields, buttons, data presented, and so on have been thoroughly tested for each interface. The test cases are shown in the following table.

Table 4.2 Test case Switch Tab Interface

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
T001	Go to login tab	Click "Login" tab	Switch to login tab and display login interface correctly	User switch to login tab interface and display login interface correctly	Pass	-
T002	Go to register tab	Click "Register" tab	Switch to register tab and display it correctly	User switch to register tab interface and the interface display correctly	Pass	-

Table 4.3 Test Case Register Account

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
R001	Check empty input value for email address	Click "REGISTER" button without input any value into text field for email address	Display error message "Please add your email"	Error message "Please add your email" displayed correctly	Pass	-
R002	Check empty input value for full name	Click "REGISTER" button without input any value into text field for full name	Display error message "Please add your full name"	Error message "Please add your full name" displayed correctly	Pass	-
R003	Check empty input value for password	Click "REGISTER" button without input any value into text field for password	Display error message "Please add your password"	Error message "Please add your password" displayed correctly	Pass	-
R004	Check empty input value for confirm password	Click "REGISTER" button without input any value into text field for confirm password	Display error message "Confirm password did not match"	Error message "Confirm password did not match" displayed correctly	Pass	-

R005	Check invalid email	Input email without “@” and “.”	Display error message “Please include “@” in the email address”	Error message “Please include “@” in the email address displayed correctnly”	Pass	-
R006	Check email already exist	Input an email that had already used to register the account before	Display error “This email already exists”	Error message “This email already exists”	Pass	-
R007	Check incorrect format for password	Input password without at least 6 characters.	Display error “Password must be at least 6 characters	Error message “Password must be at least 6 characters.”	Pass	-
R008	Check inputted confirm password not same with the inputted password	Input conform password not same with inputted password	Display error message “Confirm password did not match”	Error message “Confirm password did not match”	Pass	-
R009	Register an account	Input full name, Email, password, confirm password, and role with correct format	Display message “Registration successfully” and redirect to login interface	Display message “Registration successfully” and redirect to login interface	Pass	-

		and inputted email has not been used before.				

Table 4.4 Test Case Login Account

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
L001	Check empty input value for email address	Click “Login” button without input any value into text field for email address	“Login” button unable to click	“Login” button unable to click	Pass	-
L002	Check empty input value for password	Click “Login” button without input any value into text field for password	“Login” button unable to click	“Login” button unable to click	Pass	-

L003	Check invalid email	Input email without “@” and “.”	Display error message “Please include “@” in the email address”	Error message “Please include “@” in the email address displayed correctly”	Pass	-
L004	Check email does not exist	Input an email that haven’t use to register the account before	Display error “This email does not exist”	Error message “This email does not exist”	Pass	-
L005	Check incorrect value for password	Input wrong password	Display error message “password is incorrect”	Error message “password is incorrect”	Pass	-
L006	Check incorrect role of user	Input wrong role of user	Display error message “User not authorized”	Error message “user not authorized’	Pass	-
L007	Check correct email address and password	Input Email, password, and role with correct format and click ”Login” button	Successfully log into the application and redirect to correct dashboard interface	User redirect to dashboard interface and the interface display correctly	Pass	-

Table 4.5 Test Case Dashboard Page

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
D001	Display welcome message "Welcome $username"	User successfully Login into the application	Display welcome message "Welcome $username"	Display welcome message "Welcome $username"	Pass	-
D002	Go to Chat interface	Click the Chat icon	Redirect to chat interface	User redirect to chat interface	Pass	-
D003	Go to user list interface	Click the User List icon	Redirect to user list interface	User redirect to user list interface	Pass	-
D004	Go to Appointment list interface	Click the Appointment list icon	Redirect to appointment list interface	User redirect to appointment list interface	Pass	-
D005	Go to Forum interface	Click the Forum icon	Redirect to Forum interface	User redirect to Forum interface	Pass	-
D006	Go to Profile interface	Click the Profile icon	Redirect to Profile interface	User redirect to profile interface	Pass	-
D007	For Patient, Go to Prescription interface	Click the Prescription icon	Redirect to Prescription interface	User redirect to Prescription interface	Pass	-
D008	For Patient, Display	Patient successfully	Display the Record made by patient	Display the record made by patient	Pass	-

	Booking record	login into application				
D009	For Patient, Go to the particular Booking record	Click the date link on the Booking record	Redirect to Appointment Details interface for that booking	Redirect to Appointment Details interface for that booking	Pass	-
D010	For Patient, Display the Location of the particular Hospital in Map	Patient successfully login into system	Display the location of the Hospital in Map	Display the location of the Hospital in Map	Pass	-
D011	For Doctor, Display the recent request appointment made by patient.	Doctor successfully login into application	Display the recent request appointment made by patient	Display the recent request appointment made by patient	Pass	-
D012	For Doctor, Go to the particular request appointment	Click the date link on the recent booking request	Redirect to the Approving Appointment interface	Redirect to the Approving Appointment interface	Pass	-
D013	Go to Chatbot	Click Chatbot icon located on right bottom	Pop-up automatic chatbot interface	Pop-up automatic chatbot interface	Pass	-

Table 4.6 Test Case Manage Profile

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
P001	Display user profile information	User click on the profile button on the drop-down menu	Display user profile	Display user profile	Pass	-
P002	Check functionality of Edit profile	Input mobile, address, identity card, and website and click “Save” button	Display “Update Success" Message and the value changed	Display “Update Success" Message and the value changed	Pass	-

Table 4.7 Test Case Dark Mode

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
M001	Check the functionality of Dark Mode	Click the Dark Mode button	The screen turns from white to dark mode	The screen turns from white to dark mode	Pass	-
M002	Check functionality	Click the light mode button	The screen turns from dark to white mode.	The screen turns from dark to white mode.	Pass	-

	of Light Mode					
M003	Check the colour contrast ratio suitability	Go to all interface to have a look	The dark mode displayed colour is awesome	The dark mode displayed colour is awesome	Pass	-

Table 4.8 Test Case Logout

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
O001	Logout account	Click the “Logout” button	Successfully Logout and redirect to login interface	Successfully Logout and redirect to login interface	Pass	-

Table 4.9 Test Case User List

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
U001	Display All user list	User click on the user list interface	Display All user list including patient and doctor	Display All user list including patient and doctor	Pass	-
U002	Add friend	Click the “ADD” button	“Add” button change to “UnAdd” button	“Add” button change to “UnAdd” button	Pass	-
U003	For Doctor, Go to all user’s profile card	Click the user’s name link	Redirect to the particular user profile card interface	Redirect to the particular user profile card interface	Pass	-
U004	For Patient, Go to Doctor’s profile card	Click the doctor’s name link	Redirect to doctor’s profile card interface	Redirect to doctor’s profile card interface	Pass	-
U005	Check Patient not able go to other patient’s profile card	Click the other patient’s name link	Not able to redirect to profile card	Not able to redirect to profile card	Pass	-

Table 4.10 Test Case Booking

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
B001	For Doctor, check no "Booking" button in other doctor's profile card	Click the doctor' name link in user list interface	Display only the "Add" button	Display only the "Add" button	Pass	-
B002	For Patient, check has "Booking" button in doctor's profile card.	Click the doctor' name link in user list interface	Display "Add" button and "Booking" button	Display "Add" button and "Booking" button	Pass	-
B003	For Patient, pop up Booking form	Click the "Booking" button in doctor's profile card interface	Pop up Booking form	Pop up Booking form	Pass	-
B004	For Patient, check correct patient id, doctor name, patient name, email, age, phone number,	Input patient id, doctor name, patient name, email, age, phone, number, address, type of booking, date, time, and reason of	Successfully booked into database and redirect to appointment page	Successfully booked into database and redirect to appointment page	Pass	-

	address, type of booking, date, time, and reason of booking.	booking correctly and click "Booking" button				

Table 4.11 Test Case Appointment List

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
A001	Display all appointment list	User click on the appointment list interface	Display All appointment list	Display All appointment list	Pass	-
A002	View Appointment	Click the “VIEW” button	Redirect to appointment detail interface	User direct go to appointment detail interface	Pass	-
A003	Edit Appointment	Click the “EDIT” button	Redirect to the edit appointment interface	User direct to the edit appointment interface	Pass	-
A004	For Patient, Delete Appointment	Click the “DELETE” button	Redirect to delete appointment interface	User direct to delete appointment interface	Pass	-

A005	For patient, Check the functionality of Manage appointment	Run the View, Edit, Delete process	Data can be viewed, changed, delete successfully	Appointment data can be viewed, changed, delete successfully	Pass	-
A006	For Doctor, Approve Appointment	Click the “APPROVE” button	Direct to Approve interface	Doctor Direct to Approve interface	Pass	-
A007	For Doctor, Reject Appointment	Click the” REJECT” button	Direct to Reject interface	User Direct to Reject interface	Pass	-
A008	For Doctor, Check the functionality of approve and reject appointment	Run the approve and reject process.	Status can be change from PENDING to APPROVE and PENDING to REJECT	Status can be change from PENDING to APPROVE and PENDING to REJECT	Pass	-
A009	For Doctor, Add prescription	Click the “Add” button	Direct to add prescription interface	User direct to add prescription interface	Pass	Recommend to add more progress of appointment.
A010	For Doctor, check the Add button appear after Doctor approve the appointment	Run the approve process	Display a “Add” button on the status column	Display a “Add” button on the status column	Pass	-

A011	For Doctor, Add button disappear after adding prescription successfully	Run the add prescription process	Nothing display on the status column	Nothing display on the status column	Pass	-

Table 4.12 Test Case Chat

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
C001	Search function	User enter user name in search box to find user	Display all the particular user with a letter that search	Display all the particular user with a letter that search	Pass	-
C002	Chat function	Enter text in text box and click the send icon	Display the message on other user's view	The user can receive the message	Pass	-
C003	Phone Call function	Click the phone call icon	Pop-up phone call screen and able to organise a phone call in real-time	Pop-out phone call screen and able to organise a phone call in real-time	Pass	-

C004	Video Call Function	Click the video call icon	Pop-up video screen and able to organise a video call in real-time	Pop-up video screen and able to organise a video call in real-time	Pass	-
C005	Check the functionality of end call and accept call in phone call and video call	Run the Phone call and Video call	Accept call and end call successfully	Accept call and end call successfully	Pass	-
C006	For Patient, cannot create phone and video call with doctor	Click the chat interface	No phone and video call icon appear	No phone and video call icon appear	Pass	-
C007	Delete conversation	Click the “Ok” button	The conversation is deleted	The conversation is deleted	Pass	-
C008	Delete conversation	Click the “cancel” button	The conversation data is not deleted	The conversation data is not deleted	Pass	-
C009	Check the functionality of chat with emotion icon	Click the emotion icon and pick favourite icon to send	Display emotion icon in chat box	Display emotion icon in chat box	Pass	-

C010	Check the functionality of sending picture in chat box.	Click the picture icon and upload favourite picture	Display the selected picture in chat box	Display the selected picture in chat box	Pass	-
C011	Check the timestamps	Send message in chat box	Display date and time correctly	Display date and time correctly	Pass	-

Table 4.13 Test Case Forum

Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
F001	For Patient, create forum	Click the "submit" button	Display a new forum	Display a new forum	Pass	-
F002	For Patient, edit forum	Click the "edit question" button	Display the corrected question in forum	Display the corrected question in forum	Pass	-
F003	For Patient, delete forum	Click the "remove question" button	The forum disappears in forum interface	The forum disappears in forum interface	Pass	-
F004	For Doctor, answer the question	Click the "add your comments" button	Display a comment in the particular forum	Display a comment in the particular forum	Pass	Recommend to add disclaimer

Table 4.14 Test Case Prescription

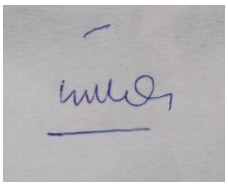
Test ID	Event	Test Data	Expected Result	Actual Result	Pass/Fail	Comment
E001	For Patient, view prescription	Click the prescription interface	Display all prescription record	Display all prescription record	Pass	-

4.6 System Design Approval

This part contains application design approval, which will be approved by the web-buzz vision consultation application's client.

Table 4.15 Sign by the client to verify the functionality of the application design

	Name	**Date**
 Developer	TANG XIN ZHE	17/1/2023

Approved by:   Client	DR. NORHILDA BINTI ABDUL KARIM pH: 016-4118204 email: vovhilda@ump.edu.my	17/1/2023

4.7 Coding

The language used for developing in Visual Studio Code are MERN stack. Frontend is Reactjs, Backend is Expressjs in Nodejs environment and MongoDB act as Database.

```
const Users = require("../models/userModel");
const bcrypt = require("bcrypt");
const jwt = require("jsonwebtoken");

const authCtrl = {
  register: async (req, res) => {
    try {
      const { fullname, username, email, password, position } = req.body;
      let newUserName = username.toLowerCase().replace(/ /g, "");

      const user_name = await Users.findOne({ username: newUserName });
      if (user_name)
        return res.status(400).json({ msg: "This user name already exists." });

      const user_email = await Users.findOne({ email });
      if (user_email)
        return res.status(400).json({ msg: "This email already exists." });

      if (password.length < 6)
        return res
          .status(400)
          .json({ msg: "Password must be at least 6 characters." });

      const passwordHash = await bcrypt.hash(password, 12);

      const newUser = new Users({
        fullname,
        username: newUserName,
        email,
        password: passwordHash,
        position,
      });

      const access_token = createAccessToken({ id: newUser._id });
      const refresh_token = createRefreshToken({ id: newUser._id });

      res.cookie("refreshtoken", refresh_token, {
```

Figure 4.86 Script for authentication

```
const Conversations = require("../models/conversationModel");
const Messages = require("../models/messageModel");

class APIfeatures {
  constructor(query, queryString) {
    this.query = query;
    this.queryString = queryString;
  }

  paginating() {
    const page = this.queryString.page * 1 || 1;
    const limit = this.queryString.limit * 1 || 9;
    const skip = (page - 1) * limit;
    this.query = this.query.skip(skip).limit(limit);
    return this;
  }
}

const messageCtrl = {
  createMessage: async (req, res) => {
    try {
      const { sender, recipient, text, media, call } = req.body;

      if (!recipient || (!text.trim() && media.length === 0 && !call)) return;

      const newConversation = await Conversations.findOneAndUpdate(
        {
          $or: [
            { recipients: [sender, recipient] },
            { recipients: [recipient, sender] },
          ],
        },
        {
          recipients: [sender, recipient],
          text,
          media,
          call,
```

Figure 4.87 Script for messaging

```
const Users = require("../models/userModel");

const userCtrl = {
  searchUser: async (req, res) => {
    try {
      const users = await Users.find({
        username: { $regex: req.query.username },
      })
        .limit(10)
        .select("fullname username avatar");

      res.json({ users });
    } catch (err) {
      return res.status(500).json({ msg: err.message });
    }
  },
  getUser: async (req, res) => {
    try {
      const user = await Users.findById(req.params.id)
        .select("-password")
        .populate("friend add", "-password");
      if (!user) return res.status(400).json({ msg: "User does not exist." });

      res.json({ user });
    } catch (err) {
      return res.status(500).json({ msg: err.message });
    }
  },
  updateUser: async (req, res) => {
    try {
      const { avatar, fullname, mobile, address, story, website, position, experience, specialist, identitycard, education } =
        req.body;
      if (!fullname)
        return res.status(400).json({ msg: "Please add your full name." });

      await Users.findOneAndUpdate(
        { _id: req.user._id },
```

Figure 4.88 Script for users

```
const Conversations = require("../models/conversationModel");
const Messages = require("../models/videoModel.js");

class APIfeatures {
  constructor(query, queryString) {
    this.query = query;
    this.queryString = queryString;
  }

  paginating() {
    const page = this.queryString.page * 1 || 1;
    const limit = this.queryString.limit * 1 || 9;
    const skip = (page - 1) * limit;
    this.query = this.query.skip(skip).limit(limit);
    return this;
  }
}

const videoCtrl = {
  createMessage: async (req, res) => {
    try {
      const { sender, recipient, text, media, call } = req.body;

      if (!recipient || (!text.trim() && media.length === 0 && !call)) return;

      const newConversation = await Conversations.findOneAndUpdate(
        {
          $or: [
            { recipients: [sender, recipient] },
            { recipients: [recipient, sender] },
          ],
        },
        {
          recipients: [sender, recipient],
          text,
          media,
          call,
```

Figure 4.89 Script for video

```
const Notifies = require("../models/notifyModel");

const notifyCtrl = {
  createNotify: async (req, res) => {
    try {
      const { id, recipients, url, text, content, image } = req.body;

      if (recipients.includes(req.user._id.toString())) return;

      const notify = new Notifies({
        id,
        recipients,
        url,
        text,
        content,
        image,
        user: req.user._id,
      });

      await notify.save();
      return res.json({ notify });
    } catch (err) {
      return res.status(500).json({ msg: err.message });
    }
  },
  removeNotify: async (req, res) => {
    try {
      const notify = await Notifies.findOneAndDelete({
        id: req.params.id,
        url: req.query.url,
      });

      return res.json({ notify });
    } catch (err) {
      return res.status(500).json({ msg: err.message });
    }
  },
```

Figure 4.90 Script for notification

```
// Show a particular CRUD Detail by Id
const crud_details = (req, res) => {
    Crud.findById(req.params.id, function (err, crud) {
        if (!crud) {
            res.status(404).send("No result found");
        } else {
            res.json(crud);
        }
    });
};
```

Figure 4.91 Script of Appointment Based on Id

```
    // Update CRUD Detail by Id
    const crud_update = (req, res) => {
        Crud.findByIdAndUpdate(req.params.id, req.body)
            .then(function () {
                res.json("Crud updated");
            })
            .catch(function (err) {
                res.status(422).send("Crud update failed.");
            });
    };
```

Figure 4.92 Script of Update Appointment

```
// Delete CRUD Detail by Id
const crud_delete = (req, res) => {
    Crud.findById(req.params.id, function (err, crud) {
        if (!crud) {
            res.status(404).send("Crud not found");
        } else {
            Crud.findByIdAndRemove(req.params.id)
                .then(function () {
                    res.status(200).json("Crud deleted");
                })
                .catch(function (err) {
                    res.status(400).send("Crud delete failed.");
                });
        }
    });
};
```

Figure 4.93 Script of Delete Appointment

```
createComment: async (req, res) => {
  try {
    const { postId, content, tag, reply, postUserId } = req.body;

    const post = await Posts.findById(postId);
    if (!post)
      return res.status(400).json({ msg: "This post does not exist." });

    if (reply) {
      const cm = await Comments.findById(reply);
      if (!cm)
        return res.status(400).json({ msg: "This comment does not exist." });
    }

    const newComment = new Comments({
      user: req.user._id,
      content,
      tag,
      reply,
      postUserId,
      postId,
```

Figure 4.94 Script of Comments

CHAPTER 5

CONCLUSION

5.1 Introduction

Five sections make up this entire thesis. The first section introduced the overall idea for the project, its goals, the problem itself, and the anticipated limitations of the application. It was discussed in Chapter 2 how to apply this to the current situation. We compare the new plan to the three existing apps currently available on the market. The methodology, app architecture, and app structure were illustrated in detail in Chapter 3. To illustrate the functionality of the program, the storyboard will be shown. In Chapter 4, we'll talk about the results and outputs you may expect to see from the finished application. In Chapter 5, we'll talk about the app's limitations and the potential improvements we may make in the future.

5.2 Objective Revisited

There are three goals for this project, as described in Chapter 1. The goals of this research are to (1) to identify the current limitation of the Binocular Vision Consultation process, (2) to develop a Web-Based Binocular Vision Consultation System, and (3) to evaluate the functionality of the proposed system

The first goal has been completed after an existing application is selected and its benefits and drawbacks have been discussed. Second, when the Web-buzz Vision Consultation Application is developed at the project's conclusion, we will have met our second goal as well. The last goal of using user acceptance testing to assess the utility of the web-buzz consultation application has also been completed successfully.

5.3 Limitations

The limitations of the Web-Buzz Consultation Application are that this web application can only support the video call feature to around 20 seconds due to deploying to a free server. The free service does not support socket.io since it requires a high workload on the server side. Therefore, it makes the web-buzz consultation application's video call feature unstable and inconsistent.

5.4 Future Work

There are various improvements that can be made to the Web-Buzz Vision Consultation Application in the future. First, Future efforts will try to address the drawbacks described above. Trying to deploy this Web-Buzz Vision Consultation Application to a payment service that is able to support socket.io and webRTC in a consistent and fully functional. Second, I will a more intent on the Chatbot feature in Web-Buzz Vision Consultation Application. Therefore, it can able to chat with users more like humans and give the user more interaction. Thirdly, I should mention the disclaimer of this web-buzz vision consultation application to prevent irresponsibility doctor to give some wrong guidance or treatment to patient.

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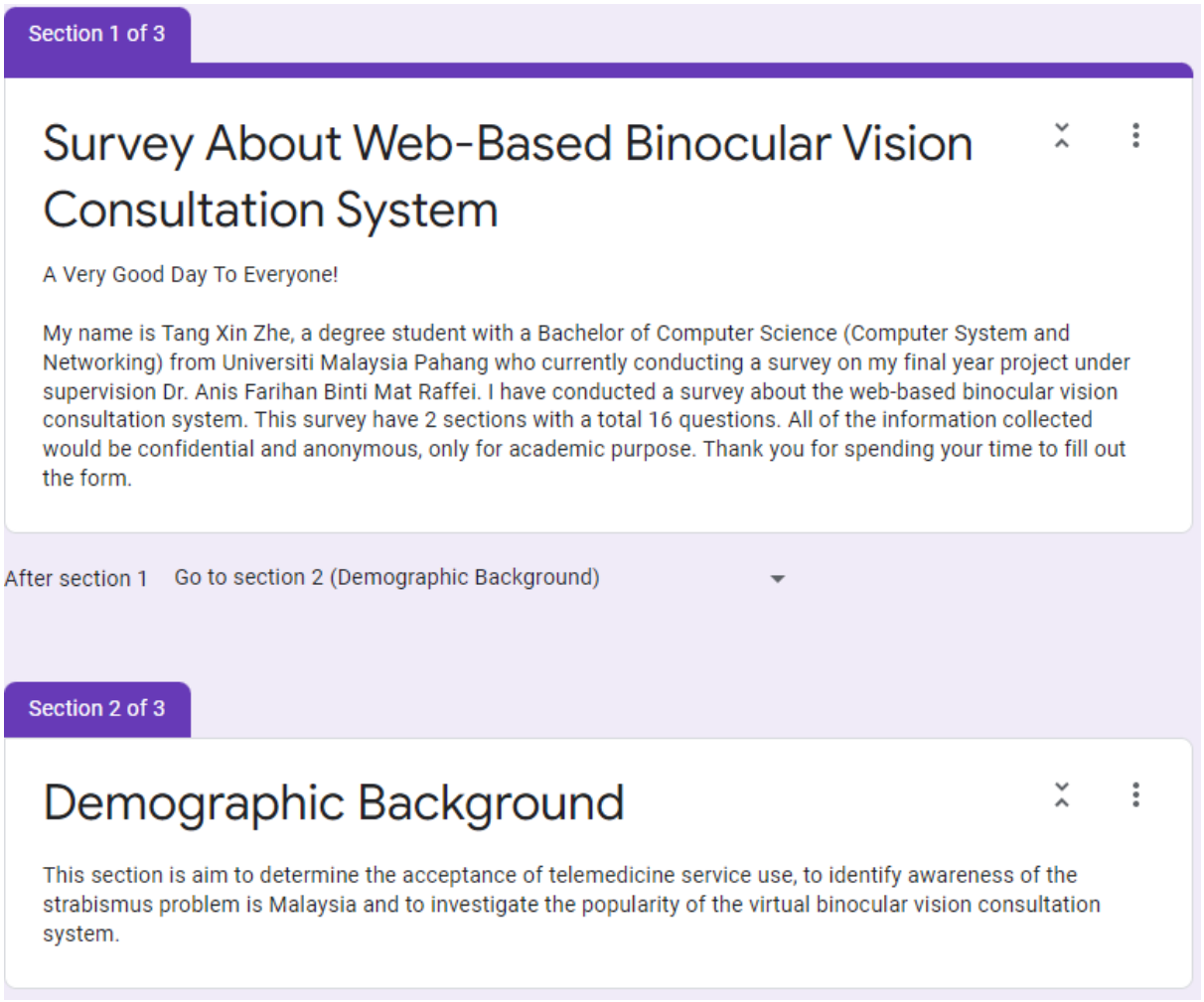
APPENDIX A
GOOGLE SURVEY FORM



Do you prefer to use telehealth or in-person visit? *

- ○ Telehealth
- ○ In-person visit

Do you think telehealth consultation can be convenient for you? *

- ○ Yes
- ○ No

Do you know strabismus? *

- ○ Yes
- ○ No

Do you have awareness of the seriousness of strabismus *

- ○ Yes
- ○ No

Have you used any virtual binocular vision consultation system before? *

- Yes
- No

Do you think virtual binocular vision consultation system can help in increasing the awareness of strabismus? *

- Yes
- No

After section 2 Go to section 3 (Feature Requirement)

Section 3 of 3

Feature Requirement

This section is aim to investigate the requirements for the Web-Based binocular Vision Consultation System

Do you like to have an advertisement in the system? *

- Yes
- No

Will it be helpful if provide a user manual on how to use the system? *

- Yes
- No

Do you want to know more about the strabismus in the system? *

- Yes
- No

Will it be helpful to provide dashboard queries feature for you to ask questions and get feedback from the doctor *

- Yes
- No

Will it be helpful if the dashboard queries feature have all the histories of questions and answer asked by all users? *

- ○ Yes
- ○ No

Will it be good if the applications has an in-app video conferencing feature? *

- ○ Yes
- ○ No

Will it be good if the application has an automatic chatbot feature? *

- ○ Yes
- ○ No

APPENDIX B
GANTT CHART