ONLINE APPOINTMENT BOOKING AND PATIENT HEALTH TRACKING SYSTEM FOR TRADITIONAL CHINESE MEDICINE

BY

KWAN KAH LOK

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF INFORMATION SYSTEMS (HONOURS)

BUSINESS INFORMATION SYSTEMS

Faculty of Information and Communication Technology

(Kampar Campus)

JANUARY 2023

UNIVERSITI TUNKU ABDUL RAHMAN

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_____

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ACKNOWLEDGEMENTS

ABSTRACT

The project focused on the development of an online appointment and patient health tracking system for Traditional Chinese Medicine (TCM) in Malaysia.

 After conducting research and analysis, the current TCM system had made efforts to provide some basic online services for patients, however, there were still some services that required consumers to visit a brick-and-mortar TCM clinic to enjoy the service. In addition, the current TCM system also had shortcomings. The system fell short of customer expectations, the management of medical records was time-consuming, and there was a lack of clear and credible TCM information data for clinical parties to view and track patient medical records.

To solve the mentioned issue, several features and functions were developed and implemented into the proposed system. The proposed TCM system would meet or exceed client expectations by providing TCM services through online and accessible anytime and anywhere. Besides, the system would implement an easy-to-manage record function, allowing users to easily store and manage database records. To provide high credibility, clear and credible TCM information data would be displayed so that Chinese medicine practitioners (CMPs) could analyze medical records and patients could track their medical records.

The main functions of the TCM system were appointment booking, patient health tracking, leave management, and database management. On top of that, the system would provide users with more comprehensive services by implementing additional functions such as real-time chat and reminders. Besides, the medical records would be stored into the system, allowing users to easily access the data.

The methodology used in this project was a prototyping model to obtain the desired result. The prototyping model was a system development methodology in which prototypes were built, evaluated, and refined until an appropriate prototype was accomplished. Finally, the proposed system was tested by volunteers for feedback and comments on functionality, user interface, and other related areas of improvement. If any technical problems were discovered, the system would be resolved as well.

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CHAPTER 1: PROJECT BACKGROUND

Chapter 1 will discuss the project background and problem statement of the Online Appointment Booking and Patient Health Tracking System for Traditional Chinese Medicine (TCM). The Online Appointment Booking and Patient Health Tracking System for Traditional Chinese Medicine is a web-based system designed to allow patients to make appointments and help Chinese medicine practitioners (CMP) to track the health of patients through online. Moreover, this system will be developed and implemented with different function for the three types of users, namely patients, CMP, and admin. In addition, the system will allow users to manage the databases respectively.

1.1 Introduction

Traditional Chinese medicine, also known as TCM, is an ancient health care system that has been used in China for decades and has evolved over time from its origins. Besides, TCM is not focused on science and medicine, but based on balance, harmony, and energy. However, there are many people still misunderstand the medical system of Chinese medicine and believe that herbal medicine is the overall treatment of TCM. In fact, TCM treatment involves a variety of medical therapies, such as moxibustion, acupuncture, cupping, massage (Tui Na) and qigong. [1]

To further explain, moxibustion is a type of heat therapy in which a dry plant material called "moxa" is placed on or near to the skin to stimulate the "Qi" in the body and remove certain pathogenic factors. [2] Next, acupuncture is a technique that uses needles to invigorate pressure points throughout the body to stimulate the central nervous system. [3] Furthermore, cupping is a therapy that will creates suction on the skin, which helps to eliminate stagnation. [4] Besides, Tui Na is a type of massage therapy, while qigong is a form of exercise that uses breathing and exercise to improve blood circulation. Hence, the mentioned TCM medical therapies are the treatment method to achieve a balance between the body and the surrounding environment. [5]

However, there are still differences between traditional Chinese medicine and modern Western medicine. Traditional Chinese medicine is based on the idea of healthy

flow of Qi (pronounced "Chee") or vital energy flowing throughout the body. The "Qi" is believed to be influenced by the opposing forces of "Yin" (negative energy) and "Yang" (positive energy) and is believed to control the positive aspects of a person's mental, emotional, mental, and physical balance. Traditional Chinese medicine believes that the disease is caused by poor flow of "Qi" and imbalance between yin and yang. Therefore, herbal medicine, nutritional therapy and restorative physical exercise are part of the treatment of diseases in Chinese medicine. On the contrary, modern Western medicine is based on the germ theory of disease. They claim that many diseases are caused by microscopic bacteria and require drugs, surgery, or radiation therapy to cure the disease. [6]

Due to the advancement of medical information technology and the relatively low promotion of Chinese medicine, Chinese medicine has gradually been eliminated. Besides, most Chinese medicine clinics have not seized the opportunity to apply information technology. In addition, the traditional Chinese medicine physicians (CMP) still use traditional methods to manually record patient appointments and patient treatment records in paper documents. This will cause inconvenience to both the Chinese medicine practitioner and the patient, because the paper documents will be overloaded and difficulty to find.

On the other hand, modern western medicine has become today's leading medical treatment. The reason is that they have integrated information technology into the medical field to provide the public with better, faster, and more convenient services. For instance, modern western medicine branches use information technology (IT) to obtain, store, access, and share medical data. In this case, patients and healthcare providers will benefit greatly from these improvements. Therefore, with the accelerating pace of life, people nowadays are not interested in TCM, not because the treatment is ineffective, but because the traditional operation of Chinese medicine clinics has caused dissatisfaction among patients and healthcare providers.

As technology changes people's expectations of the medical system, TCM can transform and change the way they conduct business by applying information technology (IT) to their systems to provide services that satisfy people's satisfaction. With the help of information technology, medical management becomes easier and smoother, which will bring maximum efficiency and convenience to patients and

Chinese medicine practitioners. On the contrary, if the TCM system lacks the application of information technology, medical management will become chaotic, which is not conducive to their arrangement of documents and records. However, people are now looking for convenient and effective services that can be obtained online. Therefore, it is best for Chinese medicine to transform its traditional system into an online system.

By transforming the TCM traditional system into an online TCM system, users can get access and perform with many activities and services through online. For instance, the patients can get access with their medical records through online instead of paper documents. This will help them better understand their diseases and medical history, thereby encouraging them to use the system. [7] Besides, most Chinese medicine clinics currently only allow patients to make appointments at the clinic, which brings inconvenience to people living in hectic cities and busy with work. However, through the online TCM system, patients can make appointments online 24/7 anytime, anywhere. In addition, since the system records patient appointment records, patients can easily track their appointments and consultations through online.

Furthermore, the lack of information technology in the TCM management system will also affect the CMP from many deficiencies as the documents are not computerized. In this case, CMP will not be able to access patient records effectively and efficiently. However, with the help of information technology in TCM systems, all patient records will be able to be recorded in the form of electronic health records (EHR). An electronic health record (EHR) is a computerized record that can record information in digital form, such as a patient's medical history, physical examination, investigation, and treatment. Through EHR, CMP will be able to easily obtain the latest, accurate and complete patient information, to better plan and provide suitable treatment or plan for patients. [8]

In conclusion, with the advancement of technology, people's expectations and requirement will be higher, because technology has brought them a lot of convenience. Therefore, there are more traditional business platforms are transforming their businesses into online platforms to provide services to the public to meet their expectations. In order to satisfy and improve the user experience (UX) on the TCM system, the traditional services and management must be transformed to online

platform. Apart from that, the TCM system must provide more comprehensive functionality and features for the users as well. Thus, the project will develop and implement a web based TCM system, allowing users to obtain more effective TCM services through the TCM online system.

1.2 Problem Statement and Motivation

1.2.1 Current traditional Chinese medicine services fail to meet or exceed customer expectations.

With the continuous advancement of global technology, people's expectations will also become higher. There are many traditional business platforms are transforming towards digital platforms to provide services online and expand their businesses on a global scale. Thus, we can determine that people are expecting to get convenient, faster, and friendlier services through online. However, currently most of the TCM branches are only available for walk-in or phone call to check or to make booking appointment. Besides, if they want to make booking appointment after the business hours, they have to wait for the next working time to make booking appointment. Furthermore, during peak business hours, they may not be able to make calls because other patients may be calling during this period, which will cause congestion on the phone line. This brings inconvenience to people as they need travel to the physical TCM branch to make an appointment when they cannot make an appointment by phone. Thus, all this will bring extra costs, inconvenience, and time-consuming to the public who need TCM services. [9]

1.2.2 Time consuming and difficult to manage traditional file records.

Today, many traditional businesses, such as TCM platforms, still use paper documents to record databases. It is difficult to organize, and time consuming just to record or find the files on the file shelf. [10] Besides, when patients come to the TCM branch, there are still manual records of the patients' personal information and medical history on paper. If the handwriting is not clear, CMP may get wrong information and cause the patient to misdiagnose. Furthermore, to update patients' records, the CMP needs to find the patient's file to update it manually. The overloaded data records on paper files will cause inconvenience in database record management, which can lead to other problems, such as time-consuming just looking up for a file. Therefore, without using technology, the TCM business platform will need to spend more time manually inputting and updating data, which will initially cause trouble in the management of

database records.

1.2.3 Lack of clear and credible TCM information data for clinical parties to view and track patient medical records.

Lack of clear and credible TCM information data will make it difficult for all clinical parties to analyze and provide patients with the best TCM treatment services. By displaying clear and credible information to Chinese medicine physicians (CMP), they can understand and analyze patients' medical records to provide them with appropriate diagnosis and treatment. On the other hand, if the CMP does not obtain the complete information and data of the patient's medical record, the CMP will not know which treatment is most suitable for the patient and may cause the patient to misdiagnose. [11] In addition, patients will not be able to keep track on their medical records through the system, making them feel unsafe, suspicious, and distrustful of the services provided by TCM. Under these circumstances, the traditional Chinese medicine business platform will lose the trust of patients, thus affecting the business growth.

1.3 Project Scope and Direction.

This project aims to develop and implement a web-based online appointment booking and patient health tracking system for TCM. Besides, this system will be developed and implemented with different function for the three types of users, namely patients CMP and admin. The main functions in this system include appointment booking, patient health tracking, patient, and CMP database management, and TCM inventory management. In addition, the system will also develop and implement some additional features to provide users with more comprehensive services, such as real-time chat and reminders.
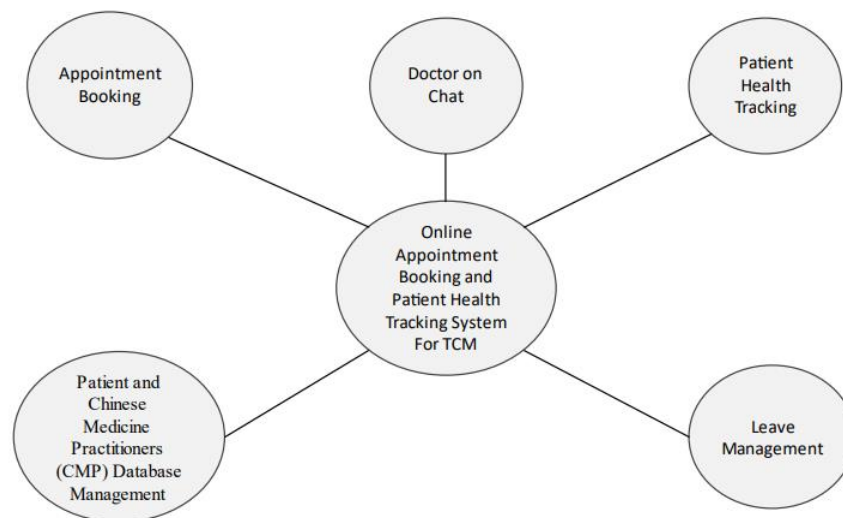
Figure 1.1 Project Scope Mind Map

1.3.1 Appointment Booking

- The system will allow the patient to view the available time to make an appointment.

- The system will be able to record patient appointments.

- The system will allow CMP to check the appointment time.

- The system will be able to send reminder to the patient to remind the appointment date.

1.3.2 Patient Health Tracking

- The system will store the patient's health records in the database.

- The system will allow patients and CMP to track their health records.

1.3.3 Patient and Chinese Medicine Practitioners (CMP) Database Management

- The system will store patients and CMP s' information in the database.

- The system will allow patients and CMPs to view, delete and update their personal information.

- The system will allow admin to view, update and delete the patient and CMP database.

1.3.4 Practitioner Leave Management

- The system will allow the admin to view, approve and cancel practitioner leave application.

- The system will be able to store and record the practitioner leave record into database updated by the admin.

1.3.5 Doctor on Chat

- The system will allow the patient to select the available practitioner to perform online chat.

- The system will allow the patient and practitioner with a 2-way communication through the online chat box.

- The system will be able to store and record the patient and practitioner chat information into database.

1.4 Research Objectives

1.4.1 To provide online TCM services that can meet or exceed customer expectations and are accessible anytime and anywhere.

To make this project a success, people's expectations toward the traditional Chinese medicine system will be analyzed and determined. Similar system will be studied and compared to provide a comprehensive and enhanced functions in the proposed project to meet and exceed customer expectation toward the traditional Chinese medicine system. Besides, the proposed project will be developed and implemented in a web-based, allowing patients to access traditional Chinese medicine services anytime and anywhere through online. In addition, the proposed project aims to provide patients with a booking appointment function, allowing them to make appointments in the system even outside of working hours. This will bring convenience to people who living in the hustle and bustle of the city, they don't need to travel far and wide to go to traditional Chinese medicine branches to make an appointment during working hours.

1.4.2 To develop an online TCM system to store and manage database records.

In this proposed project, a database management function will be developed and implemented. The purpose of the database management functions is to avoid the hassle management for database records in traditional Chinese medicine. Besides, with this function, the patient's personal information and medical history can be stored in a

computer system instead of being recorded in a paper file. Patients can update their personal details in the system as well. For example, if the patient's phone number changes, they can update the phone number in the system so that Chinese medicine practitioners can obtain the latest information and reduce the redundancy of the database. In addition, these functions will also facilitate the Chinese medicine practitioners to access patient database records for updates. In this way, Chinese medicine practitioners can update and track the patient's past medical history through the database system to better diagnose and provide them with better traditional Chinese medicine services.

1.4.3 To design a clear and credible online TCM system for clinical parties and patients to view and track patient medical records.

In this high-tech world, trust is very important, especially for traditional business platforms, such as TCM business, that wants to provide booking appointment services through online. Therefore, to gain and build the trust of patients, this project will implement clear and credible TCM information. With clear and credible information, patients' doubts will be reduced, so that TCM business can gain trust. In addition, the patient's medical history information will be recorded and displayed in the system, allowing them to understand the medical services provided to them, and enabling patients and Chinese medicine practitioners (CMP) to trace their medical records in the system. In addition, CMP information and qualifications will be displayed for patients to view as well. Through the information of CMP, patients will be able to understand the information and qualifications of the CMP, to better decide whether to obtain the services they provide. Thus, patients will trust the traditional Chinese medicine because they are sure on certain information that provided in this system.

1.5 Contribution

The contribution of this project is to provide a web-based system for patients to make appointment booking and help Chinese medicine practitioners (CMP) to track the health of patients through online. In addition, the project also allows admin to manage Chinese medicine through the system. Since the project will be carried out in digital form, the minimum requirement for users to access TCM services is to connect to the Internet on their digital devices. Nowadays, the Internet can be accessed from anywhere because there are many places that provide free Internet access to the public. Thus, users can actually access the TCM system anytime and anywhere.

From patients' point of view, since this project is carried out as a digital model, they can make an appointment anytime, anywhere, even outside of business hours. In that case, they do not need to visit a physical TCM branch during the business hour to make an appointment. This brings convenience to people living in hectic cities. Besides, with the rapid development of technology, online fraud cases have also increased, causing people to distrust the information provided on the Internet. In order to gain the trust of patients, this project will provide CMP information for them to view in a highly transparent manner, allowing them to understand the qualifications of CMP before obtaining TCM services. Furthermore, the project will record patient databases such as appointment session, patient personal information and medical history in the system which enable the patients to trace back their records easily. Hence, the project initially provided patients with transparent information, helping patients save travel expenses, save time, and able to manage and trace their information through the system easily.

From Chinese medicine practitioners' point of view, as the patient's database is stored in the project system, CMP can easily track the patient's medical history instead of looking up those files on the file rack. In addition, CMP can update patient medical records in the system instead of manually recording them in paper files which will help minimize the occurrence of writing errors and able to track back easily. In addition, considering that CMP may improve their skills and obtain higher qualifications, the project will allow CMP to update their information in the system, allowing patients to obtain the latest information and understand the skills and knowledge of CMP. Hence, the project allows CMP to manage patient medical records in the system to reduce the time required to track and update patient medical records, besides, this system also allows them to update their detailed information so that patients understand their skills in the system.

From admin point of view, as the system will provide traditional Chinese medicine inventory management functions, the admin can also manage and view the inventory status in the system. Using this function, the admin can track the inventory status to ensure that the inventory is sufficient and up to date. In addition, with the help of traditional Chinese medicine inventory management functions, admin can better analyze, forecast, and prepare inventory orders as well. Furthermore, to avoid fraudulent information that may be provided by CMP, the project also allows admin to manage CMP information. With this management function, the admin can ensure that

CMP will not provide false information for patients to view. Hence, the project allows admin to manage the inventory of traditional Chinese medicines in the system to avoid shortages and allows them to manage CMP details to avoid displaying false information to patients.

In the nutshell, with the continuous development of technology, it has not only changed people's lifestyles, but also transformed the way people conduct business. In this case, there will be more traditional business platforms, such as traditional Chinese medicine business platforms, which will be transformed into digital platforms to provide business services and expand their business to more people. Therefore, as technology brings more convenience, better and faster services to people, the old traditional service methods will gradually be eliminated.

1.6 Report Organization

The remaining chapter will show the details of this research. In Chapter 2, some similar systems are reviewed. Features, strengths, and weaknesses from each different similar system had been listed down. In Chapter 2 also included ways to resolve the weaknesses of similar system and a table of comparison between similar systems and proposed system. Methodology, hardware, and software used to implement the proposed project, project milestone and user requirement been described in Chapter 3. Then, a system design of the proposed system was presented in Chapter 4. In system design included ERD Diagram, use case diagram, use case description, activity diagram and sequence diagram. System architecture diagram and prototype will be resided in Chapter 4. Preliminary work of the proposed system, hardware, and software setup, setting and configuration and implementation issue and challenges and been cover in Chapter 5. Furthermore, Chapter 6 describes system evaluation and discussion of the proposed system which included with the system testing and performance metrics, testing setup and result, and objectives evaluation. Last but not least, Chapter 7 will show the conclusion of the entire project.

CHAPTER 2: LITERATURE REVIEW

2.1 Literature Review

In chapter 2, relevant literature will be conduct on existing Traditional Chinese Medicine systems will be reviewed. During the literature review, many useful functions and features have been discovered in the existing system, such as appointments, Chinese medicine procurement, and blogs section that is written by some doctors in order to improve the user's knowledge of Chinese medicine. Besides, the differences in functions and characteristics between these similar systems were also discovered, and these differences were defined as their unique functions and characteristics.

To determine and clarify the basic system requirements and user behaviors that will affect users' perception of the usefulness of the TCM system, the similar online TCM systems such as Eu Yan Sang Clinic, Thomson TCM and Refresh Group TCM, Sunway TCM, PRTCM Centre will be analyzed, evaluated, and reviewed. The purpose of conducting similar system reviews is to obtain the strengths and weaknesses of each of the online TCM system mentioned above. In addition, through the literature review, the lack of functions in each similar system can be found, which enables this project to propose more comprehensive functions in the system.

Since this project is a new online TCM system, users may find it challenging to adapt to the new online TCM system. Therefore, based on the analysis results of the literature review, the results will be used as references to help enhance the functions and characteristics of the proposed system. In addition, this can help the proposed project to gather and acquire user requirements and expectations, so that the final product can better serve and meet user requirement and expectations when accessing the functions in the proposed system.

2.2 Critical Remarks of Similar Systems

2.2.1 Eu Yan Sang TCM
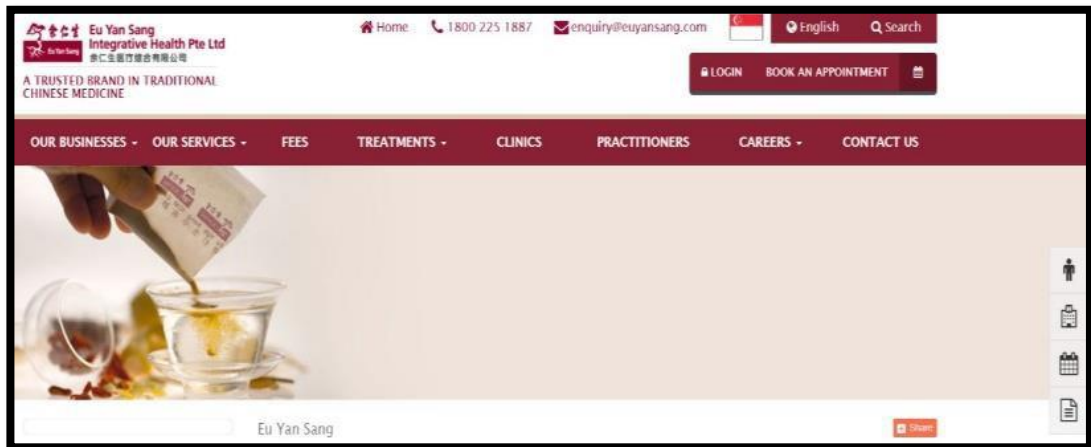
Figure 2.1 Eu Yan Sang Clinic

Eu Yan Sang Clinic is currently one of the leading online TCM system challenger brands on the market. Besides, Eu Yan Sang has been regarded as a world-renowned brand for almost 140 years. In addition, it also encouraging and inspiring people to live their best lives through accessible healthcare based on the wisdom of traditional Chinese medicine (TCM). Furthermore, Eu Yan Sang Clinic have many physical branches in Singapore and the Eu Yan Sang general clinics will be located throughout the Midwest of Singapore to treat various acute and chronic diseases. Apart from that, Eu Yan Sang has overcome all the problems currently faced by Chinese medicine clinics. For example, Eu Yan Sang provides an online appointment function, which allows users to access these services online anytime, anywhere without having to travel all the way to the Eu Yan Sang Clinic. Finally, according to the system review of Eu Yan Sang Clinic, some features, strengths, and weaknesses can be found. [12]

2.2.1.1 Eu Yan Sang Clinic Function:

- Provide users with the ability to search for practitioners.
- Provide users with the ability to search for clinic.
- Provide users with the ability to find for treatment.
- Provide users with an appointment function.
- Provide users with the ability to search articles based on search keywords.
- Provide users with the ability to perform login and logout.

- Provide users with the ability to purchase products online.
- Provide users with the ability to redeem the rewards.

2.2.1.2   Eu Yan Sang Clinic Features:

- Enable users to find suitable practitioners by entering diseases or treatments in the search bar.
- Enable users to find a suitable treatment by entering the disease in the search bar.
- Support Google map function, allowing users to see the clinic location more clearly.
- Allow users to receive reminder emails when the appointment date is approaching.
- Having wildcard features in search algorithm to maximize the search result in database.
- Allow users to update their personal information details in the system.
- Able to support delivery features and will show user the current delivery status.
- Allow users to make a one-time payment after adding all products to the shopping cart.
- Provide filtering prices features to display according to the price selected by the user.
- Able to change website language between Chinese and English.
- Provide the latest vouchers according to the festival, allowing patients to redeem for more discounts.

2.2.1.3 Eu Yan Sang Strength

- The system will send reminder emails to users to notify them that the appointment date is approaching.
- The content of the page has been sorted according to its own category and located in the navigation bar.
- The layout of the web page is pleasant and not complicated.
- The search bar contains a wildcard function, which is very useful when users don't know the complete word or want to describe the type of information they are looking for.
- The system includes Google Maps, allowing users to view real-time locations.
- The system provides a filter price function for patients to filter the display output

according to the needs of purchasing Eu Yan Seng products.

- The system has a customer reward function, allowing patients to engage more in the system.

- The system is provided with a practitioner page, users can view the detailed information of the practitioner, find the most suitable practitioner by entering the disease and treatment, and make appointments.

- The system has a treatment page where users can input diseases for treatment screening and obtain treatment details to have a general understanding of the treatment they will receive.

- The system provides many Chinese medicine articles, and users can search for articles to improve their knowledge.

- The system provides online Chinese medicine product purchase function, which makes it convenient for users to purchase products without visiting physical stores.

2.2.1.4 Eu Yan Sang Clinic Weakness

- The system does not provide patient health tracking function for patients to view their historical records.

- The system lacks a doctor on duty function for patients which required them to go to the clinic to ask the doctor about their condition.

- The system does not support multilingual, which makes it difficult for users who do not understand English and Chinese to understand the content of the webpage.

- The system is only applicable to Singaporeans.

- The system does not provide live-chat function for them to inquiry.

- The system lacks FAQ function, which makes users unable to get answers directly through FAQ.

- The system lacks practitioner leave management function, which makes practitioner and business owner unable to manage the leave application effectively.

2.2.2 Thomson TCM
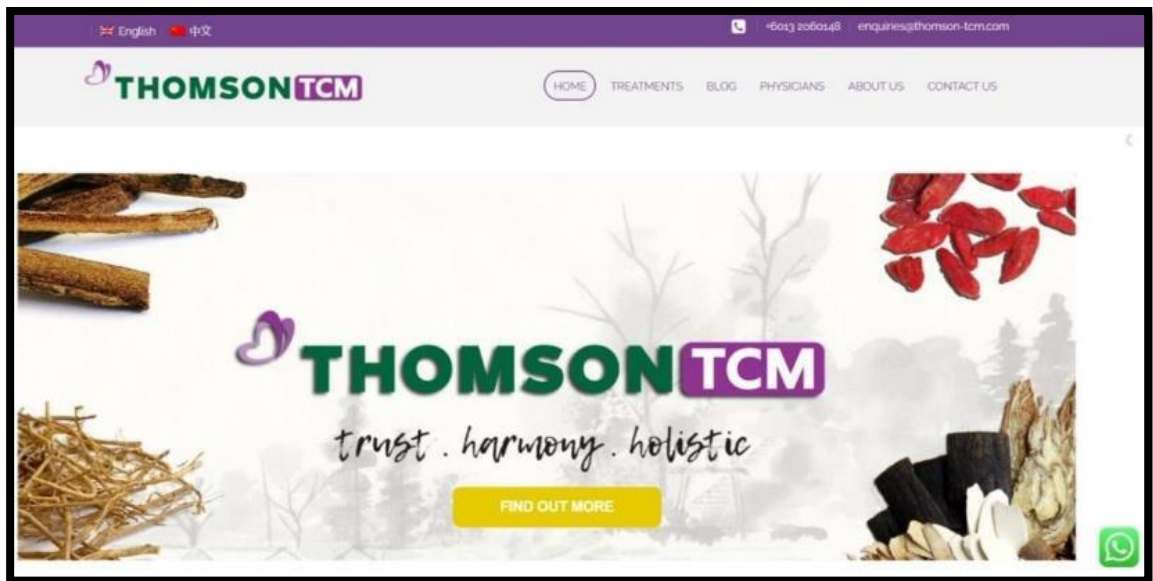
Figure 2.2 Thomson TCM

Thomson TCM is a TCM system founded in Puchong. The goal of the system is to allow users to find the most suitable personalized treatment method for them, to treat diseases, and to restore the body to a state of balance and optimal vitality through holistic techniques. In their system, they provide a drop-down menu that allows users to select services to obtain detailed information for better understanding, such as acupuncture and cupping. After understanding the details of the treatment, the user can schedule an appointment. These features allow users to view and obtain transparent information in their system, allowing them to view doctor details and treatment details before making any appointments. [13]

2.2.2.1 Thomson TCN Function
- Provide users with the ability to search for practitioners.
- Provide users with the ability to find for treatment.
- Provide users with an appointment function.
- Provide users with the ability to search articles based on search keywords.

2.2.2.2   Thomson TCM Features:
- Enable user to find a suitable practitioner by entering the disease in the search bar.
- Enable users to find a suitable treatment by entering the disease in the search bar.
- Allow users to receive reminder emails when the appointment date is

approaching.

- Having wildcard features in search algorithm to maximize the search result in database.

- Provide user FAQ in the system for users to get answers in the FAQ section.

- Integrate with social media, such as WhatsApp, Instagram, and Facebook, so that user can communicate with business owners for better understanding.

- Able to change website language between Chinese and English.

2.2.2.3   Thomson TCM Strength:

- The system will send reminder emails to users to notify them that the appointment date is approaching.

- The content of the page has been sorted according to its own category and located in the navigation bar.

- The layout of the web page is pleasant and not complicated.

- The system provides a practitioner page, and users can view the detailed information of the practitioner, find the most suitable practitioner by entering the disease and make reservations.

- The system provides a treatment page, and users can enter diseases in the search bar to obtain treatment details, so that users have a general understanding of treatment.

- The system provides many Chinese medicine articles, and users can search for article to improve their knowledge.

- The search bar contains a wildcard function, which is very useful when users don't know the complete word or want to describe the type of information they are looking for.

- The system provided FAQ function, which allow users to get answers directly through FAQ.

2.2.2.4   Thomson TCM Weakness:

- The system does not provide patient health tracking function for patients to view their historical records.

- The system lacks a doctor on duty function for patients which required them to go to the clinic to ask the doctor about their condition.

- The system does not support multilingual, which makes it difficult for users who do not understand English and Chinese to understand the content of the webpage.

- The system is only applicable to Malaysian.
- The system does not provide a real-time chat function for user to inquiry, and they use social media as a communication tool to force users to open different applications, which is not a friendly behavior.
- The system does not provide customer feedback function, which restricts patients from engaging more in the system.
- The system does not online Chinese medicine product purchase function, which brings in connivences to users in purchasing products.
- The system lacks practitioner leave management function, which makes practitioner and business owner unable to manage the leave application effectively.

2.2.3 YongKang TCM
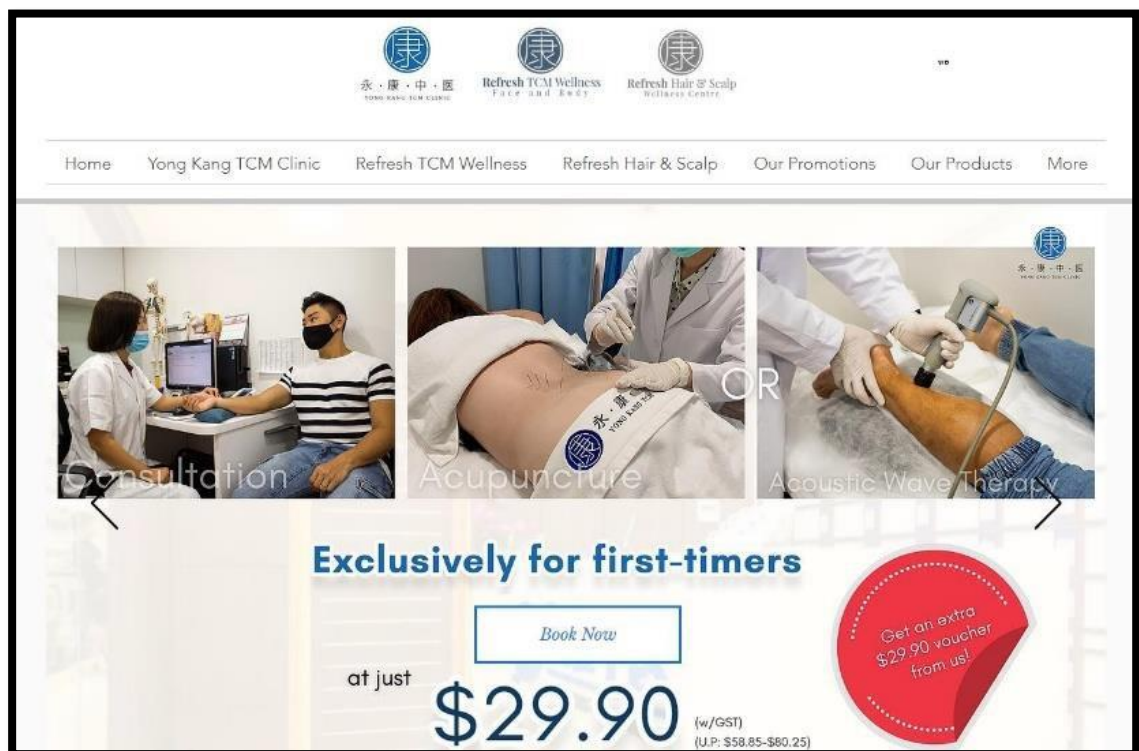
Figure 2.3 YongKang TCM

YongKang TCM is an online Chinese medicine system established in Singapore. Yongkang TCM was founded by Refresh Group in 2021 and has several branches in Singapore. In addition, YongKang TCM provides 24/7 online appointment function, even if YongKang clinic is not in business hours, users can make an appointment. Furthermore, the system provides users with booking confirmation feedback within 24 hours. This proves that the Yongkang TCM system is very flexible, and people can make appointments even outside the business hours of Yongkang Clinic. [14]

2.2.3.1 YongKang TCM Function:

- Provide users with the ability to search for clinic.

- Provide users with the ability to have live-chat function.

- Provide users with an appointment function.

- Provide users with the ability to find for treatment.

- Provide users with the ability to search for practitioners.

- Provide users with the ability to communicate with physicians through doctor- on call function.

- Provide users with the ability to purchase products online.

2.2.3.2 YongKang TCM Features:

- Enable users to find suitable practitioners by entering diseases or treatments in the search bar.

- Enable users to find a suitable treatment by entering the disease in the search bar.

- Allow users to receive reminder emails when the appointment date is approaching.

- Able to support delivery features and will show user the current delivery status.

- Allow users to make a one-time payment after adding all products to the shopping cart.

- Integrate with WhatsApp, so that users can communicate with business owners for better understanding.

- The system provided FAQ function, which allow users to get answers directly through FAQ.

- Able to change website language between Chinese and English.

- Enable users to get quick response from real-time chat, so users do not need to explore the functions and features of the webpage by themselves.

2.2.3.3 YongKang TCM Strength:

- The system will send reminder emails to users to notify them that the appointment date is approaching.

- The content of the page has been sorted according to its own category and located in the navigation bar.

- The layout of the web page is pleasant and not complicated.

- The system is provided with a practitioner page, users can view the detailed

information of the practitioner, find the most suitable practitioner by entering the disease and treatment, and make appointments.

- The system has a treatment page where users can input diseases for treatment screening and obtain treatment details to have a general understanding of the treatment they will receive.

- The system provided FAQ function, which allow users to get answers directly through FAQ.

- The system provides online Chinese medicine product purchase function, which makes it convenient for users to purchase products without visiting physical stores.

2.2.3.4 YongKang TCM Weakness

- The system is only applicable to Singaporeans.

- The system does not provide patient health tracking function for patients to view their historical records.

- The system does not support multilingual, which makes it difficult for users who do not understand English and Chinese to understand the content of the webpage.

- The system does not provide customer feedback function, which restricts patients from engaging more in the system.

- The system lacks price filtering function, users cannot view all products by price and get the products they want.

- The system lacks a TCM blog and article section for users to acquire additional knowledge of Chinese medicine, causing them to prefer Western medicine to Chinese medicine.

- The system lacks practitioner leave management function, which makes practitioner and business owner unable to manage the leave application effectively.

2.2.4 Sunway TCM

Figure 2.4 Sunway TCM

Sunway TCM Centre offers a system that integrates traditional and complementary medicine with Western healthcare systems. Sunway TCM Centre also adopts a multi-disciplinary strategy to provide medical services to patients. However, Sunway TCM Centre despite its emphasis on a holistic approach to healthcare. Besides, Sunway TCM Centre provides personalized and tailored treatment programs by understanding healthy functions and disease processes, emphasizing disease prevention, and encouraging self-healing abilities. Sunway TCM Centre has a series of TCM tutorial videos and some honorary newspapers to increase users' affirmation of the treatments provided by its practitioners. In addition, the users can get the latest promotions and package through their website as well. On top of that, Sunway TCM Centre offers an online appointment feature that allows their users to book appointments through their system. [15]

2.2.4.1   Sunway TCM Centre Function:

- Provide users with an online appointment function.
- Provide users with the ability to search webpage content based on search keywords.
- Provide users with the ability to find for treatment.
- Provide user with the ability to search for practitioners.
- Provide users with the ability to purchase products and medicine through online.
- Provide users with the ability to provide feedback through enquire form.

2.2.4.2 Sunway TCM Centre Features:

- Allow users to receive reminder emails when the appointment date is approaching.

- Enable users to find suitable practitioners by entering diseases or treatments in the search bar.

- Enable users to find a suitable treatment by entering the disease in the search bar.

- Support Google map function, allowing users to see the clinic location more clearly.

- Provide user FAQ in the system for users to get answers in the FAQ section.

- Integrate with Facebook, so that users can communicate with business owners for better understanding and view the post on the Sunway TCM Centre Facebook Homepage.

2.2.4.3 Sunway TCM Centre Strength:

- The system will send reminder emails to users to notify them that the appointment date is approaching.

- The content of the page has been sorted according to its own category and located in the navigation bar.

- The layout of the web page is pleasant and not complicated.

- The system provides a practitioner page, and users can view the detailed information of the practitioner, find the most suitable practitioner by entering the disease and make reservations.

- The system includes Google Maps, allowing users to view real-time locations.

- The system has a treatment page where users can input diseases for treatment screening and obtain treatment details to have a general understanding of the treatment they will receive.

- The system provides many Chinese medicine articles, treatment tips video, honored newspapers to improve the trust from the user to the practitioner.

- The system provides online Chinese medicine product purchase function, which makes it convenient for users to purchase products without visiting physical stores by linking the website to e-commerce platform - Shopee.

- The system provided FAQ function, which allow users to get answers directly through FAQ.

2.2.4.4 Sunway TCM Centre Weakness:

- The system does not provide patient health tracking function for patients to view their history records.

- The system does not support multilingual, which makes it difficult for users who do not understand English and Chinese to understand the content of the webpage.

- The system lacks a doctor on call and chat with practitioner function for patients which required them to go to the clinic to ask the doctor about their condition.

- The system does not provide a real-time chat and customer services function for user to inquiry, and they use social media as a communication tool to force users to open different applications, which is not a friendly behavior.

- The system lack of login function which make the system not capable produce customize and dynamic webpage.

- The system lack of inventory management function which make the admin or business owner manage their inventory not effective.

- The system lacks practitioner leave management function, which makes practitioner and business owner unable to manage the leave application effectively.

2.2.5 PRTCM Centre
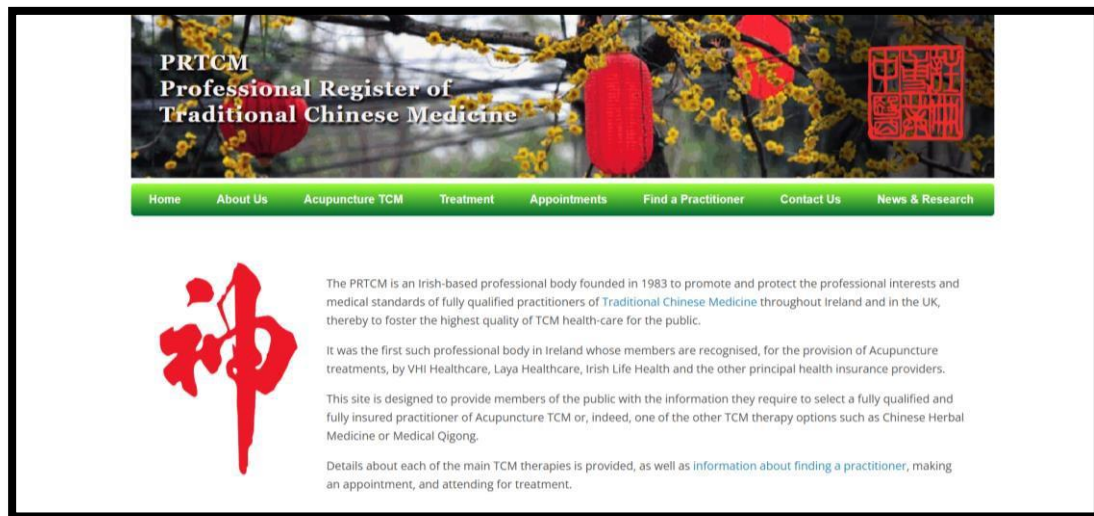
Figure 2.5 PRTCM Centre

Professional Register of Traditional Chinese Medicine (PRTCM) was founded in 1983 and is an Irish-based professional organization. PRTCM is aimed to promote and protect the professional interests and medical standards of fully licensed practitioners of Traditional Chinese Medicine (TCM) throughout Ireland and the UK. In addition, PRTCM is the first professional organization of its kind in Ireland. The PRTCM system was developed to provide the public with the information they need to select fully licensed and insured TCM practitioners for acupuncture and moxibustion, as well as any other TCM alternatives such as TCM or Medical Qigong. There are instructions on how to choose a doctor, schedule a consultation and receive treatment, as well as a detailed description of the main TCM treatments. [16]

2.2.5.1   PRTCM Centre Function:

- Provide users with an online appointment function.
- Provide users with the ability to find for treatment.
- Provide user with the ability to search for practitioners.
- Provide users with the ability to provide feedback through enquire form.
- Provide users with the ability to view and read the trading TCM news and research article.
- Provide users with the ability to enquiries information via contact us form.

2.2.5.2   PRTCM Centre Features:

- Allow users to receive reminder emails when the appointment date is approaching.

- Enable users to find suitable practitioners by entering treatment or filtering the nearest practitioner in the practitioner listing form.

- Provide user with honorary members features to improve the trust from the user to the practitioner.

- Support Google map function, allowing users to see the clinic location more clearly.

- Enable users to update their TCM knowledge via system provided TCM latest news and research article.

2.2.5.3   PRTCM Centre Strength:

- The system will send reminder emails to users to notify them that the appointment date is approaching.

- The content of the page has been sorted according to its own category and located in the navigation bar.

- The layout of the web page is pleasant and not complicated.

- The system provides a practitioner page, and users can view the detailed information of the practitioner, find the most suitable practitioner by entering treatment or filtering the nearest practitioner in the practitioner listing form.

- The system includes Google Maps, allowing users to view real-time locations.

- The system has a treatment page where users can obtain treatment details to have a general understanding of the treatment they will receive.

- The system provides honorary which listed those who have significantly contributed to the development and preservation of one or more areas of Traditional Chinese Medicine study or practice improve the trust from the user to the practitioner.

2.2.5.4   PRTCM Centre Weakness:

- The system does not provide patient health tracking function for patients to view their history records.

- The system does not support multilingual, which makes it difficult for users who do not understand English and Chinese to understand the content of the webpage.

- The system lacks a doctor on call and chat with practitioner function for patients which required them to go to the clinic to ask the doctor about their condition.

- The system does not provide a real-time chat and customer services function for user to inquiry, and they provide enquiry form which user have to get their information with some period of time.

- The system lack of login function which make the system not capable produce customize and dynamic webpage.

- The system lack of inventory management function which make the admin or business owner manage their inventory not effective.

- The system provided FAQ function, which allow users to get answers directly through FAQ.

- The system lack of online Chinese medicine product purchase function, which makes it inconvenient for users to purchase products with visiting physical stores.

- The system lack of searching treatment by entering the disease name function which make user confuse and not sure which treatment they have to apply.

- The system lack of ability to perform searching the latest TCM news and TCM article which make user inconvenience because the user can not directly view the TCM news or TCM article they want.

2.3 Recommendation to Improve the Similar Systems

Similar Systems	Recommendation to Improve the Systems
Eu Yan Sang	• Develop patient health tracking system by using MySQL to store patient history and provide a web page to display the patient historical treatment record. • Provides a doctor on call function, allowing users to choose to make a voice call or video call on the web to contact the doctor. • Provide multiple languages on the web page for users to choose the system language. • Make their TCM system accessible to other countries. • Provide a real-time chat function at the correct position on the web page to ensure that users will not be blocked from viewing it. • Provide FAQ features on treatment, clinic, partitions web pages. • Develop a leave management system to store, create and display leave information.
Thomson TCM	• Develop patient health tracking system by using MySQL to store patient history and provide a web page to display the patient historical treatment record. • Provides a doctor on call function, allowing users to choose to make a voice call or video call on the web to contact the doctor. • Provide multiple languages on the web page for users to choose the system language. • Make their TCM system accessible to other countries. • Provide a real-time chat function at the correct position on the web page to ensure that users will not be blocked from viewing it. • Provides customer rewards function to stores reward points, displays accumulated reward points and redeemable items. • Provide a leave management functions for doctor to store, create, and display leave information. • Provide the function of purchasing traditional Chinese medicine products and allow users to pay through the system.

YongKang TCM	- Develop patient health tracking system by using MySQL to store patient history and provide a web page to display the patient historical treatment record. - Provide multiple languages on the web page for users to choose the system language. - Provide customer reward function by using MySQL to store the customer reward point and create a web page to display all reward items. - Provide filter price features for TCM products to obtain better search results. - Provide web pages of TCM articles and TCM blogs written by TCM experts. - Provide a leave management functions for doctor to store, create, and display leave information.
Sunway TCM Centre	- Develop patient health tracking system by using MySQL to store patient history and provide a web page to display the patient historical treatment record. - Provide multiple languages on the web page for users to choose the system language. - Provides a doctor on call function, allowing users to choose to make a voice call or video call on the web to contact the doctor. - Provides a real-time chat and customer services function, allowing user to inquiring with the staff to solve their issue immediately. - Provides a login module with database to store user credential and user information. - Provides an inventory module with good user interface, allowing staff or business owner to manage their inventory easily, and minimize the mistake make by staff or business owner. - Provide a leave management functions for doctor to store, create, and display leave information.
PRTCM Centre	Develop patient health tracking system by using MySQL to store patient history and provide a web page to display the patient historical treatment record.

	- Provide multiple languages on the web page for users to choose the system language. - Provides a doctor on call function, allowing users to choose to make a voice call or video call on the web to contact the doctor. - Provides a real-time chat and customer services function, allowing user to inquiring with the staff to solve their issue immediately. - Provides a login module with database to store user credential and user information. - Provides an inventory module with good user interface, allowing staff or business owner to manage their inventory easily, and minimize the mistake make by staff or business owner. - Provide FAQ features on treatment, clinic, and practitioner web pages. - Provide online Chinese medicine product purchase function and allow users to pay through the system. - Develop a search bar with the disease name search keyword in treatment webpage.

Table 2.1 Recommendation to Improve the Similar Systems

2.4 Comparison Between Similar Systems

Functions	Eu Yan Sang Clinic	Thomson TCM	YongKang TCM	Sunway TCM	PRTCM	Proposed System
Search engine in practitioner's web pages	✓	✓	✓	✓	✓	✓
Search engine in treatments web pages	✓	✓	✓	✓	✗	✓
Appointment booking function	✓	✓	✓	✓	✓	✓
Trading article and news	✓	✓	✗	✓	✗	✓
Login and Logout	✓	✗	✗	✗	✗	✓
Doctor on chat	✗	✗	✓	✗	✗	✓
FAQ	✗	✓	✓	✓	✗	✓
Practitioner Leave Management	✗	✗	✗	✗	✗	✓
Patient Health Tracking	✗	✗	✗	✗	✗	✓

Table 2.2 Comparison Between Similar Systems

CHAPTER 3 PROPOSED METHOD/APPROACH

3.1 Methodology

3.1.1 Comparison Between Different Methodology

A web development methodology is a methodology that provides more structure to the production of a website. Besides, the web development methodology outlines the life cycle of the web development process to streamline workflow and meet project deadlines consistently. In addition, each stage of the methodology is planned to ensure that the result of the project maintains its high quality and meets the client's needs.

In fact, each project follows a certain project development cycle. There are various software development methodologies available such as waterfall methodology, agile methodology, lean methodology, and prototyping methodology. To select the most appropriate methodology to use for web application development depends on the project's objectives, specifications, size, timeline, team members, and project management tools.

The Waterfall Method
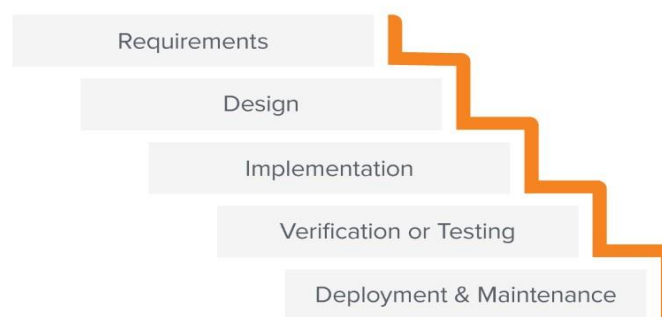
Figure 3.1 Waterfall Modal

The most common software development methodology is waterfall modal. It is indeed one of the most widely used methods for web development projects over the years due to its plan-driven approach. However, the waterfall methodology requires a lot of structure and documentation. The procedure of this methodology is divided into

a series of stages, such as analysis, design, implementation, testing, and maintenance.

The first step is critical for every project, both the developer and the client must thoroughly understand the requirements and scope of the project. Additionally, developers must conduct thorough up-front research to compile the functional and non-functional requirements of the system.

Since the waterfall method is rigid, each stage must be completed before moving on to the next. Waterfall will require a complete restart if any changes need to be made or if any errors are discovered while the project is still in progress. Therefore, projects managed using waterfall techniques may take longer. On the other hand, if the scope of the entire project is predetermined, it is important to ensure that all deliverables meet the requirements and simplify evaluating progress. Web development projects with a specific, predetermined scope, set deadlines for completion, and minimal iterations or modifications typically follow a waterfall process.

Waterfall method has advantages and disadvantages. The advantage of the waterfall method is that the waterfall method can determine the final goal early. Besides, developers should avoid deviating from the original commitment to the final product, goal, or delivery, as this is one of the key elements of the waterfall process. For large projects with unclear intent, developers must expend considerable effort gathering requirements and analyzing them further to ensure they meet user requirements and align with customer system specifications. By taking this step, developers will have a better understanding of the overall goals of the project and will be less likely to get bogged down in the details as the project progresses. Compared to Scrum, which breaks a project into multiple sprints, Waterfall can determine the final goal. If it has a definite end date, the waterfall method will eliminate the possibility of slowing down the efforts towards a specific goal of the project. [17]

The disadvantage of the waterfall method is that it is difficult to make changes when entering the design and implementation phases. The waterfall method relies heavily on sticking to a set of stages that keep developers moving forward. Besides, legacy versions of the system rarely allow for last-minute modifications. If developers follow the waterfall process faithfully until an unforeseen obstacle arises that forces a change in scope or goal, the turnaround will not be simple. Thus, the developers need to put a lot of time and effort into a project based on very strict and specific assumptions.

The parameters of the project can suddenly change, rendering most of the work the developers have done up to that point meaningless and delaying the overall schedule.

However, in this proposed system, it has to be changed during the development process when newer requirements are obtained, and market demands change. Also, it's not a large project and the waterfall approach is not suitable for it. Therefore, there is no need to waste time on extensive up-front research.

Figure 3.2 Agile Modal

Another popular methodology to web application development planning is agile. The Agile methodology are often used for projects with unclear requirements and short time horizons. Customers are involved in the development process, paperwork is minimized, and working software is prioritized are hallmarks of agile methods. Since the entire project has not been pre-planned, these responsibilities are carried out in an adaptive manner. Developers focus on secondary work that must be done right away. Agile strategies also support rapid adjustment of project scope and direction in response to market changes. Complex web development projects that require variability can be better managed using agile methods. It enables developers to work on projects in short iterations with fixed deadlines and deliverables but no fixed sequence.

The advantage of agile methods is time to market. When developers apply agile methods during the development of their projects, it ensures that the final project can be released and put on the market in a short period of time. Agile methods often produce products with shorter time-to-market due to faster startup times. Additionally,

incremental development efforts will enable early delivery of solutions, if not all, at least part of it. To ensure that the first version of the system can allow a business owner to run their business, developers must prioritize user needs, and developers can improve their systems in subsequent versions.

The downside of agile methods is the need for training and skills. To successfully execute an agile strategy, a lot of training and skills are required. Many developers either don't have the full education and expertise needed or don't want to put in the effort. Without understanding the basics of agile, they seek to implement it mechanically, which is often not very successful. Developers should be multidisciplinary and include diverse teams with skills. The main skill of the developer should be a high level of programming skills to deliver the final product in a timely manner or to deliver a system preferably of a shorter duration than expected. [18]

However, in this proposed system, agile methods are not suitable for use in this project due to the lack of technical training and skills required for the project. Additionally, the percentage of projects not delivering on time is high due to the need to develop self-technical skills during project development process. Therefore, this is not an appropriate method to implement in this project.

Figure 3.3 Lean Modal

Lean development is a method for software development that is originated directly from Toyota's lean manufacturing system. This method provides a conceptual framework, upholding ethical standards and sound development procedures. Besides, lean manufacturing is a method of streamlining production lines to reduce waste and

increase customer value. This approach is widely used in many industries, including the development of web applications. Lean methods are iterative and waste averse. The idea behind Lean is to deliver as little value as possible while confirming its viability and identifying any possible dangers. It's all about restructuring processes and delivery methods. Thus, to determine a flow of true value, remove any errors from the code.

The benefit of the lean approach is the emphasis on market validation and creating successful products. Lean methods require analysis and observation of market needs, rather than development and implementation based on the needs of the product owner. The final product will be developed according to the market needs and expectations, and therefore, the developer can ensure that the developed projects will meet the requirement and expectation of the market.

The downside of lean methods is the lack of proper documentation. System development requires documentation, especially related to the business function being worked on, otherwise, development may be poorly done and contain bugs. This documentation is important to help developers focus on goals and serve as a tool for future system improvements. The requirements gathering phase of a project is where developers should start. Without documentation of these standards, software development teams can quickly deviate from their goals. Furthermore, developers may have to spend more time trying to diagnose system failures. In addition, developers need documentation to perform system version maintenance and future enhancements as well. [19]

Therefore, the lean methodologies are not suitable to be applied to the proposed system, as the system will be further improved, aiming to update the version by adding more features and deliver it to the market in the future. Thus, documentation is an important part of this proposed project.
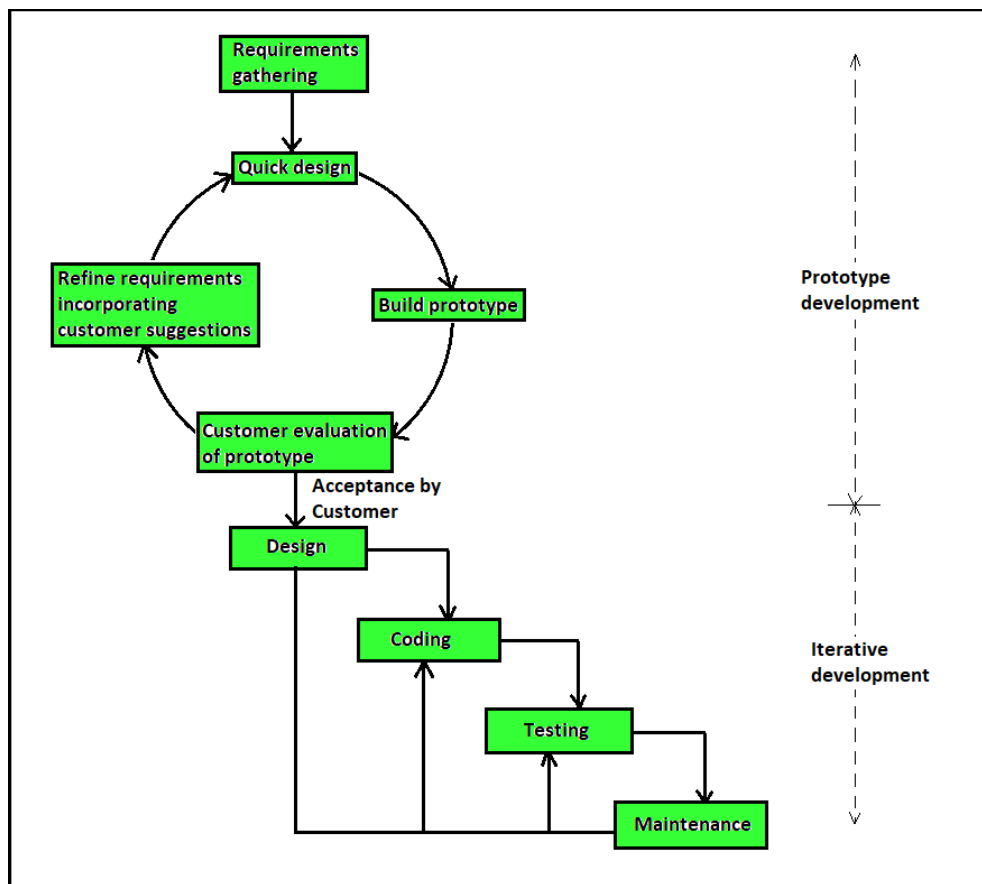
Figure 3.4 Prototyping Modal

The cycle of the prototype methodology is produced, tested, and then modified as needed until acceptable results are obtained that allow the development of a complete system or product. This method is known as the prototyping model. This model works best without a detailed prior knowledge of all project requirements. It's an iterative, trial-and-error process between engineers and users. The system is partially developed before or during the analysis phase of this process model, enabling customers to see the product early in the product life cycle. The process begins with client interviews and the creation of an incomplete senior thesis model. This document is used to build an initial prototype and supports only the most basic functionality requested by the customer. Once the customer has identified the problem, the prototype is further refined to fix the problem. This process is repeated until the user gives the prototype their blessing and declares that the functional model is sufficient. Thus, this method is more suited to the system development for this proposed project.

The benefit of the prototype method is that there is room for improvement and can be easily adapted to new requirements. Early in the system development life cycle, the analysis phase, the requirements of the system are defined in detail by gathering

requirements and resources to identify possible problems and user expectations. This will help ensure that the final system meets user expectations and requirements, making it easy to update and improve the system over time. In fact, this project will be developed according to the collected user requirements and tested by the user until the user is satisfied with the system. Therefore, this method is suitable for this proposed project. [20]

The downside of the prototype model is that it collects overloaded consumer requirement and feedback that can cause a lot of problems. Due to the overwhelming requirement and feedback from consumers, developers need to filter and identify the needs that are currently the most prioritized. Therefore, the system may not currently meet certain market demands. However, the collected requirements and feedback that are not currently the highest priority can be used as a reference for future updates of the system. Therefore, compared to other methodology, the prototyping method is the most suitable method to be applied in this proposed project.

3.1.2 Chosen Methodology- Prototyping Methodology
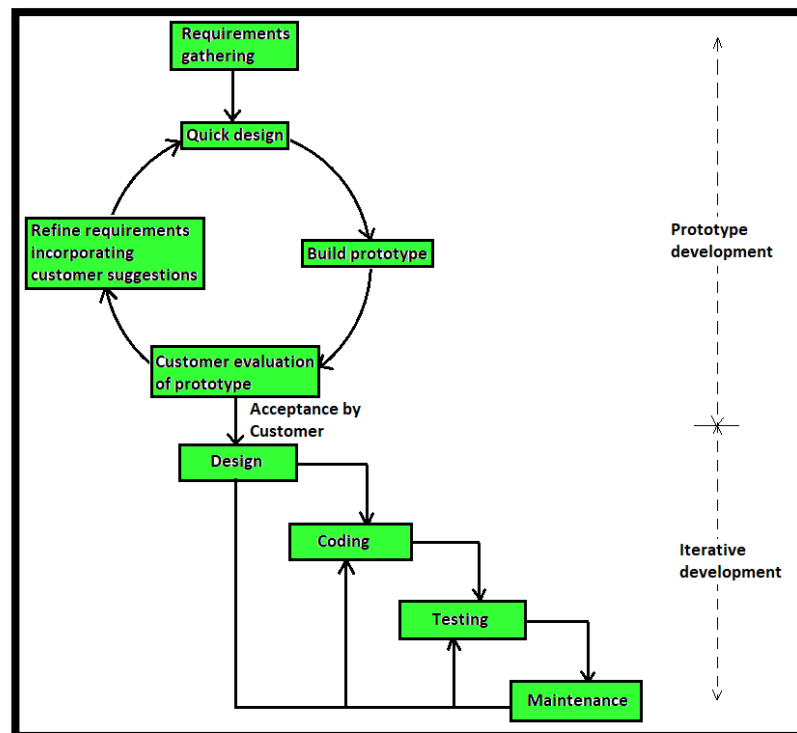
Figure 3.5 Chosen Methodology - Prototyping Model

The methodology that will adopt in this project is prototyping model. The prototyping model is a system development methodology in which prototypes are built, evaluated, and refined until appropriate prototypes are accomplished. The first stage of prototyping model is requirement analysis. At this stage, the requirements of the system are defined in detail by collecting requirements and resources to determine possible problems and user expectations. Next, based on the requirements and resources that has collected, a quick design will be sketch out. Then, the prototype will be built from the design without full functionality or not yet fully tested, so that users can get system ideas and provide feedback. Thus, problems will be discovered through the feedback, allowing developers to return to the analysis stage to rebuild the prototype until the prototype is accepted by the user. After the prototype is accepted by the user, it will be designed, coded, and tested before being published to the user. Finally, maintenance will be carried out to ensure the normal operation of the system without any technical problems.

The construction of a prototype model involves two main activities, which are prototyping development and iterative development. Besides, some similar systems will be studied, analyzed, and compared in the early phases of the prototype

development activities to determine and comprehend their benefits and drawbacks. The literature on comparable systems assists in identifying potential user issues and expectations for the TCM system, avoiding the drawbacks of comparable systems, and maximizing its benefits in the proposed project. Therefore, a significant amount of information and requirements will be gathered in the first stage to develop a successful system for online appointment booking and patient health tracking for TCM.

After the requirement collecting phase, the developer must go through an iterative cycle to create a prototype that satisfies the needs and requirements of the user. In this iterative cycle, several phases must be completed, including the quick design phase, prototype construction phase, prototype evaluation phase, requirements refinement phase, and incorporating customer suggestions phase. A quick design of the TCM system will be created based on the collected information. However, the quick design is a simple design that will not have any full functionality or is not yet fully tested. After that, the actual prototype will be designed and constructed based on the quick design. Next, the proposed system will be presented to the user for preliminary evaluation. User feedback will be collected to determine the advantages and disadvantages of the system. After that, the prototype will be redesigned and rebuilt until the prototype meets the user's requirements and expectations. If the prototype meets the user's requirements and expectations, the methodology will enter the next stage. However, if the prototype does not meet the user's requirements and expectations, this iteration cycle will be repeated until the prototype is accepted by the user.

The final prototype will be developed and implemented as the iterative development activity's outcome. Several stages must be completed during iterative development activities, including design, coding, testing, and maintenance. The project will be implemented through coding. After the implementation process, a testing phase will be performed to check and ensure that the coding is correct. If there is any problem has found during the testing phase, the problem should be resolved as fast as possible. On the other hand, if there is no problem during the testing phase, the system can be implemented and published to the users. Lastly, the developer is required to carry out maintenance work on the system to ensure that the system is running well without errors. [20]

3.2 Technology Involved

3.2.1 Hardware Requirements

Hardware	Specification	Description
Processor	Intel® Core™ i5-8300H CPU @ 2.30GHz 2.30 GHz	Used to execute programs in a laptop.
Memory	12.0 GB	Used for program storage.
Graphic Card	NVIDIA GeForce GTX 1060	Used to present graphical content and interface.
Input Device	Mouse and Keyboard	Used to control the input data.

Table 3.1 Hardware Requirements

The project will be developed and implemented using a laptop equipped with Intel® Core™ i5-8300H CPU @ 2.30GHz 2.30 GHz processor and 12GB memory. In addition, the laptop will use NVIDIA GeForce GTX 1060 to present graphical content and interface. Furthermore, the mouse and keyboard will be used to control the input data.

3.2.2 Software Requirements

Software	Specification	Description
Operating System	Window 10	Used to provide services for laptop computer programs.
Web Browser	Google Chrome	Used to display system output.
Visual Studio Code	Version 2019	Used to develop the project system.
Front-End	HTML, CSS, Bootstrap, JavaScript, and PHP	Used as a development tool for the website's graphical user interface
Database	MySQL Database	Used to store users and appointment data.

Table 3.2 Software Requirements

The operating system implemented in this laptop is Window 10, which is used to provide services for laptop programs, such as website programs. Besides, the web browser used to display system output is Google Chrome. Next, this project will use Visual Studio Code 2019 version for development and implementation. This project

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will use HTML, CSS, Bootstrap, JavaScript, and PHP as the development tools for the website's graphical user interface. In addition, MySQL will be used to store user and inventory data.

3.3 User Requirement

3.3.1 User Requirement- Patient Perspective

How do you recommend the traditional way to record information in paper or file based
30 responses
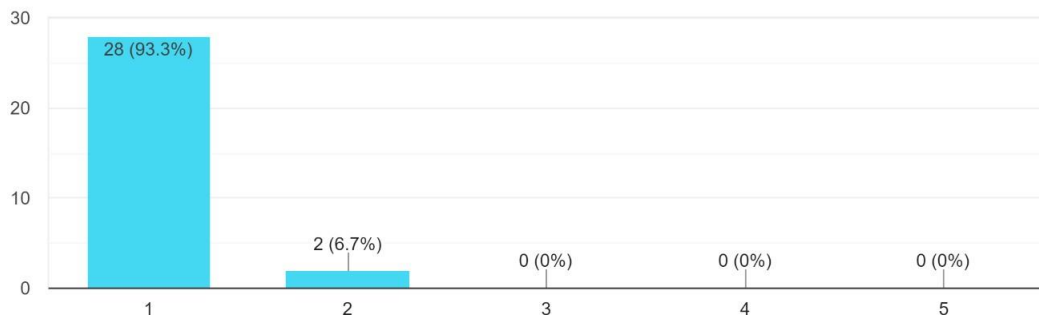
Figure 3.6 User Requirement Response 1

According to the above bar graph, none of the respondents advocated using a file or paper-based records to keep track of information. Besides, 93.3% of respondents said that recording and storing information on paper or in a file was very ineffective and inefficient. While 6.7% of respondents say that systems relying on paper or files are less efficient and less effective.

They may have experienced issues that led to the loss of their hard copies of the receipt, treatment record, or medication list. And it is difficult for them to examine and access their information. As a result, everyone who responded believes that systems based on paper or files should become obsolete.

Describe the effectiveness of appointment booking with 24/7 features via online website
30 responses
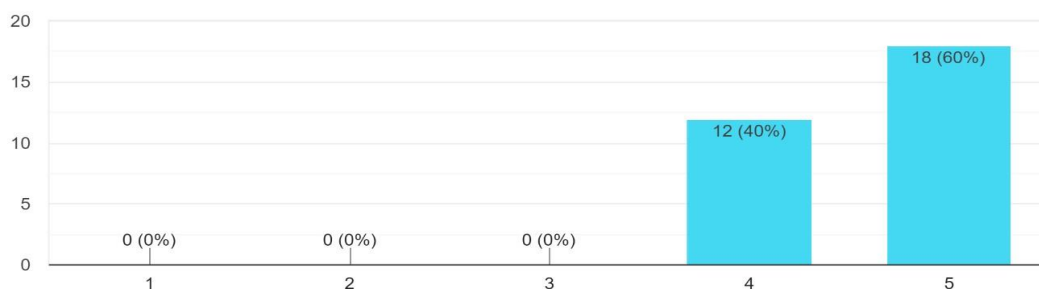
Figure 3.7 User Requirement Response 2

According to the above bar chart, all respondents agree that using an internet website to book appointments with 24/7 functionality is very helpful to the user. According to 60% of respondents, booking with 24/7 functionality is very effective and convenient for them. Additionally, 40% of respondents say they find booking with 24/7 functionality to be helpful.

The reason may be that it is people these days are so preoccupied with their jobs that they are unable to visit a physical business to schedule an appointment. Even if the clinic's business hours have ended, they can still schedule an appointment online. Additionally, it is more accommodating for patients, who may find it difficult to move due to disease or a fracture.

If the appointment date is approaching, what method patient like to get a notification
30 responses
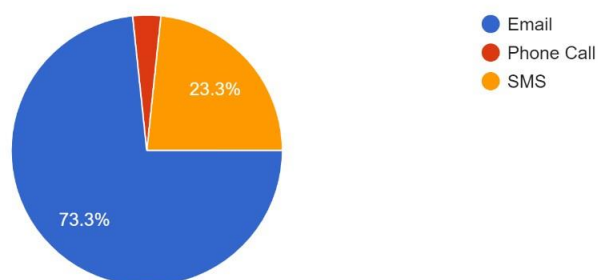
Figure 3.8 User Requirement Response 3

Based on the pie chart above, most respondents preferred email as the platform for user and clinic communications. Email is preferred by 73.3% of respondents as a medium for receiving notifications, such as appointment reminders, cancelled appointments, promotions, and news and notices pertaining to the clinic. While 23.3% of respondents said they would rather receive notifications from the clinic by SMS. However, 3.4 of respondents said they would rather prefer a phone call to acknowledge their appointment is approaching.

Because the user may be at work, school, or a conference and unable to take a phone call, the effect will be that the user dislikes using phone calls as a channel to remind them that their appointment is approaching. The use of SMS as a medium for communication and reminders will disrupt the user's productivity. Additionally, the user will likely forget the text's contents. It's because the user is unable to set an alert alarm or reminder on their phone or laptop to notify them once again when the

appointment is approaching. While email has built-in functionality that can link to a user's Google calendar and further serve as a reminder for an appointment,

How do you recommend a patient have to physically visit a traditional Chinese medicine clinic to perform reschedule or cancel an appointment
30 responses
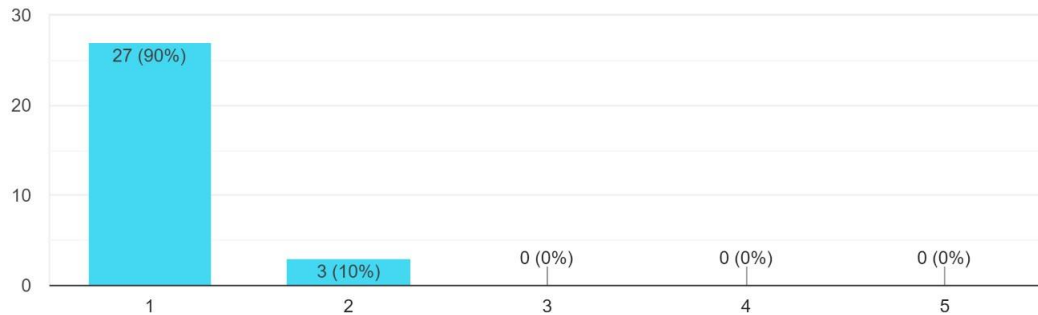
Figure 3.9 User Requirement Response 4

According to the above bar chart, none of the respondents suggested physically visiting the clinic to complete appointment cancellation or rescheduling. According to this bar graph, there are 90% of responders are categorically not advised to physically visit the clinic to handle their appointment. The other 10% of respondents said it was ineffective and inefficient to schedule or cancel an appointment by physically going to the clinic.

Due to the fast-paced and busy nature of life today, they may have had difficulties using their valuable time to reschedule and cancel appointments at the clinic. Additionally, because they must travel a great distance and lose time doing so, it is particularly antagonistic to people who live distant from the clinic.

Make the treatment and practitioner information clear and visible to the patient. Describe the effectiveness level
30 responses
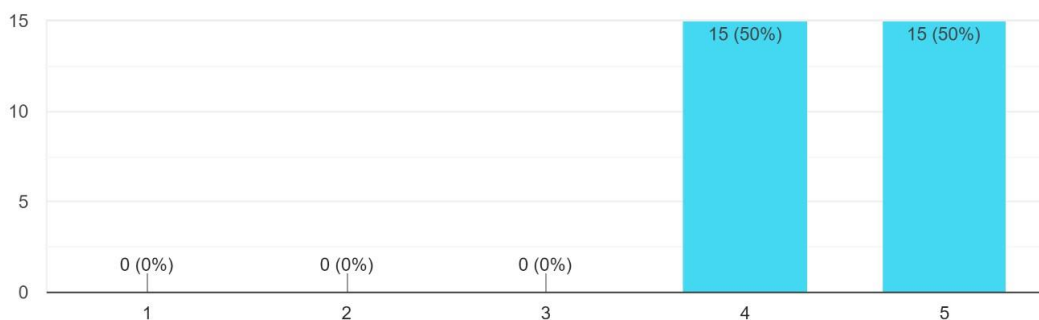
Figure 3.10 User Requirement Response 5

Based on the bar chart above, it can be determined that all of the respondents claim that making the treatment and practitioner information clear and visible to the patient is effective action. In this bar chart, I can find that 50% of respondents perceived this feature as highly effective, and the other 50% of respondents are perceive this feature as effective for them.

The reason behind might be user can gain trust to the treatment when they are clarifying on the way of treatment, and it benefit. Since this is an online website, novice many new users won't be familiar with the clinic, thus this feature was introduced so that they may find out more information. It can also inform users of the capabilities that our clinic provides.

How do you recommend patient need to physically visit a traditional Chinese medicine clinic to perform medical enquiry

30 responses
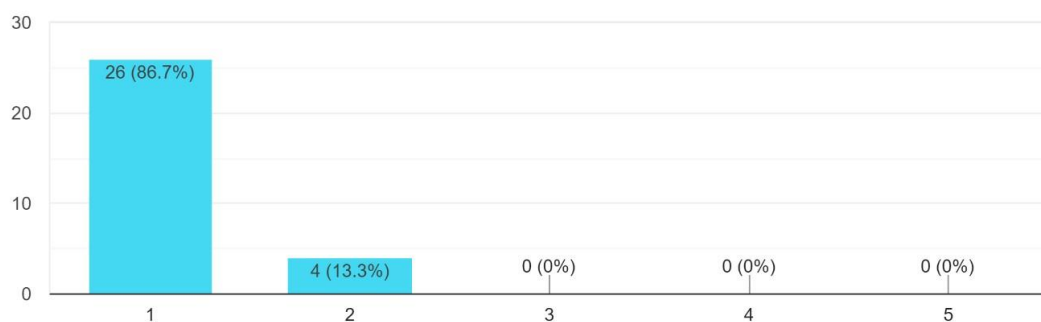
Figure 3.11 User Requirement Response 6

Based on the bar chart above, it can be identified that none of the user are prefer physically to visit a clinic to perform medical enquiry. According to 86.7% of respondents, personally visiting a clinic to conduct medical research is insufficient and ineffective. And 13.3% of respondents said that it wasn't an efficient approach to carry it out.

The reason is that the respondent might have believed that asking a doctor question online would make the user more knowledgeable about their illness and the therapies they intended to employ. Additionally, a doctor can inform a patient that their disease cannot be appropriately and efficiently treated by traditional Chinese medicine if it is discovered that this is the case. This will allow the patient to seek treatment elsewhere in order to minimize the user time and their cost.

Traditional Chinese medicine clinic using one time go approach which patient cannot view back their historical record. Describe about like or dislike

30 responses
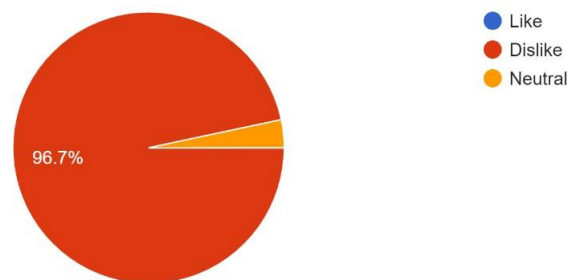
Figure 3.12 User Requirement Response 8

According to the pie chart above, it can be identified that that the majority of respondents disapprove of the one-time-only method, which prevents patients from reviewing their prior medical history or records. The graph demonstrates that 96.7% of respondents dislike not being able to view their past treatment and health record. 3.3% of respondents, though, say they are neutral in response to this question. It's because these features are novel ones that the market currently lacks. As a result, the user might not be familiar with it or aware of its benefits.

For example, parents can track their children's medical history, so doctors are not relying on self-reported symptoms from children. Similarly, older adults can benefit from having their medical history tracked. If their memory begins to wane, having documented medical histories will make treatment easier and they no need to border to remember their past treatment and health status.

What if implement a patient health tracking features, which let the patient view back their historical treatment record.
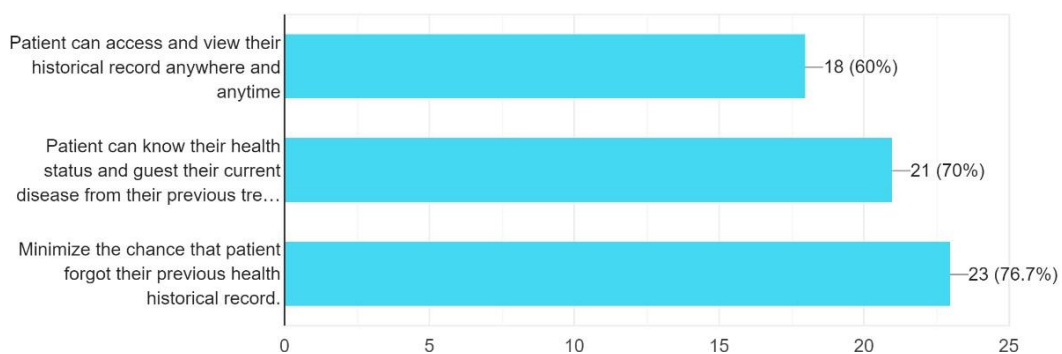
30 responses

Figure 3.13 User Requirement Response 9

From the chart above, it can be identified that the respondents are using the patient health tracking tools based on the bar chart above. Through this feature,

patients can examine their prior medical records. It can be declared that this feature is important in my proposed system because, according to 76.7% of respondents, using it can reduce the likelihood that a patient will forget their prior medical history, and because, according to 70% of users, using it allows patients to learn about their current disease and health status from previous treatment records and because, according to 60% of respondents, using it allows patients to access and view their past medical records from any location. Therefore, the early prognosis of this proposed project was validated with regard to the patient's response to this function.

Nowadays, people lack traditional Chinese medicine knowledge and do not update the latest news related to traditional Chinese medicine. What if th... that can increase user trust in the TCM treatment?
30 responses
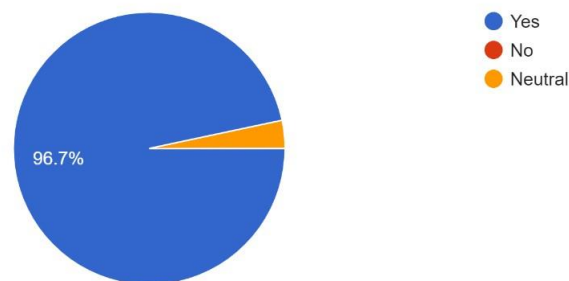
Figure 3.14 User Requirement Response 9

Based on the pie chart above, it can be identified that major of the respondent are claim that the system provides a list of the latest TCM article and news can increase the user trust in the TCM treatment. 96.7% of respondents assert that the TCM system's performance of this function is adequate. In this question, 3.7% of respondents identify as neutral. To maximize the likelihood that users will view and learn about TCM by using this function offered by the system, the system will be developed and implement this feature in a more interactive and entertaining way.

Because of the impact of the West, Chinese medicine is becoming less and less popular as more individuals choose Western medicine. Therefore, the introduction of this feature has the potential to significantly raise consumers' knowledge of TCM and boost their confidence in TCM therapies. Lastly, it can increase the clinic's profitability.

Is that important for traditional Chinese medicine clinics to receive and get patient feedback?
30 responses

- ● Important
- ● Not important
- ● Neutral

100%

Figure 3.15 User Requirement Response 10

Based on the pie chart above, it can be identified that all of the respondents are claim feedback function is important in TCM system. With this function user able to create and view the feedback have been created by the other user or himself. As point of the developer and clinic owner, the comments of patients and other service users regarding the healthcare services provided are vital information that comes from patient feedback. Analyzing patient feedback will provide a clear understanding of what aspects of care delivery need further improvement. As business owner address their complaints, the business owner will gain more devoted consumers. From the standpoint of a web developer, they can add new features and change the user interface depending on considerations of cognitive science and user experience.

Medical inquiry features integrate with the system, therefore the user can perform real-time chat with the practitioner online. Is that can save patients time and more convenience?
30 responses

- ● Yes
- ● No
- ● Neutral

100%
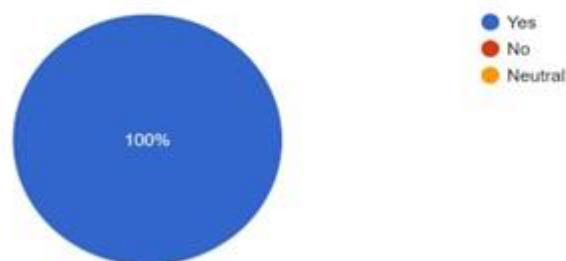
Figure 3.16 User Requirement Response 11

Based on the pie chart above, it can be identified that all of the respondents are more likely with the real-time chat features. The reason behind might be the user able to communication with the practitioner without visiting the clinic physically. If the patient has a straightforward illness, the doctor can provide a list of suitable traditional Chinese medicine to them in real-time conversation. Users will get various advantages, including reduced misunderstanding regarding their own health and time saved for

patient visits. Users will find it convenient to be able to communicate with doctors at various times and places.

3.3.2   User Requirement- Practitioner Perspective

How do you recommend on practitioners have to manually remember or manually record their appointment schedule?
30 responses
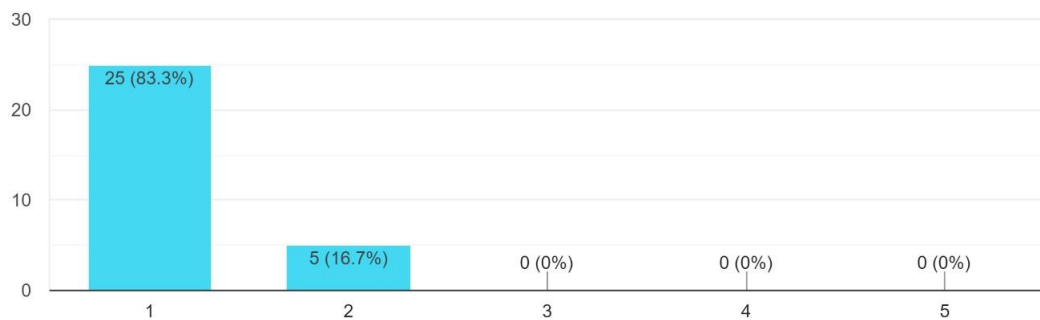
Figure 3.17 User Requirement Response 1

Based on the above bar chart, it can be identified that none of the practitioners recommend physically keeping track of or recording their appointment schedule. 83.3% of practitioners state that manually writing down or remembering their appointment schedule is inefficient and incompatible with their memory. They are forgetting portions of the appointment schedule since their memory capacity is limited and too many appointments will overload their memory. Additionally, 16.7% of respondents said it would be ineffective to physically record and remember their patient's appointment schedule.

What if record practitioner appointment schedule in database and practitioner able to view and manage their appointment schedule. Describe the effectiveness level
30 responses
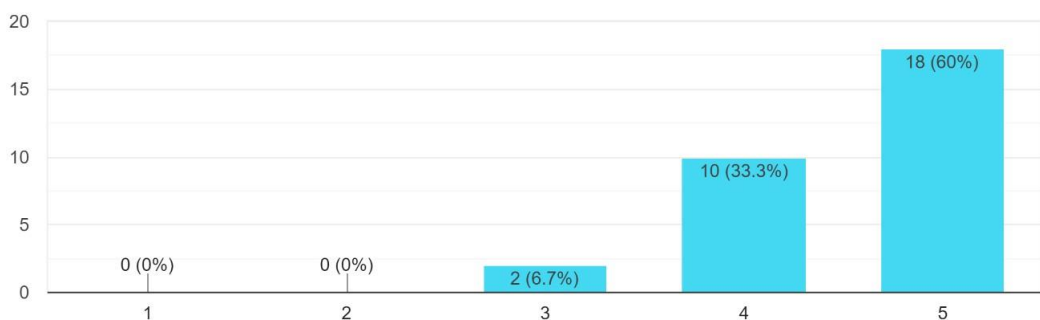
Figure 3.18 User Requirement Response 2

Based on the aforementioned bar chart, it can be identified that the majority of respondents describe keeping track of practitioners' appointment schedules in databases

so they can examine and manage them effectively rather than having to manually keep track of them. A small percentage of responders chose the neutral option for this question. According to the bar graph above, 60% of respondents believe that using these tools to view and manage their appointment schedule is the most efficient method to do so. While 33.3% of those surveyed believe these features are helpful and efficient. Additionally, 6.7% of respondents made a neutral claim.

The reason might be the memory of practitioners is limited, they struggle to remember too many schedules, and they have trouble recalling those that are more than a month away. They will forget some of the scheduled appointment since they are busy. Due of their busy schedules, some practitioners are unable to manually modify their schedules and end up not matching those of their patients. Additionally, with this feature, practitioners won't have to remember their schedule because they have the freedom to check it wherever they are and whenever they want.

Are that misdiagnose chances will be reduced when practitioner able to view and access their patient historical treatment record?
30 responses
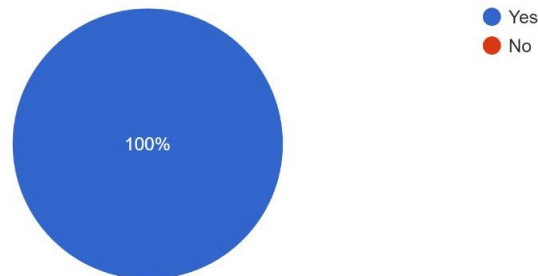
Figure 3.19 User Requirement Response 3

Based on the pie chart above, it can be identified that all of the respondents are belief that when they are able to view and access their patient historical treatment and health record, the chances of misdiagnose will gradually reduce. The reason behind is that the practitioner can access and view the patient's prior treatment record to double-check their intended course of therapy before acting. This serves as a decision support. If every patient had an electronic health record that was a record of all of their medical history. This reduces the likelihood that a practitioner would overlook important details in a patient's history. Access to medical information quickly, easily, and effectively is essential for lowering the likelihood of such diagnosing errors.

Which preferable format of patient historical treatment when practitioner export the report
30 responses
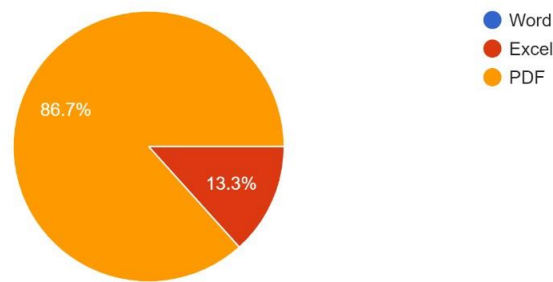
Figure 3.20 User Requirement Response 4

According to the pie chart above, the majority of respondents prefer to export patient health reports in PDF file format. A minority of responders, prefer to export the patient health report in Excel file format. While 13.3% of respondents choose Excel as the file format for the patient health report, 86.7% of respondents prefer using PDF files. One of the main reasons why practitioner like this format is that PDF files are simple to prepare and share. The various formats can make document creation complicated. Practitioner may export your document as a PDF file and share it with everyone even when using Microsoft Word or Excel. Although, minor of the practitioner prefers Excel file format it is because formatting is frequently used to make data appear more engaging and descriptive. Additionally, the doctor is capable of importing database or CSV data. Considering that PDF is compatible with everyone, the majority of respondents preferred utilizing it.

What if implementing a disease report features for the practitioners further analyze the data. Describe the effectiveness level
30 responses
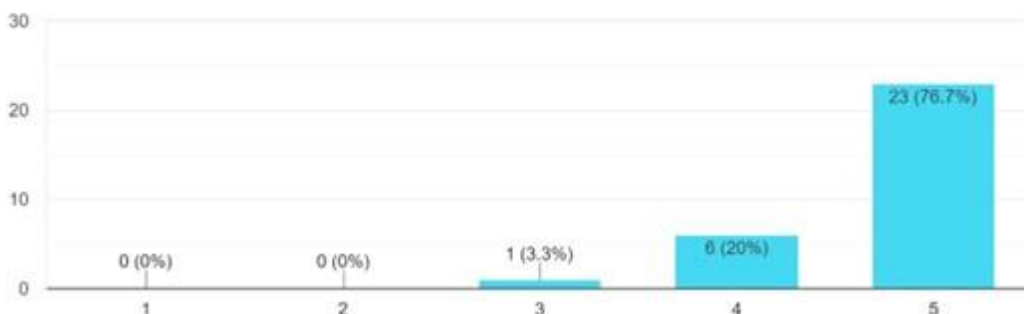
Figure 3.21 User Requirement Response 5

According to the bar chart above, it can be identified that that most respondents approve of the system's illness report capabilities, which let a practitioner further evaluate the data. According to the bar graph above, 76.7% of respondents are willing

to use this feature because they think it will be extremely beneficial to them as they continue to analysis the disease data. And 20% of respondents said that these qualities help them while they are conducting research and analysis. However, 3.3% of those surveyed state their response to be neutral. The market is currently lacking these characteristics because it is innovative features. The user may not be familiar with it as a result.

Graphs can be difficult to comprehend, frequently needing us to carefully examine the data and make note of what is being shown and what can be comprehended. This feature is likely to be used by practitioners because the system will automatically generate graphs in a variety of graph formats. As a result, while manually plotting the graph, the practitioner can reduce the amount of time required and the likelihood of human mistake.

How do you recommend that practitioner have to apply leave in a manual way without computerized the data
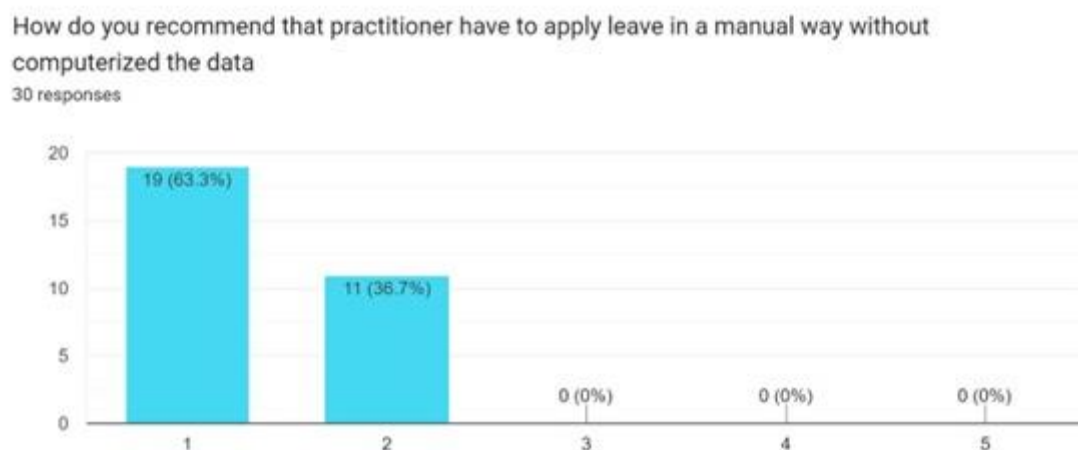
30 responses

Figure 3.22 User Requirement Response 6

Based on the bar chart above, it can be identified that all of the respondents are claim that apply leave in a manual way without computerized the data is not an effective way to doing. According to 63.3% of respondents, applying for leave manually in the absence of an automated system is a laborious and ineffective process. And 36.7% of respondents said that not having a computerized means to request a leave of absence is inconvenient for the practitioner.

The reason behind is that the practitioner is tired and impatient of filling out leave paper forms. Because they must prepare a tangible copy of their letter requesting a leave of absence and deliver it to the business owner. Moreover, the hardcopy leave

letter is vulnerable to water damage and is easily lost. Additionally, because there are no automated features for applying for leaves of absence, it will take the business owner some time to view or accept when a practitioner applies.

Figure 3.23 User Requirement Response 7
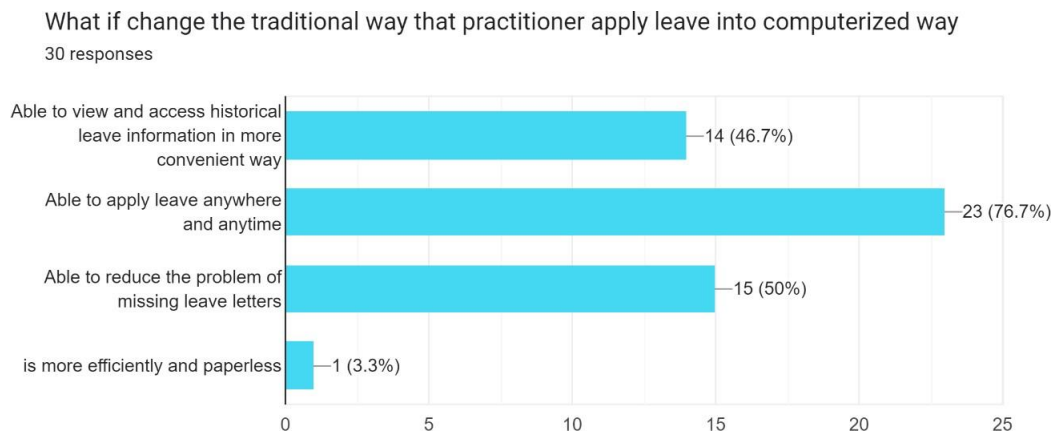
Based on the preceding bar chart, it can be identified that the respondents are unquestionably and prefer applying for leave in a mechanized and automated manner. With the help of this function, practitioners can request leave at any time and from any location and all they need is network connectivity and system access. The majority of practitioners assert that being able to request leave at any time and from any location is the biggest benefit they may receive, according to 76.7% of respondents. The benefit of adopting this function, according to 50% of respondents, is being able to lessen the issue of missing leave letters. And 46.7% of respondents have noticed that it is now easier for them to read and access historical leave information. 3.3% of those surveyed said that the paperless nature of the function made applying for leaves more efficient. Therefore, the early prognosis of this proposed project was validated with regard to the patient's response to this function.

3.3.3 Functional Requirement

3.3.3.1 Functional Requirement – Patient Perspective

User Requirement Functional Requirement	Description
Able to make an appointment booking online	Allow users to perform appointment booking without physically visiting the TCM clinic.
Able to receive a reminder appointment booking notification	Allow users to receive reminder appointment booking notifications if their appointment is coming up
Able to reschedule or cancel their appointment booking	Allow users to easily reschedule or cancel their appointment booking without physically visiting the TCM clinic.
Able to search and view the treatment and practitioner information	Allow users to search and view the treatment and practitioner information to gain trust in the TCM clinic.
Able to perform medical inquiry	Allow users to perform medical inquiries by a chat with the practitioner in the web application
Able to view and download their historical treatment record	Allow users to view and download historical treatment records in a computerized format.
Able to view and search trading articles and news related to TCM	Allow users to view and search trading articles and news related to TCM to increase user trust in TCM.
Able to view other user's feedback and perform feedback	Allow users to view other users' feedback in a holistic view and perform feedback without physically visiting the TCM clinic.
Able to update personal information easily	Allow users to easily update and change their personal information in the web application.

Table 3.3 Functional Requirement - Patient Perspective

3.3.3.2 Functional Requirement – Practitioner Perspective

User Requirement Functional Requirement	Description
Able to view and manage their appointment schedule	Allow users to easily manage and view their appointment schedule in computerized format.
Able to view and download their patient historical treatment record	Allow users to view and download their patient historical treatment records in a computerized format.
Able to reschedule or cancel their appointment booking	Allow users to easily reschedule or cancel their appointment booking without physically visiting the TCM clinic.
Able to access and view the disease report	Allow users to access and view the disease report for further analyses the data.
Able to view historical leave information and apply leave application	Allow users to view historical leave information and apply leave application in computerized way.
Able to view and download their historical treatment record	Allow users to view and download historical treatment records in a computerized format.
Able to view their patient's feedback and perform feedback	Allow users to view their patient's feedback in a holistic view and perform feedback without physically visiting the TCM clinic.
Able to update personal information easily	Allow users to easily update and change their personal information in the web application.

Table 3.4 Functional Requirement - Practitioner Perspective

3.3.3.3 Functional Requirement – Business Owner Perspective

User Requirement Functional Requirement	Description
Able to view, approve, and cancel the practitioners leave application	Allow users to view, approve, and cancel the practitioner leave application
Able to view and download their historical treatment record	Allow users to view and download historical treatment records in a computerized format.

Able to view all the feedback and perform feedback	Allow users to view all the feedback in a holistic view and perform feedback without physically visiting the TCM clinic.
Able to update patient and practitioner personal information easily	Allow users to easily update and change the patient and practitioner personal information in the web application.
Able to create a new practitioner account	Allow users to create a new practitioner account in computerized way if new practitioner is joining to the TCM.

Table 3.5 Functional Requirement - Business Owner Perspective

3.3.4 Non-Functional Requirement

Non-Functional Requirement	Description
Real time basic	The system should be able to receive user input and response to the user in real time basic.
Reminder appointment booking notification	The system should be able to send user reminder appointment booking notification in email format.
Download historical treatment record	The system should be able to let user download their historical treatment record in PDF format.
Simplicity	The system user interface should match the user's mental modal for easy understanding.
Accessibility	The system should be easy to access anytime and anywhere.

Table 3.6 Non-Functional Requirement

3.4 Timeline

3.4.1 Timeline-FYP1

TASK	Period													
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Chapter 1- Introduction	█													
Project Background	█													
Problem Statement and Motivation	█													
Project Objectives	█													
Project Scope and Direction	█													
Requirement Gathering	█													
Refine Project Objective and Project Scope	█													
Contributions	█													
Report Organization	█													
Chapter 2- Literature Review		█												
Analyse/Review on other websites and system		█												
Resolve the weaknesses of similar system		█												
Compare Similar Systems		█												
Chapter 3- Methodology and System Design			█											
Define Methodology			█											
Determine System Hardware and Software			█											
Block Diagram			█											
Use Case Diagram			█											
Project Timeline			█											
Future Develoment Plan			█											
Chapter 4- Implementation and Testing				█	█	█	█	█	█	█	█	█	█	█
Implementation Module				█	█	█	█	█	█					
Create a Prototype									█					
Prototype Testing										█				
Design Poster											█			
Black Box Testing											█			
User Testing											█			
Finalise FYP 1 Report												█		
FYP 1 Report Submission													█	
FYP 1 Demonstration														█

Figure 3.24 Timeline - FYP1

3.4.2 Timeline-FYP2

TASK	Period													
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Refinement of Chapter 1, 2, 3	█													
Overall Refinement of Chapter 1	█													
Overall Refinement of Chapter 2	█													
Overall Refinement of Chapter 3	█													
Project Timeline	█													
Chapter 5- Implementation and Testing		█	█	█	█	█	█	█	█	█				
Implementation Module		█	█	█	█	█	█	█						
Define Technology and Tools Used		█	█	█	█	█	█	█						
Define Algorithim Used		█	█	█	█	█	█	█						
Define API Used		█	█	█	█	█	█	█						
Implementation Issues and Challenges								█						
Black Box Testing									█					
User Testing										█				
Chapter 3- System Specification											█			
Analysis											█			
Design											█			
System Evaluation/Verification											█			
Chapter 4- CONCLUSION AND RECOMMENDATION											█	█	█	█
Project Review, Discussions, and Conclusion											█			
Novelties and Contributions											█			
Future Work											█			
Prototype Testing												█		
Limitation												█		
Finalise FYP 2 Report												█		
FYP2 Report Submission														█
FYP 2 Demonstration														█

Figure 3.25 Timeline - FYP2

CHAPTER 4: SYSTEM DESIGN

4.1 Entity Relationship Diagram
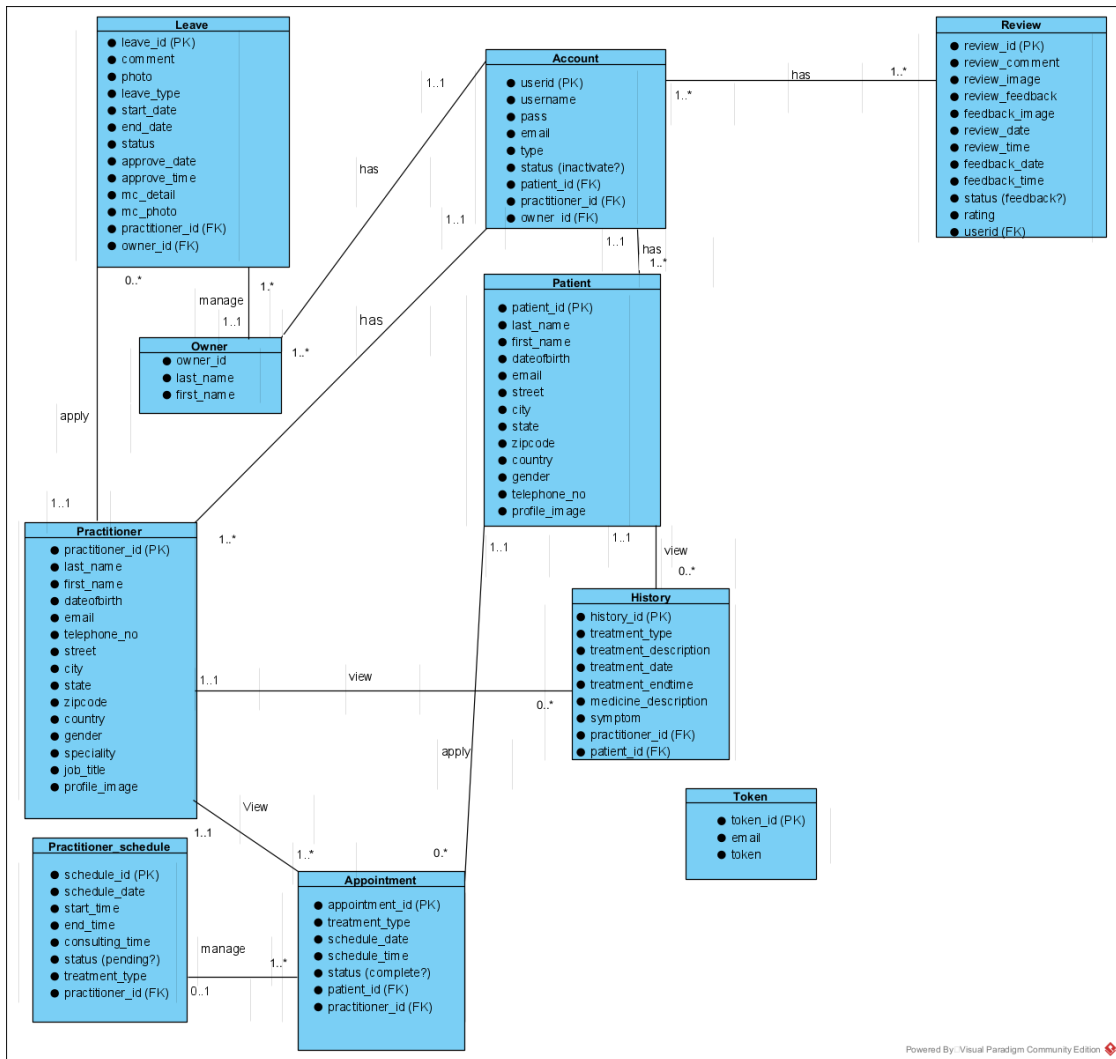
Figure 4.1 ERD Diagram

4.2 USE CASE
4.2.1 USE CASE DIAGRAM
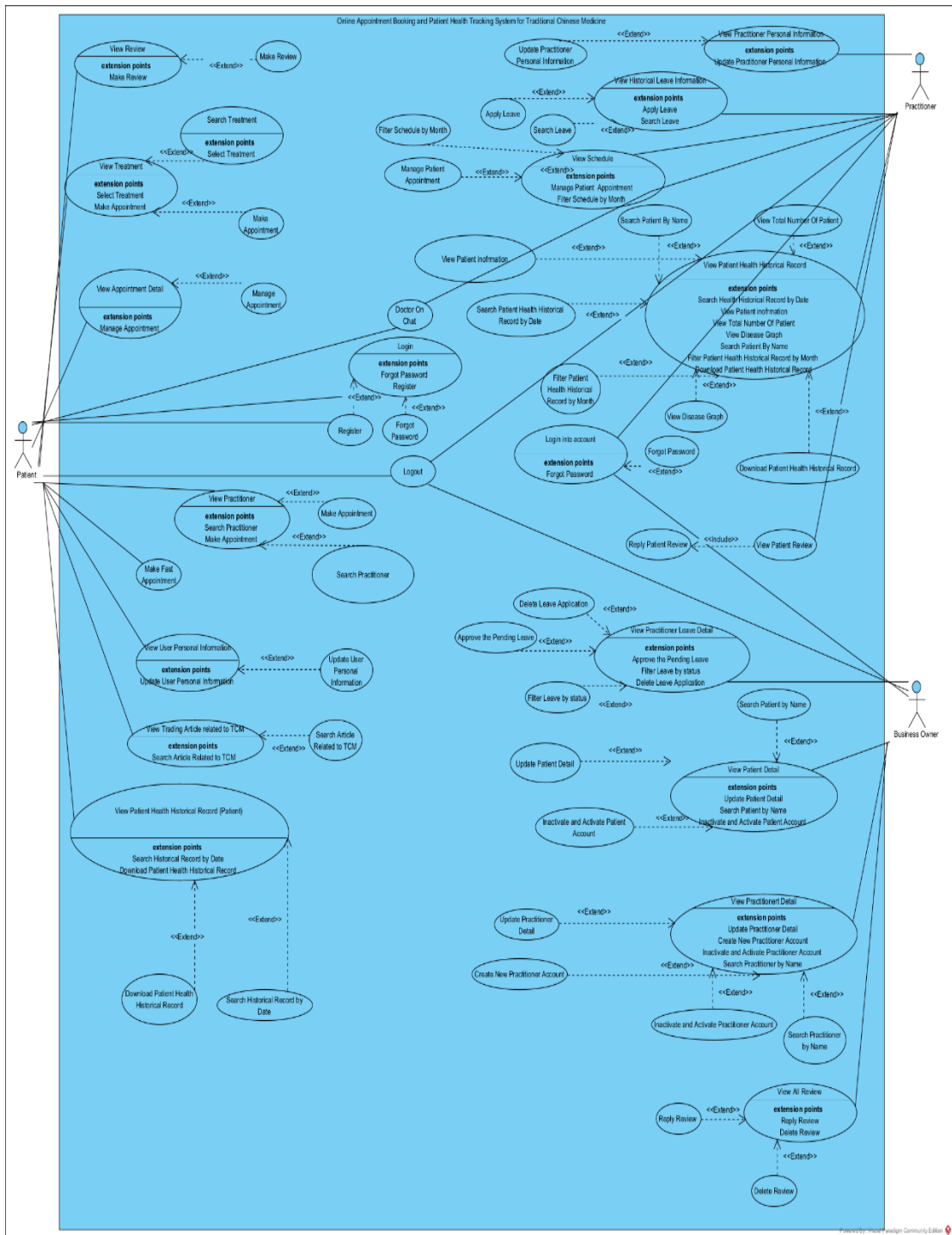
Figure 4.2 USE CASE Diagram

4.2.2 Use Case Description

4.2.2.1 View Review – Patient Perspective

USE CASE DESCRIPTION
Name – View Review
Brief Description – To Allow Patient to View Clinic Review and Testimonial
Actors - Patient
Relationships – Association: Include: Extends: Make Review Generalization:
Preconditions – User have login into his/her account

Basic Flow –
 	
    1   Users click on the review link in the navigation header
 	
    2   System will show a list of the existing user's review and testimonial

Alternate Flows –
 	
    1   When user click on the "make review" button
 	
    2   System will prompt out an input box modal, asking user to enter all the comment.
 	
    3   Users fill in all the input field.
 	
    4   Users click on the submit button.
 	
    5   System will receive the user input and validate user input.
 	
    6   System will store user input into database.
 	
    7   System will prompt out a review successfully send message

Exception Flows – Incorrect user input
Post Conditions- • Successful view all the clinic's review and testimonial • User input will record into database and display a review successfully send message.

Table 4.1 View Review - Use Case Description

4.2.2.2 View Treatment – Patient Perspective

USE CASE DESCRIPTION
Name – View Treatment
Brief Description – To Allow Patient to View Available Treatment and Perform Booking
Actors - Patient

Relationships – Association: Include: Extends: Search Treatment, Make Appointment Generalization:
Preconditions – User had login into his/her account

Basic Flow –
 	
   1   Users click on the Treatment link in the navigation header.
   2   System will display treatment main page with a treatment option selection menu.
   3   User can choose either one of the treatments options.
   4   System will display the content and information of the treatment that user selected

Alternate Flows –
 	
If user perform searching by inserting disease name
 	
   1   User filling the searching input field.
   2   Users click on the submit button.
   3   System will receive user's input and validate user's input.
   4   System will display the treatment content that related to the disease users enter.
 	
If user perform appointment booking.
 	
   1   System will display an appointment booking form.
   2   Users fill in all the input field.
   3   Users click on the submit button.
   4   System will receive user's input and validate user's input.
   5   System will check on the practitioner schedule.
   6   System will record the user's input into database.
   7   System will prompt out an appointment successfully booking message

Exception Flows – Incorrect user input

Post Conditions-
 	
   • User able to view all the treatment information and content.
   • The correct treatment result will be shown after user perform searching.
   • User input will record into database and display an appointment successfully booking message.

Table 4.2 View Treatment – Use Case Description

4.2.2.3 View Appointment Detail – Patient Perspective

USE CASE DESCRIPTION
Name – View Appointment Detail
Brief Description –   To Allow User View Appointment Detail and Manage his/her Appointment
Actors - Patient
Relationships – Association: Include: Extends: Manage Appointment Generalization:
Preconditions –   User had login into his/her account.   User had performed appointment booking

Basic Flow –
 	
     1   Users click on the Appointment link in the navigation header.
 	
     2   System will display appointment information.
 	
     3   Users click next button to view following appointment information.
 	
     4   System will display the following appointment information.

Alternate Flows –
 	
 If user edit their appointment.
 	
     1   Users click on the edit button.
 	
     2   System will change the input field become editable.
 	
     3   Users fill in all the input field.
 	
     4   Users click on the submit button.
 	
     5   System will receive the user input and validate user input.
 	
     6   System will check on the practitioner schedule.
 	
     7   System will update the database record.
 	
     8   System will prompt out an appointment detail successfully changed message.
 	
 If user delete their appointment
 	
     1   Users click on the delete button.
 	
     2   System will display a delete input field.
 	
     3   Users fill in "DELETE" in the input field.
 	
     4   Users click on the submit button.
 	
     5   System will receive the user input and validate user input.
 	
     6   System will delete the database record.

7. System will prompt out an appointment successfully deleted message
Exception Flows – Incorrect User Input
Post Conditions-   - User able to view his/her appointment detail.   - System able to update or delete the database record and display a success message.

Table 4.3 View Appointment Detail – Use Case Description

4.2.2.4 Doctor on Chat – Patient Perspective

USE CASE DESCRIPTION
Name – Doctor on Chat
Brief Description – To Able Patient Immediately Consult with the Practitioner
Actors – Patient, Practitioner
Relationships – Association: Include: Extends: Generalization:
Preconditions – User had login into his/her account
Basic Flow –   - Patients click on the doctor on chat link in the navigation header.   - System will display a chat box.   - Patient type in the message.   - Patients click on the send button.   - System will receive the user input and transfer to the practitioner site.   - Practitioner will receive the patient message.   - Practitioner type in the message.   - Practitioners click on the send button.   - System will receive the user input and transfer to the patient site.   - Patient will receive the practitioner message.
Alternate Flows –
Exception Flows –
Post Conditions- Patient and Practitioner able to send message and receive message in real time basic

Table 4.4 Doctor on Chat– Use Case Description

4.2.2.5 View Practitioner – Patient Perspective

USE CASE DESCRIPTION
Name – View Practitioner
Brief Description –   To Allow Patient to View Practitioner Information and Perform Booking
Actors - Patient
Relationships – Association: Include: Extends: Search Practitioner, Make Appointment Generalization:
Preconditions – User had login into his/her account
Basic Flow –   1   Users click on the Practitioner link in the navigation header.   2   System will display practitioner main page with all practitioner's basic information and their schedule   3   Users click on the view more information button.   4   System will display practitioner information in detail on the system prompt out modal
Alternate Flows –   If user perform searching by inserting treatment type   1   User filling the searching input field.   2   Users click on the submit button.   3   System will receive user's input and validate user's input.   4   System will display the practitioner content that related to the treatment type users enter.   If user perform appointment booking   1   System will display an appointment booking form.   2   Users fill in all the input field.   3   Users click on the submit button.   4   System will receive user's input and validate user's input.   5   System will check on the practitioner schedule.   6   System will record the user's input into database.   7   System will prompt out an appointment successfully booking messages
Exception Flows – Incorrect user input
Post Conditions-

- User able to view all the practitioner information and content.

- The correct practitioner result will be shown after user perform searching.

- User input will record into database and display an appointment
  successfully booking message.

Table 4.5 View Practitioner – Use Case Description

4.2.2.6 Make Fast Appointment – Patient Perspective

USE CASE DESCRIPTION
Name – Make Fast Appointment
Brief Description – To Allow Patient Perform Appointment Booking Quickly by random assign practitioner
Actors - Patient
Relationships – Association: Include: Extends: Generalization:
Preconditions – User had login into his/her account
Basic Flow –   1 Users fill in all the input field.   2 Users click on the submit button.   3 System will receive the user input and validate the user input.   4 System will check on the practitioner schedule.   5 System will store the user input into database.   6 System will prompt out an appointment successfully booking message
Alternate Flows –
Exception Flows – Incorrect user input
Post Conditions-   • System will store user input into database and prompt out an appointment successfully booking message

Table 4.6 Make fast Appointment – Use Case Description

4.2.2.7 View User Personal Information – Patient Perspective

USE CASE DESCRIPTION
Name – View User Personal Information
Brief Description – To Allow Patient View his/her Personal Information and Perform Editing

Actors - Patient
Relationships – Association: Include: Extends: Update User Personal Information Generalization:
Preconditions – User had login their account
Basic Flow –   User click on the account link in the navigation header   System will display user information in table format

Alternate Flows –
 	
 If user perform editing
 	
     1   Users click on the editing button.
 	
     2   System will change the input field into editable.
 	
     3   Users fill in all the input field.
 	
     4   Users click on the submit button.
 	
     5   System will receive user input and validate the user input.
 	
     6   System will update the database record.
 	
     7   System will display an update personal information successfully message.

Exception Flows –   Incorrect user input   Username and Password have been taken by another user
Post Conditions-   • System will update the database record and prompt out an update personal information successfully message

Table 4.7 View User Personal Information – Use Case Description

4.2.2.8 Trading Article – Patient Perspective

USE CASE DESCRIPTION
Name – Trading Article
Brief Description – To Allow Patient View Latest Article that related to TCM
Actors - Patient
Relationships – Association: Include: Extends: Searching Trading Article

Generalization:
Preconditions –
Basic Flow –   1   Users click on the trading article link in the navigation header.   2   System will be searching the trading article by using API and display search result.
Alternate Flows –   If user perform searching   1   Users fill in the search article input field.   2   Users click on submit button.   3   System will receive user input.   4   System searching the trading article by using API.   5   System will display the Trading article related to the search keyword.
Exception Flows – Incorrect User Input
Post Conditions- System able to display the trading article that related to the TCM

Table 4.8 Trading Article – Use Case Description

4.2.2.9 View Patient Health Historical Record – Patient Perspective

USE CASE DESCRIPTION
Name – View Patient Health Historical Record
Brief Description – To Allow Patient View his/her Historical Treatment Record
Actors - Patient
Relationships – Association: Include: Extends: Search Historical Record by Date, Download Patient Health Historical Record   Generalization:
Preconditions – User had login into his/her account
Basic Flow –   1   Users click on the Historical link in the navigation link.   2   System will display Patient historical Treatment record in table format.   3   Users click on view more button.   4   System will display Patient historical Treatment record in detail by modal basic.
Alternate Flows –   If user perform searching historical treatment record by date   1   Users fill in the search input field.   2   Users click on submit button.

	3	System will receive user input.
	4	System will search the historical treatment record by the data given by user.
	5	System will display the search result.
If user download patient health historical record		
	1	Users click on download button.
	2	Users select which directory that file will be saved.
	3	System will outfile the information into PDF file format.
	4	System will prompt out a download successfully message.
Exception Flows – Invalid file directory		
Post Conditions- The file will download successfully and store in correct directory		

Table 4.9 View Patient Health Historical Record – Use Case Description

4.2.2.10 Logout – Patient Perspective

USE CASE DESCRIPTION		
Name – Logout		
Brief Description – To Allow User Perform Logout and Erase his/her Session		
Actors – Patient, Practitioner, Business Owner		
Relationships – Association: Include: Extends: Generalization:		
Preconditions – User had login into his/her account		
Basic Flow –		
	1	Users click on logout button.
	2	System will delete his/her session.
	3	System will redirect user to login page
Alternate Flows –		
Exception Flows –		
Post Conditions- System able to delete user session and redirect user to login page		

Table 4.10 Logout – Use Case Description

4.2.2.11 Login – Patient Perspective

USE CASE DESCRIPTION
Name – Login
Brief Description – To Allow User Login Into his/her Account in this Web Application

Actors – Patient
Relationships – Association: Include: Extends: Forgot Password, Register Generalization:
Preconditions – Patient Had Register his/her Account

Basic Flow –
 	
    1   User enters username and password.
    2   System will receive user input and validate their username and password.
    3   System will redirect user to main page

Alternate Flows –
 	
If the user clicks "Forgot Password" button
 	
    1   System will display a forgot password form, asking the user to enter his/her email address.
    2   Users fill in the input field.
    3   Users click on submit button.
    4   System will send the reset password link through user's email.
    5   System will display a success message to acknowledge user that email had send.
    6   User reset their password by using the reset password link that system generated.
    7   System will update their database.
 	
If user clicks "Register" button
 	
    1   System will display a registration form.
    2   Users fill in the input field.
    3   Users click on submit button.
    4   System will receive the user input and validate the user input.
    5   System will check the username and email whether have been existed.
    6   System will store user input into database.
    7   System will display a register an account successfully messages and redirect user to login page.

Exception Flows – Incorrect user input Invalid Email Address Username and Email Address have been existed in database
Post Conditions-   •   User able login into their account successfully

• System able to update new password into database when user perform reset password.
• System able to store user input into database and display register an account successfully messages.

Table 4.11 Login – Use Case Description

4.2.2.12 View Patient Health Historical Record – Practitioner Perspective

USE CASE DESCRIPTION
Name – View Patient Health Historical Record
Brief Description – To Allow Practitioner to View Patient Health Historical Record and View Total Number of Patient (KPI)
Actors - Practitioner
Relationships – Association: Include: Extends: Download Patient Health Historical Report, Search Patient Health Historical Record by Name or Date, View Patient Information, Filter Patient Health Historical Report, View Total Number of Patient, Disease Graph   Generalization:
Preconditions –   Practitioner had login into his/her account Practitioner had existing patient

Basic Flow –
   1   Users click on the patient health tracking link in the navigation header.
   2   System will display the patient health historical record.
   3   System will display total number of patient report.
   4   System will display a disease graph.
   5   Users click on view more button.
   6   System will display detail information of patient health historical record in modal basic.

Alternate Flows –
 If user perform download patient health historical report
   1   Users click on download button.
   2   Users select which directory that file will be saved.
   3   System will outfile the information into PDF file format.

> 4   System will prompt out a download successfully message.
>
> If user perform search patient health historical record by Name or Date
>
> 1   Users fill in the search input field.
>
> 2   Users click on submit button.
>
> 3   System receives the user input and validate the user input.
>
> 4   System will display the search result according to user input .
>
> If user click on view patient information button
>
> 1   Users click on view more button.
>
> 2   System will receive user input.
>
> 3   System will prompt out a modal that show the patient information.
>
> If user perform filtering by month
>
> 1   Users click on the filter button.
>
> 2   System will display a drop-down option.
>
> 3   Users select an option and press submit button.
>
> 4   System will display the patient health historical record according user filter input.
>
> If user click on the total number of patient button
>
> 1   System will display total number of patient report and the KPI If user click on the disease graph button.
>
> 2   System will display a disease graph and the disease ratio.

Exception Flows –
Invalid file directory

Post Conditions-
• System able to display the patient health historical record.   • System able to display correct total number of patients related to the practitioner.   • System able to generate and display a disease graph.   • The file will download successfully and store in correct directory.   • System able to display the correct result according user input.

Table 4.12 View Patient Health Historical Record – Use Case Description

4.2.2.13 View Practitioner Personal Information – Practitioner Perspective

USE CASE DESCRIPTION
Name – View Practitioner Personal Information
Brief Description – To Allow Practitioner View his/her Personal Information and Perform Editing
Actors - Practitioner

Relationships – Association:
Include:
Extends: Update Practitioner Personal Information Generalization:
Preconditions –   User had registered an account in this web application User had login their account
Basic Flow –   1   Practitioners click on the account link in the navigation header   2   System will display practitioner personal information in table format
Alternate Flows –   If user perform editing   1   Users click on the editing button.   2   System will change the input field into editable.   3   Users fill in all the input field.   4   Users click on the submit button.   5   System will receive user input and validate the user input.   6   System will update the database record.   7   System will display an update personal information successfully message.
Exception Flows –   1   Incorrect user input.   2   Username and Password have been taken by another user.
Post Conditions-   System will update the database record and prompt out an update personal information successfully message

Table 4.13 View Practitioner Personal Information – Use Case Description

4.2.2.14 View Historical Leave Information – Practitioner Perspective

USE CASE DESCRIPTION
Name – View Historical Leave Information
Brief Description –   To Allow Practitioner to View his/her Historical Leave Information and Apply Leave
Actors - Practitioner
Relationships –   Association:

Include:
Extends: Apply Leave, Search Leave Generalization:
Preconditions – Practitioner had login into his/her account
Basic Flow –   1   Users click on the leave link in the navigation header.   2   System will display practitioner historical leave information.
Alternate Flows –   If user perform search by date   1   Users fill in the search input field.   2   Users click on submit button.   3   System will receive user input and validate user input.   4   System will display the search result.   If user perform apply leave   1   Users click on the apply leave button.   2   System will prompt out a apply leave form modal.   3   Users fill in the input field.   4   Users click on the submit button.   5   System will receive user input and validate user input.   6   System will store the user input into database.   7   System will display leave is pending successfully message.
Exception Flows – Incorrect user input
Post Conditions-   •   System able to display correct historical leave information to the practitioner.   •   System able to store user input into database and display leave is successfully pending message.

Table 4.14 View Historical Leave Information – Use Case Description

4.2.2.15 View Schedule – Practitioner Perspective

USE CASE DESCRIPTION
Name – View Schedule
Brief Description – To Allow Practitioner to View the his/her Appointment Schedule and Mange his/her Patient Appointment Schedule
Actors - Practitioner
Relationships –   Association:

Include:
Extends: Manage Patient Appointment, Filter Schedule by Month Generalization:
Preconditions – Practitioner had login into his/her account
Basic Flow –   1   Users click on the schedule link in the navigation header.   2   System will display his/her appointment schedule in table format.
Alternate Flows –   If practitioner approve the pending appointment   1   Users click on the approve button.   2   System will receive user input.   3   System will update the database record.   4   System will prompt out an appointment successfully approve message.   5   System will send notification to the patient.   If practitioner delete the pending appointment   1   Users click on the delete button.   2   System will receive user input.   3   System will delete the database record.   4   System will prompt out an appointment successfully deleted message.   5   System will send notification to the patient If practitioner perform filtering function.   6   Users click on the input field.   7   System will list drop-down option to user.   8   Users select one of the options and click submit.
Exception Flows –
Post Conditions-   • System able to display correct his/her appointment schedule in table format.   • System able to update database record and prompt out an appointment approved successfully message and send notification to the patient.   • System able to delete database record and prompt out an appointment deleted successfully message and send notification to the patient.   • System able to receive user filtering input and display the correct output to the user.

Table 4.15 View Schedule – Use Case Description

4.2.2.16 View Patient Review – Practitioner Perspective

USE CASE DESCRIPTION

Name – View Patient Review
Brief Description – To Allow Practitioner to View Clinic Review and Testimonial
Actors - Practitioner
Relationships – Association: Include: Reply Patient Review Extends: Generalization:
Preconditions – Practitioner have login into his/her account

Basic Flow –
 	
    1. Users click on the review link in the navigation header.
 	
    2. System will show a list of the patient's review and testimonial that related to the practitioner.

Alternate Flows –
 	
When practitioner click on the "reply patient review" button
 	
    1. System will prompt out an input box modal, asking user to enter all the comment.
 	
    2. Users fill in all the input field.
 	
    3. Users click on the submit button.
 	
    4. System will receive the user input and validate user input.
 	
    5. System will store user input into database.
 	
    6. System will prompt out feedback have been sent successfully message.

Exception Flows – Incorrect user input

Post Conditions-
 	
    • Successful view all the patient's review and testimonial that related to the practitioner.
 	
    • User input will record into database and display feedback have been sent
 	
    • successfully message.

Table 4.16 View Patient Review – Use Case Description

4.2.2.17 View Patient Detail – Business Owner Perspective

USE CASE DESCRIPTION
Name – View Patient Detail
Brief Description – To Allow Business Owner to View his/her Patient Detail and Manage his/her Patient Detail
Actors – Business Owner
Relationships –

Association:
Include:
Extends: Search Patient by Name, Update Patient Detail, Inactivate or Activate Patient Account
Generalization:

Preconditions – Business Owner had login his/her account

Basic Flow –

1. Users click on the patient link in the navigation link.
2. System will display all the patient information in pagination format.
3. Users click on next or previous button to view following or previous patient information.
4. System will display following or previous patient information.

Alternate Flows –

If user perform searching by name

1. Users fill in the search input field.
2. Users click on submit button.
3. System will receive user input and validate user input.
4. System will display the search result according to the user input

If user perform update patient detail

1. Users click on the editing button.
2. System will change the input field into editable.
3. Users fill in all the input field.
4. Users click on the submit button.
5. System will receive user input and validate the user input.
6. System will update the database record.
7. System will display a patient information updated successfully message.

If user perform inactivate or activate patient account

1. Users click on inactivate or activate button.
2. System will receive user input.
3. System will update the database record.
4. System will display a patient account inactivate or successfully activate message

Exception Flows – Incorrect User Input

Post Conditions-

- System able to display all patient detail in pagination format.
- System able to update the database record and display a patient information updated successfully message.

- System able to update the database record and display a patient account inactivate or successfully activate message

Table 4.17 View Patient Detail– Use Case Description

4.2.2.18 View Practitioner Detail – Business Owner Perspective

USE CASE DESCRIPTION
Name – View Practitioner Detail
Brief Description – To Allow Business Owner to View his/her Practitioner Detail and Manage his/her Patient Detail
Actors – Business Owner
Relationships – Association: Include: Extends: Search Practitioner by Name, Update Practitioner Detail, Inactivate or Activate Practitioner Account, Create New Practitioner Account   Generalization:
Preconditions – Business Owner had login his/her account
Basic Flow –   1. Users click on the practitioner link in the navigation link.   2. System will display all the practitioner information in pagination format.   3. Users click on next or previous button to view following or previous practitioner information.   4. System will display following or previous practitioner information.
Alternate Flows –   If user perform searching practitioner detail by name   1. Users fill in the search input field.   2. Users click on submit button.   3. System will receive user input and validate user input.   4. System will display the search result according to the user input .   If user perform update practitioner detail   1. Users click on the editing button.   2. System will change the input field into editable.   3. Users fill in all the input field.   4. Users click on the submit button.

5. System will receive user input and validate the user input.

6. System will update the database record.

7. System will display a practitioner information updated successfully message.

If user perform inactivate or activate practitioner account

1. Users click on inactivate or activate button.

2. System will receive user input.

3. System will update the database record.

4. System will display a practitioner account inactivate or successfully activate message.

If user perform create new practitioner account

1. Users click on create new practitioner account button.

2. System will display a create account form.

3. Users fill in the input field.

4. Users click on submit button.

5. System receives the user input and validate user input.

6. System will store the user input into database.
7. System will display a practitioner account successfully created message.

Exception Flows – Incorrect User Input

Post Conditions-

- System able to display all patient detail in pagination format.

- System able to update the database record and display a patient information successfully updated message.

- System able to update the database record and display a patient account inactivate or successfully activate message.

- System able to store the database record and display a practitioner account successfully created message.

Table 4.18 View Practitioner Detail – Use Case Description

4.2.2.19 View All Review – Business Owner Perspective

USE CASE DESCRIPTION
Name – View All Review
Brief Description – To Allow Business Owner to View Clinic Review and Testimonial and Manage the Review

CHAPTER 4: SYSTEM DESIGN

Actors – Business Owner
Relationships – Association: Include: Extends: Reply Review, Delete Review
Generalization:
Preconditions – Practitioner have login into his/her account
Basic Flow – 1. Users click on the review link in the navigation header. 2. System will show a list of the patient's review and testimonial and practitioner feedback.
Alternate Flows – If Business Owner click on the "reply review" button 1. System will prompt out an input box modal, asking user to enter all the comment. 2. Users fill in all the input field. 3. Users click on the submit button. 4. System will receive the user input and validate user input. 5. System will store user input into database. 6. System will prompt out feedback have been sent successfully message. If Business Owner click on the "delete review" button 1. Users click on the delete review button. 2. System will prompt out a delete confirmation form. 3. Users fill in "DELTE" at the input field and press submit. 4. System will receive user input. 5. System will delete the database record. 6. System will prompt out a review successfully deleted message.
Exception Flows – Incorrect user input

Post Conditions-

- Successful view all the patient's review and testimonial that related to the practitioner.

- User input will record into database and display feedback have been sent successfully message.

- System able to delete the database record and prompt out a review successfully deleted message.

Table 4.19 View All Review – Use Case Description

4.2.2.20 View Practitioner Leave Detail – Business Owner Perspective

USE CASE DESCRIPTION
Name – View Practitioner Leave Detail
Brief Description – To Allow Business Owner to View Practitioner Leave and Manage his/her Leave
Actors – Business Owner
Relationships – Association: Include: Extends: Approve the Pending Leave, filter leave status, delete the pending leave Generalization:
Preconditions – Business Owner had login into his/her account. Practitioner had applied leave
Basic Flow – 1. Users click on the practitioner leave link on the navigation header. 2. System will display all the practitioner leave information in table format.
Alternate Flows – If business owner performs filtering by the leave status 1. Users click filter button. 2. System will display a drop-down option. 3. Users select the option and click on submit. 4. System will receive the user input and validate the user input. 5. System will display the filtering result. If business owner performs approve the pending leave 1. Users click on the approve button. 2. System will receive the user input. 3. System will update the database record. 4. System will prompt out a leave have been approved successfully message. 5. System will send notification to the practitioner. If business owner performs delete the pending leave 1. Users click on the delete button.

2. System will receive the user input.

3. System will prompt out a delete practitioner leave form.

4. Users fill in "DELETE" and click on submit button.

5. System will receive the user input and validate user input.

6. System will delete the database record.

7. System will display a leave successfully deleted message.
8. System will able to send notification to practitioner.

Exception Flows –

Post Conditions-

- System able to display all the practitioner leave information in table format.

- System able to display correct result when user perform filter.

- System able to prompt out a leave have been approved successfully message and send notification to the practitioner.

- System able to delete the pending leave and display deleted successfully message and send notification to practitioner.

Table 4.20 View Practitioner Leave Detail – Use Case Description

4.3 Activity Diagram
4.3.1 View Review – Patient Perspective
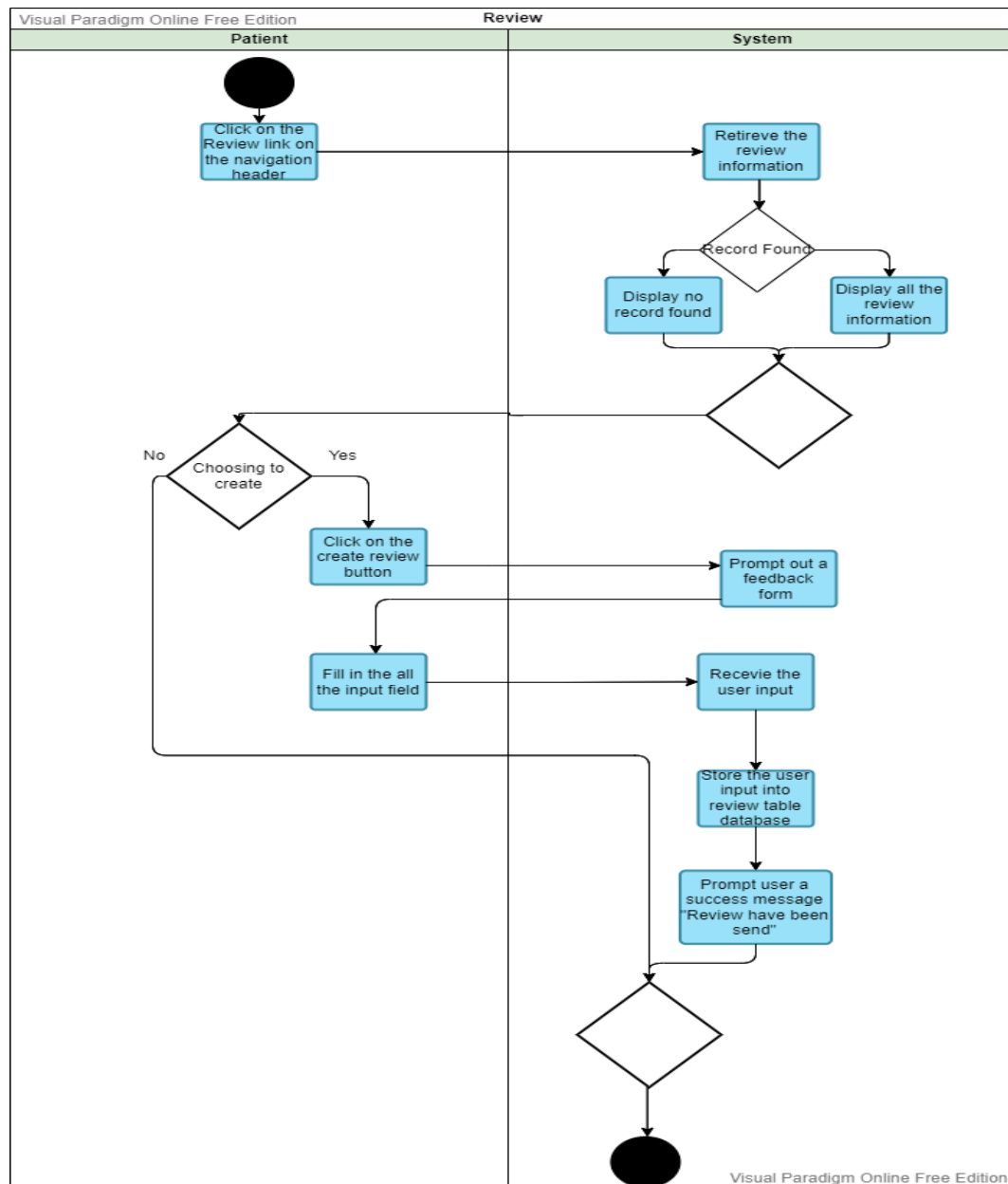
Figure 4. 3 View Review - Activity Diagram

The above activity shows the flow of the review activity. The above activity had shown the way that patient actor interacts with the system to accomplish user goal. When the patient clicks on the "Review" link on the navigation header, the system will receive the user input and retrieve the review information from database, if record have found, the system will display all the feedback information in new page, else the system will display no record found. User can scroll through the web application to view all the current review and testimonial. Besides that, if the user wishes to create their review and feedback, user can click on the "create review" button. The system will receive the

user input and prompt out a feedback form in modal basic. Next, user fill in all the input flied and press on submit button. The system will receive the user input and store the user input into review table database. After that, system will prompt user a success message "Review have been sent" to notified user that he/she review had been send successfully.

4.3.2 View Treatment – Patient Perspective
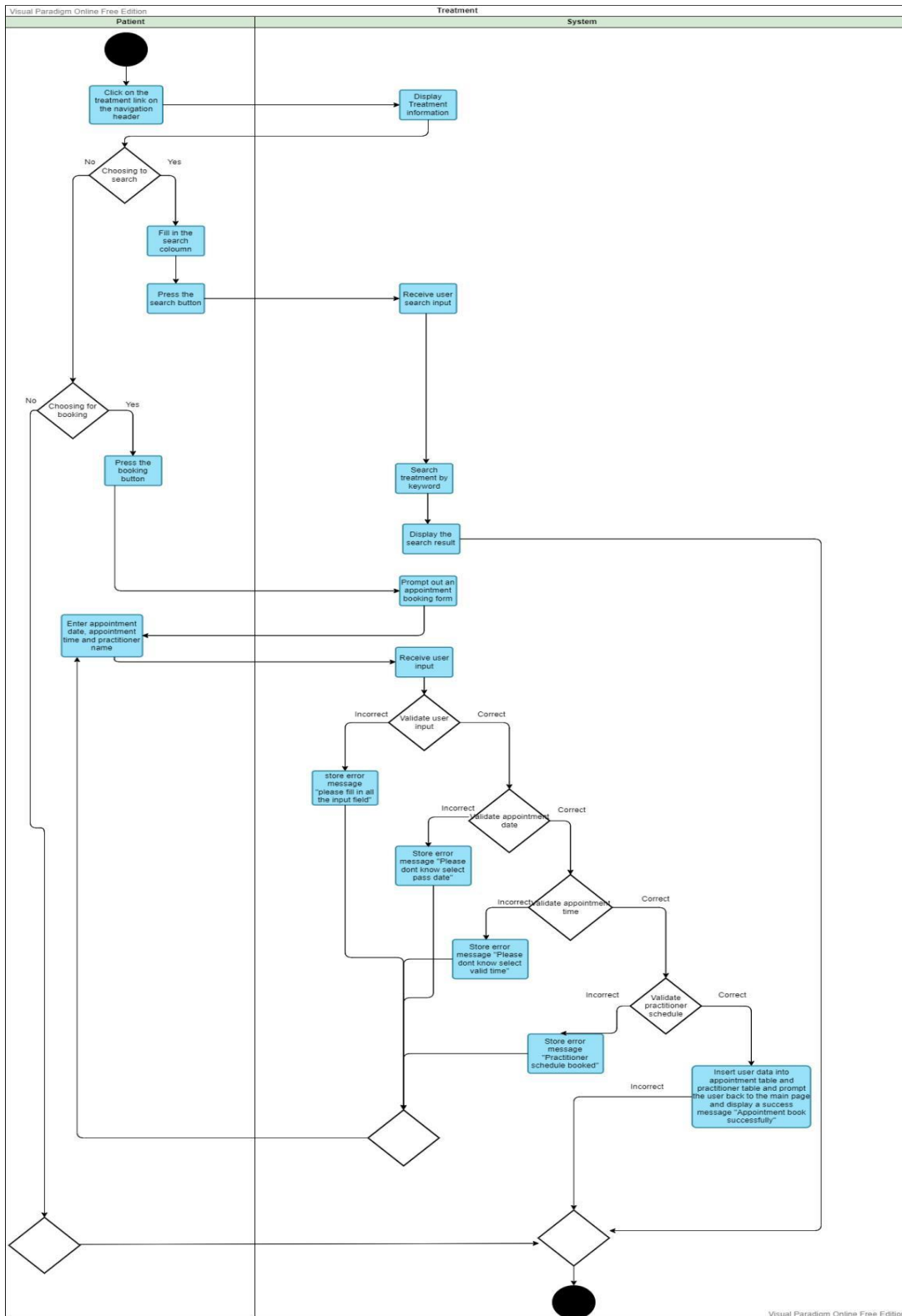
Figure 4. 4 View Treatment - Activity Diagram

The above activity shows the flow of the treatment activity. The above activity had shown the way patient actor interacts with the system to accomplish user goal. When the patient clicks on the "Treatment" link on the navigation header, the system

will receive the user input and display all the treatment information in new web page. User can scroll through the web application to view all the available treatment information. Besides that, if user wishes to perform searching treatment by disease name, user can fill in the search input field and press on the "search" button. System will receive the user input and query the database record to get the search result according to the user input and display the output treatment to the user. If user wishes to perform booking after they review the available treatment. User will click on "booking" button. The system will receive user input and prompt out an appointment booking form to the user. Next, user have to fill in all the input field and press submit button. The system will receive the user input and validate user input, if any mistake or invalid user input, the system will redirect user back to the appointment booking form and display the error message. If user input is valid, the system will check on the practitioner schedule, if the practitioner schedule was fully booked will redirect user back to the appointment booking form and notified user select another appointment date and time. If practitioner schedule is free, the user input will be insert into appointment table and practitioner schedule table. After that, the system will display a success message "Appointment booked successfully" to the user.

4.3.3 View Appointment Detail - Patient Perspective
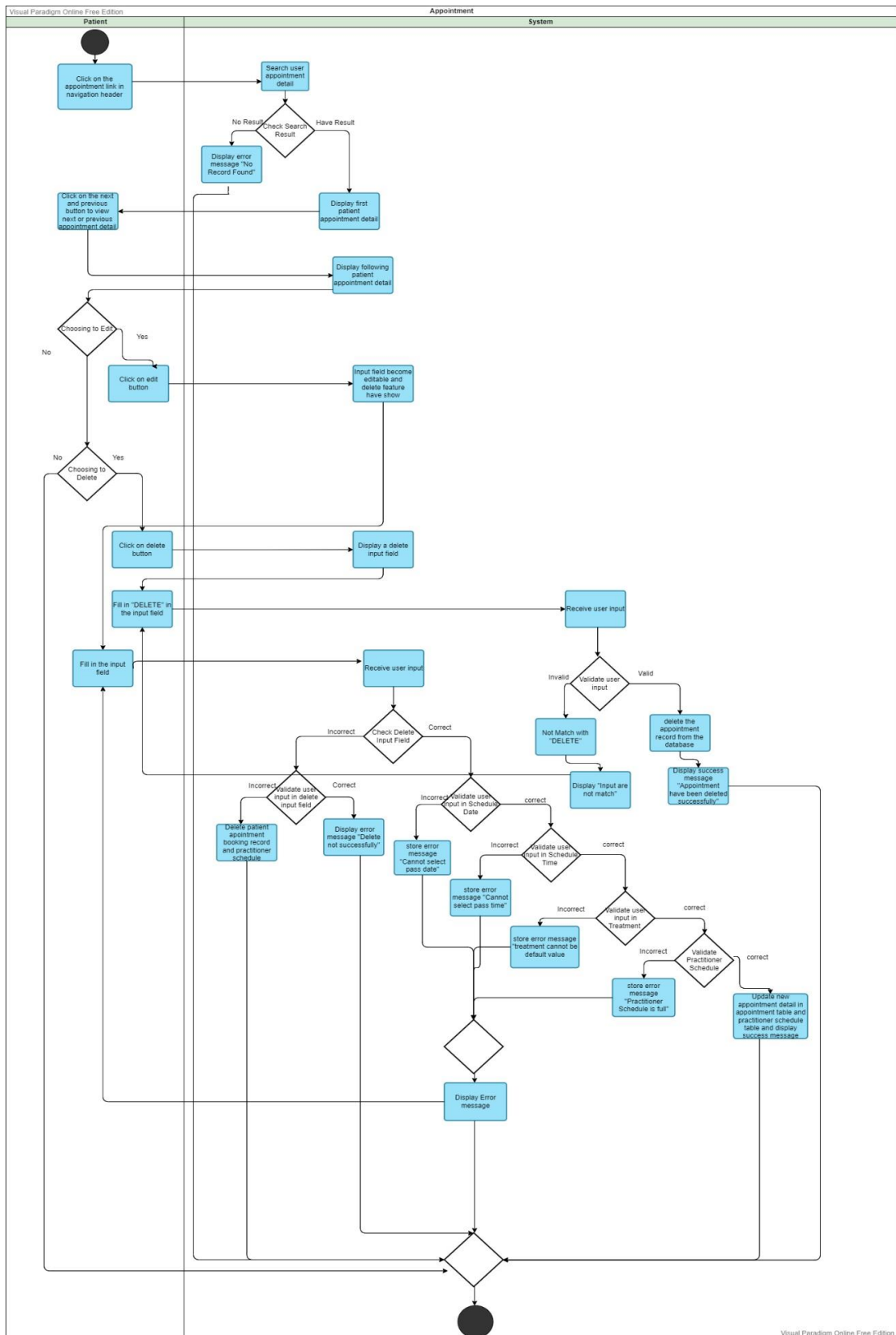
Figure 4. 5 View Appointment Detail - Activity Diagram

The above activity shoes the flow of the manage appointment activity.

The above activity had shown the way the patient actor interacts with the system to accomplish user goal. When the patient clicks on the "appointment" link on the navigation header, the system will receive the user input and system will query the database to receive user appointment detail, if the query result is not found, the system will display an error message "No record found" to the user, if the query result has been found, the system will display the patient appointment detail in pagination style. Next, user can view following appointment detail by press on the next button, the system will display the following appointment detail. If user wish to perform edit their appointment detail, user click on the edit button. System will receive the user input and change the input field from read only into editable. Next, user have to fill in all the input field and press submit button. The system will receive the user input and validate user input, if any mistake or invalid user input, the system will redirect user back to the edit appointment booking form and display the error message. If user input is valid, the system will check on the practitioner schedule, if the practitioner schedule was fully booked will redirect user back to the edit appointment booking form and notified user select another appointment date and time. If practitioner schedule is free, the user input will be insert into appointment table and practitioner schedule table. After that, the system will display a success message "Appointment updated successfully" to the user. If user wish to the perform delete their appointment detail, user need to fill in "DELETE" at the delete input field and press submit button. The system will receive and validate user input. If user input does not match with "DELETE", the system will redirect user back to the edit appointment detail form and display error message "User input are not match". If user input is match with "DELETE", the system will delete the database record in appointment table and practitioner schedule table. Next, the system will display a success message "Appointment have been cancelled" to the user.

4.3.4 Doctor on Chat – Patient Perspective
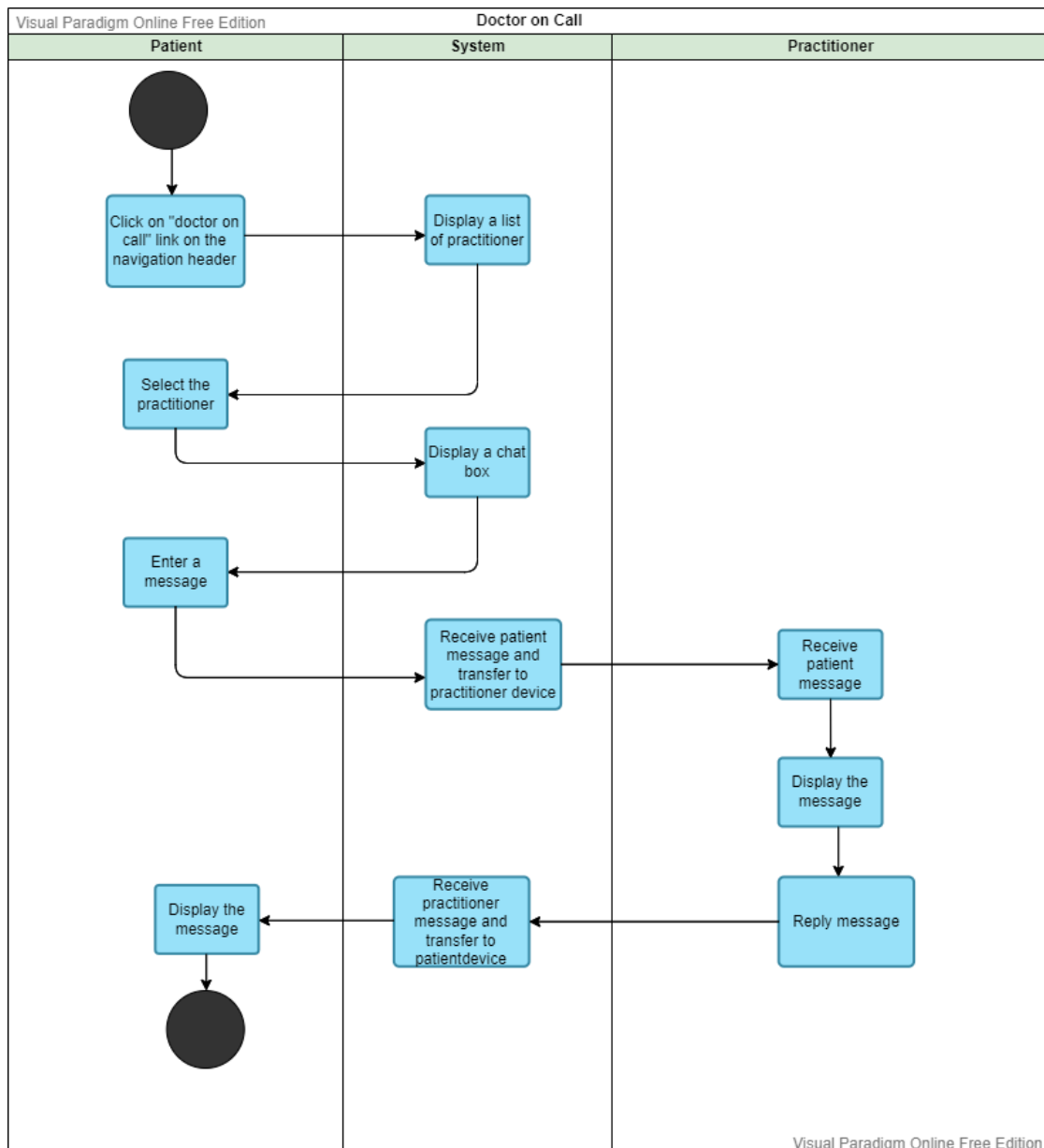
Figure 4. 6 Doctor on Chat - Activity Diagram

The activities mentioned above demonstrates the doctor's chat flow. The aforementioned exercise has demonstrated how the system interacts with the patient and practitioner actors to achieve the user goal. Whenever a patient clicks the "Doctor on Call" link located in the navigation header. The user will be directed to a webpage with a list of available doctors by the system. The patient has the option to choose the practitioner they desire. A chat box will then be generated by the system. By typing a message and clicking the "Send" button, the patient can continue interacting with the chat box. The system will receive their message and store it in the database before sending it to the practitioner's site. Once the patient has successfully sent the message,

the practitioner is able to receive it.

## 4.3.5 View Practitioner – Patient Perspective
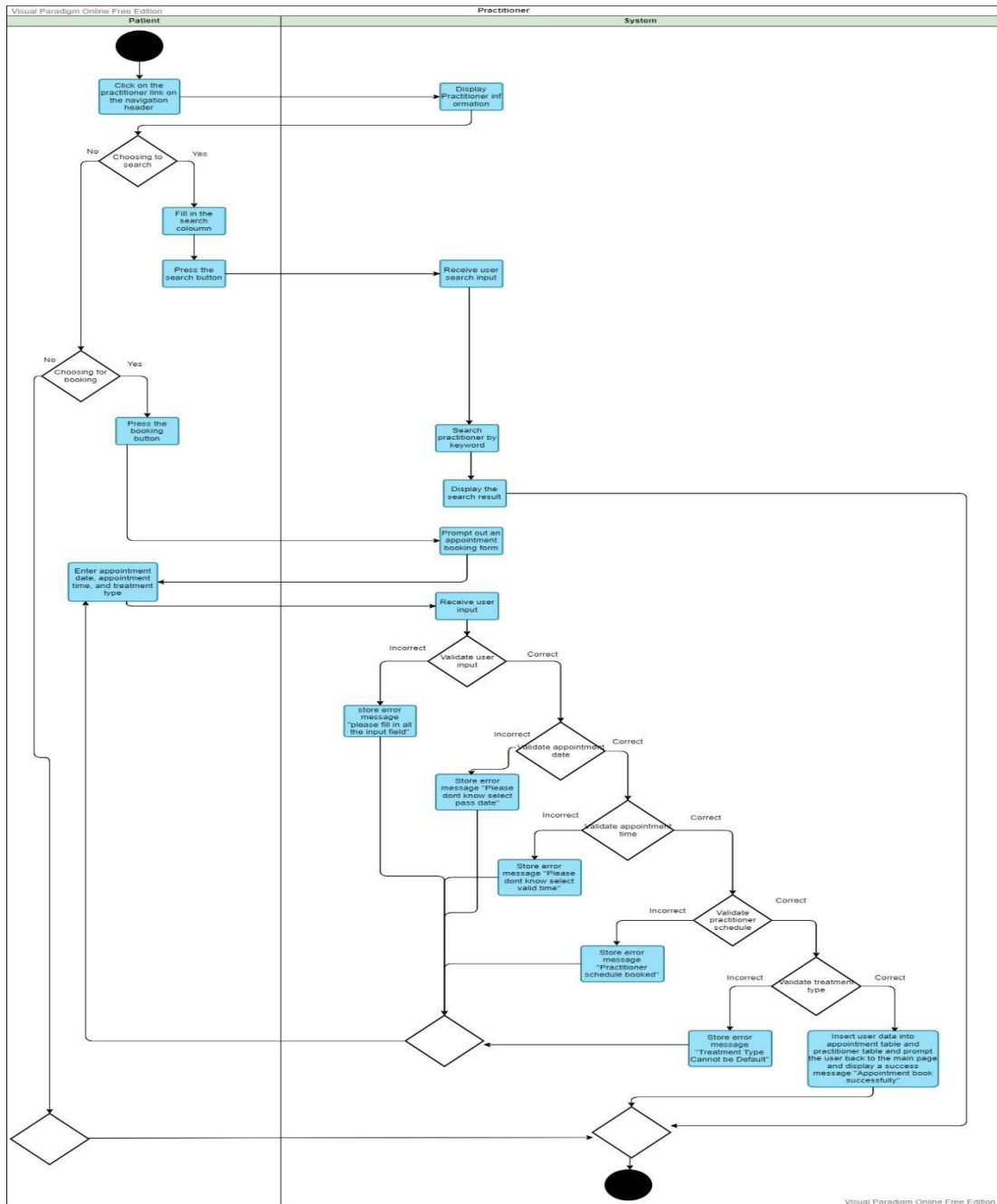
Figure 4. 7 View Practitioner - Activity Diagram

The above activity shows the flow of the practitioner activity. The above activity had shown the way patient actor interacts with the system to accomplish user goal. When the patient clicks on the "Practitioner" link on the navigation header, the system will receive the user input and display all the practitioner information in new web page. User can scroll through the web application to view all the available practitioner

information. Next, user can click on "view more" button to view more information of that practitioner. System will prompt out the full information of that practitioner in modal basic. Besides that, if user wishes to perform searching practitioner by treatment type, user can fill in the search input field and press on the "search" button. System will receive the user input and query the database record to get the search result according to the user input and display the output practitioner to the user. If user wishes to perform booking after they review the available treatment. User will click on "booking" button. The system will receive user input and prompt out an appointment booking form to the user. Next, user have to fill in all the input field and press submit button. The system will receive the user input and validate user input, if any mistake or invalid user input, the system will redirect user back to the appointment booking form and display the error message. If user input is valid, the system will check on the practitioner schedule, if the practitioner schedule was fully booked will redirect user back to the appointment booking form and notified user select another appointment date and time. If practitioner schedule is free, the user input will be insert into appointment table and practitioner schedule table. After that, the system will display a success message "Appointment booked successfully" to the user.

4.3.6 Make Fast Appointment – Patient Perspective
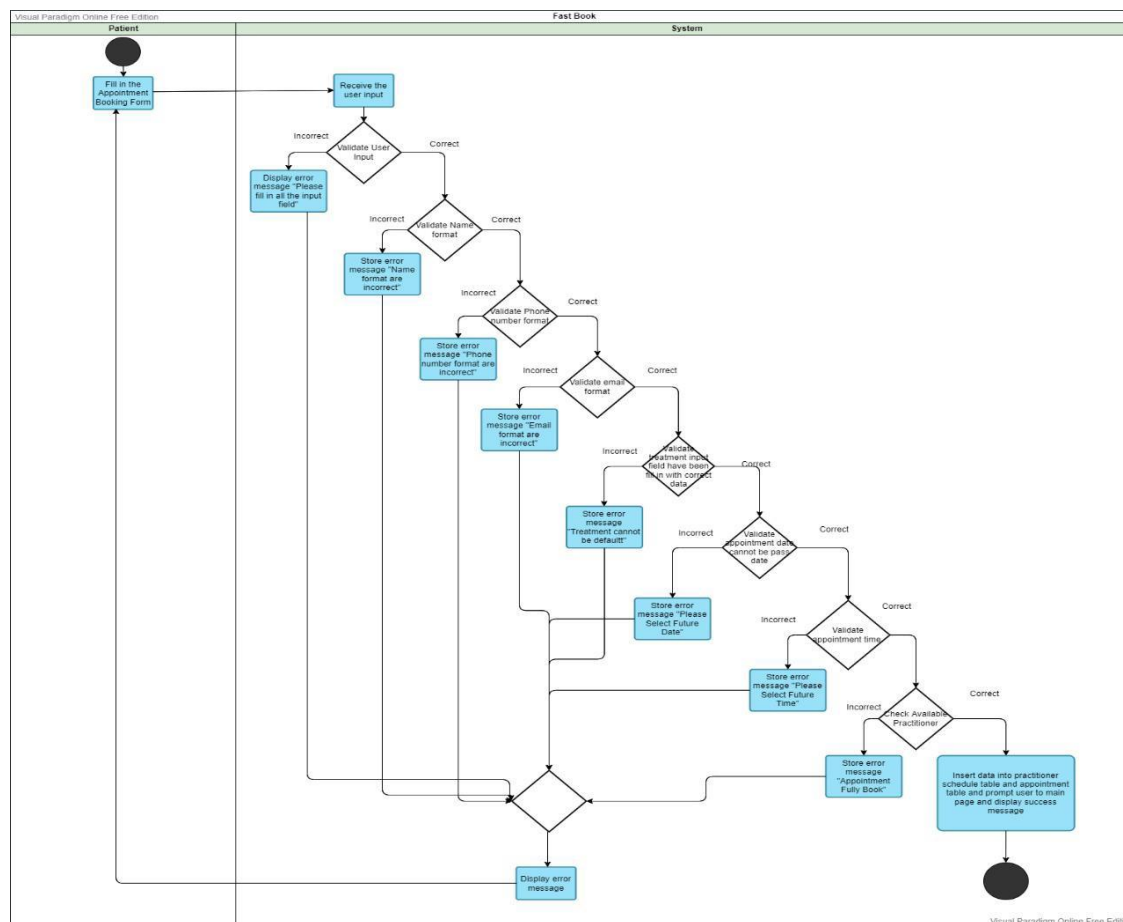
Figure 4. 8 Make Fast Appointment - Activity Diagram

The above activity shows the flow of the fast appointment booking activity. The above activity had shown the way patient actor interacts with the system to accomplish user goal. Next, user have to fill in all the input field and press submit button. The system will receive the user input and validate user input, if any mistake or invalid user input, the system will redirect user back to the appointment booking form and display the error message. If user input is valid, the system will check on the practitioner schedule and assign a practitioner to user which that practitioner is free on user mention data and time, if the practitioner schedule was fully booked will redirect user back to the appointment booking form and notified user select another appointment date and time. If practitioner schedule is free, the user input will be insert into appointment table and practitioner schedule table. After that, the system will display a success message "Appointment booked successfully" to the user.

4.3.7 View User Personal Information – Patient Perspective
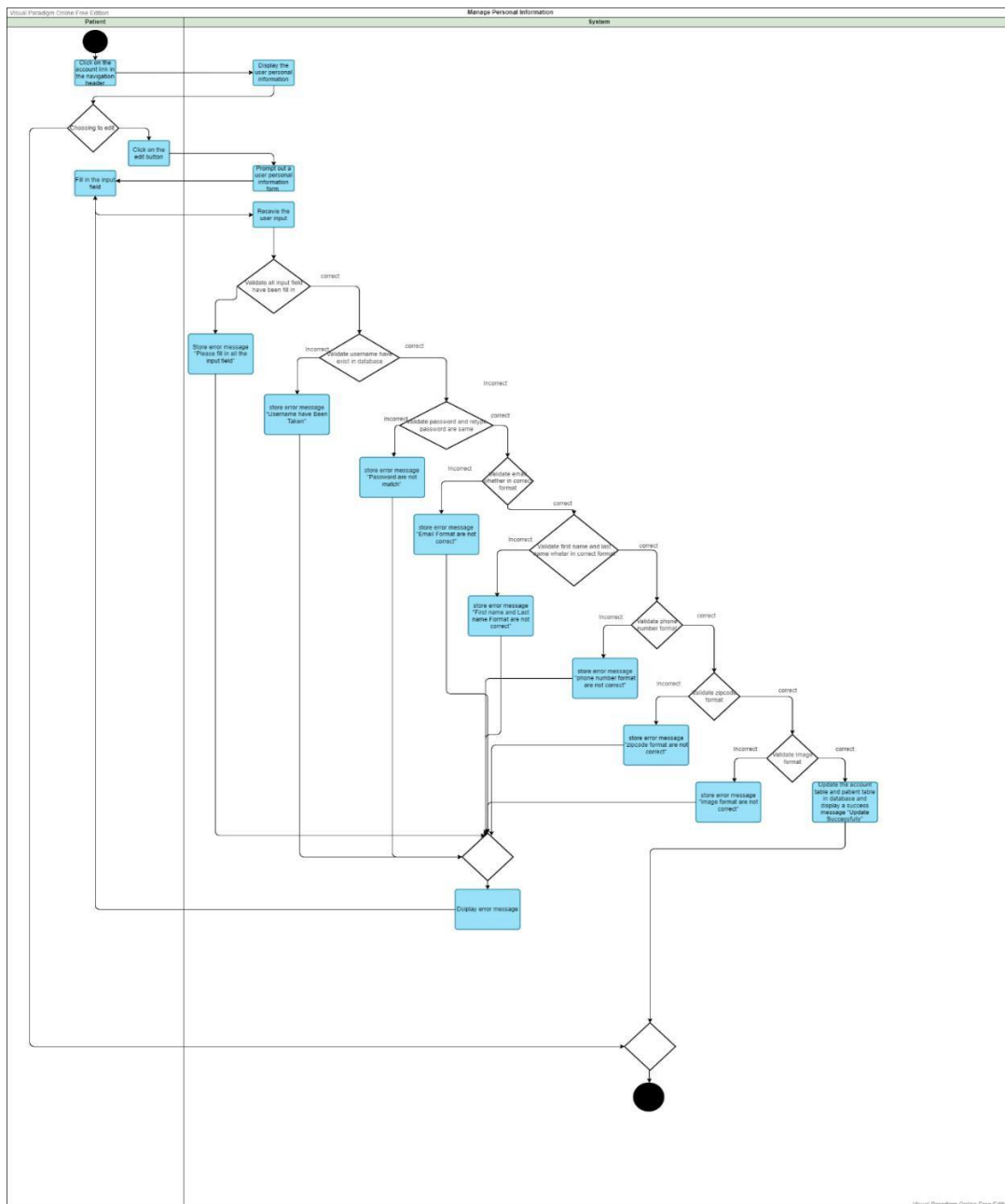
Figure 4. 9 View User Personal Information - Activity Diagram

The above activity shoes the flow of the manage personal information. The above activity had shown the way patient actor interacts with the system to accomplish user goal. When the patient clicks on the "Account" link on the navigation header, the system will receive the user input and display the user personal information in table basic. If the user wishes to perform editing for their account information, user can click on the edit button. The system will prompt out a user personal information editing form in modal basic, user will fill in the input field and press on submit button. The system will receive the user input and validate the user input. The system also checks the

username and email address to avoid duplicate username and email, if the user input is not valid, the system will redirect user back to the personal information editing form and display error message. If the user input is valid, the system will update the database record according to the user input and prompt out a success message "Personal information have been updated" to the user.

### 4.3.8 Trading Article – Patient Perspective
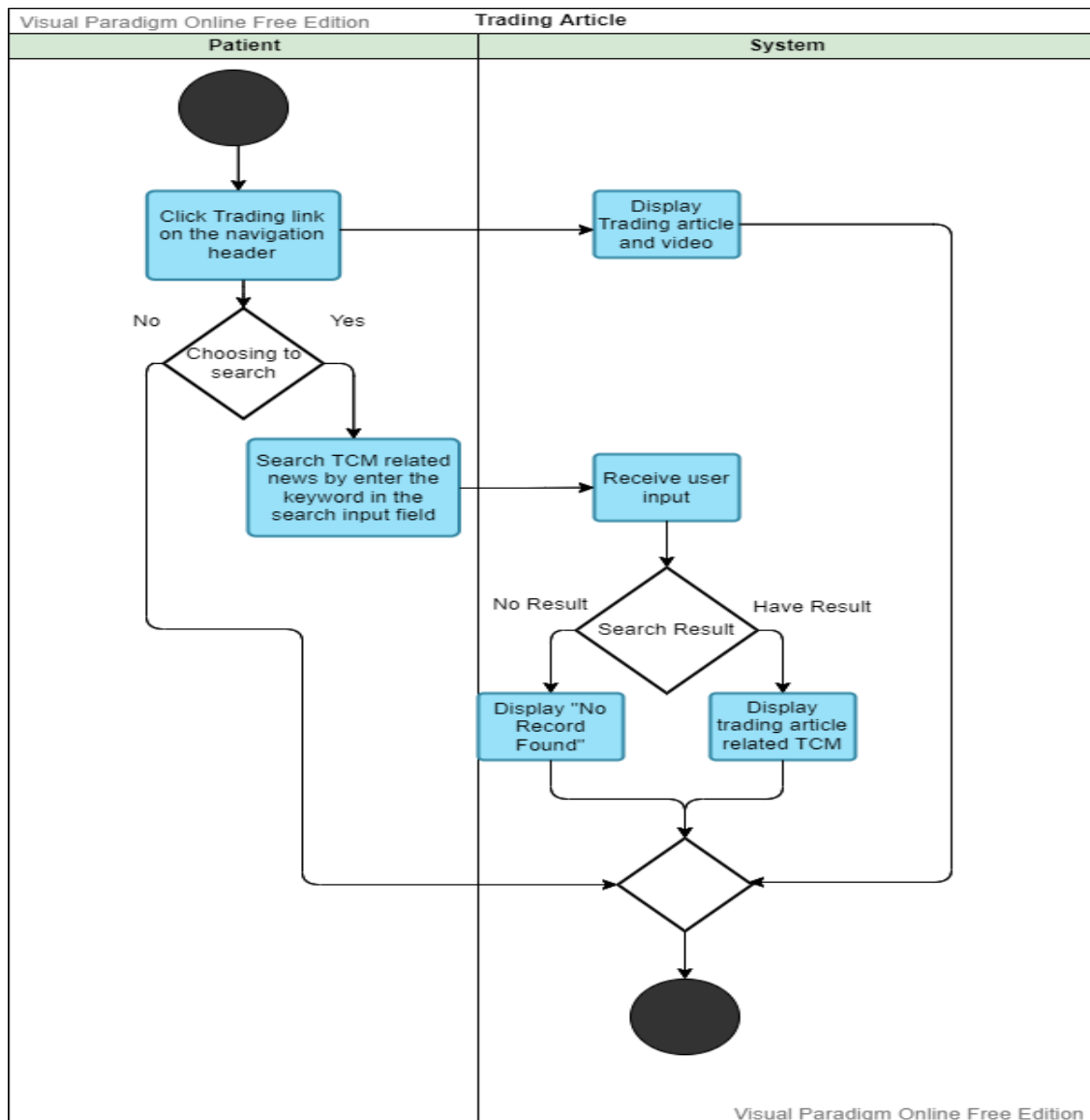
Figure 4. 10 Trading Article - Activity Diagram

The above activity shows the flow of the trading article activity. The above activity had shown the way patient actor interacts with the system to accomplish user goal. When the patient clicks on the "Trading Article" link on the navigation header, the system will receive the user input and searching the trading article that related to TCM by using API, and the system will display the search result to the user, therefore

user can view the trading article. If user wish to perform searching trading article, user fill in the search article input field and press on submit button. The system will receive the user input and searching trading article that related to TCM with wildcard features according to user input by using API. After system retrieve the search result, system will display the search result to the user.

4.3.9 View Patient Health Historical Record - Patient Perspective

Figure 4. 11 View Patient Health Historical Record - Activity Diagram

The above activity shows the flow of the patient health tracking activity. The above activity had shown the way patient actor interacts with the system to accomplish user goal. When the patient clicks on the "Historical" link on the navigation header, the system will receive user input and query the database to retrieve the patient health historical record. If the result is found, the system will display patient historical treatment record in table format. If no result is found, the system will display no record

found. Next, user click on "view more" button, the system will display Patient historical treatment record in detail by modal basic. Next, if user wishes to perform searching historical treatment record by date. User will fill in the search input field and press on submit button. The system will receive user input and search the historical treatment record by the date given by the user. If query have result found, the system will display the search result, if not, the system will display no record found to the user. Besides that, if user wish to perform download patient health historical record. Users click on the "download" button, and user select which directory that file will save. System will outfile the patient health historical record into PDF file format. After the file is successfully store in user device, system will prompt out a download successfully message.

4.3.10 Logout – Patient Perspective
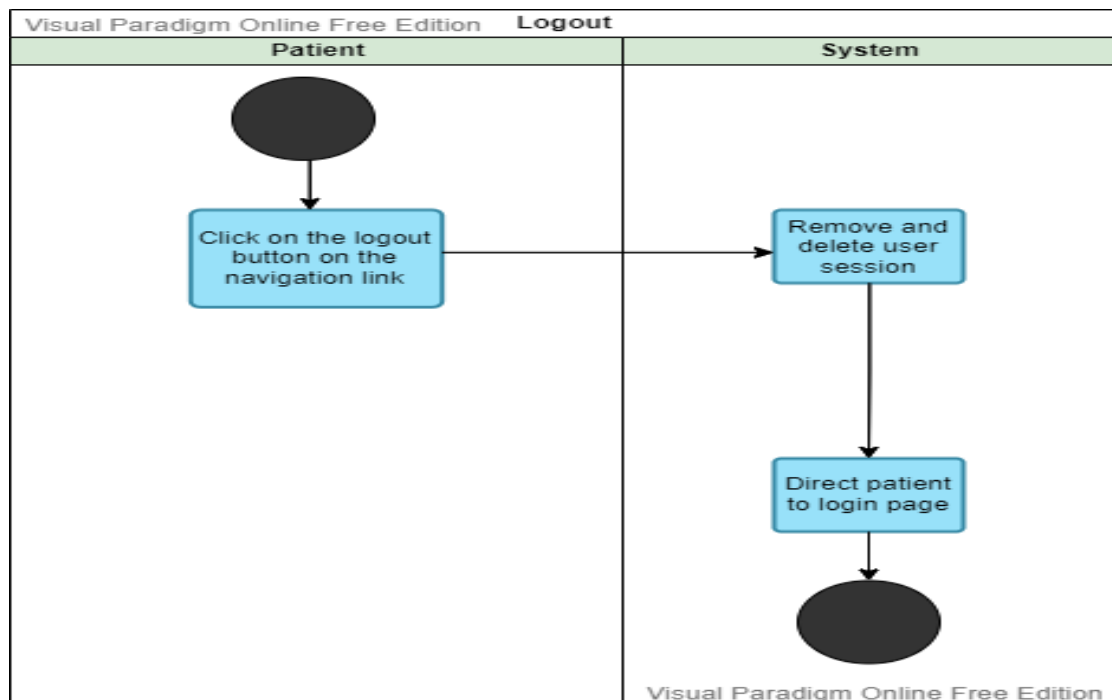
Figure 4. 12 Logout - Activity Diagram

The above activity shows the flow of the logout activity. The above activity had shown the way that patient actor interacts with the system to accomplish user goal. When the user clicks on the "logout" button at the navigation header. The system will receive the user input and delete the user session and the system will redirect user to the login page.

4.3.11 Login - Patient Perspective
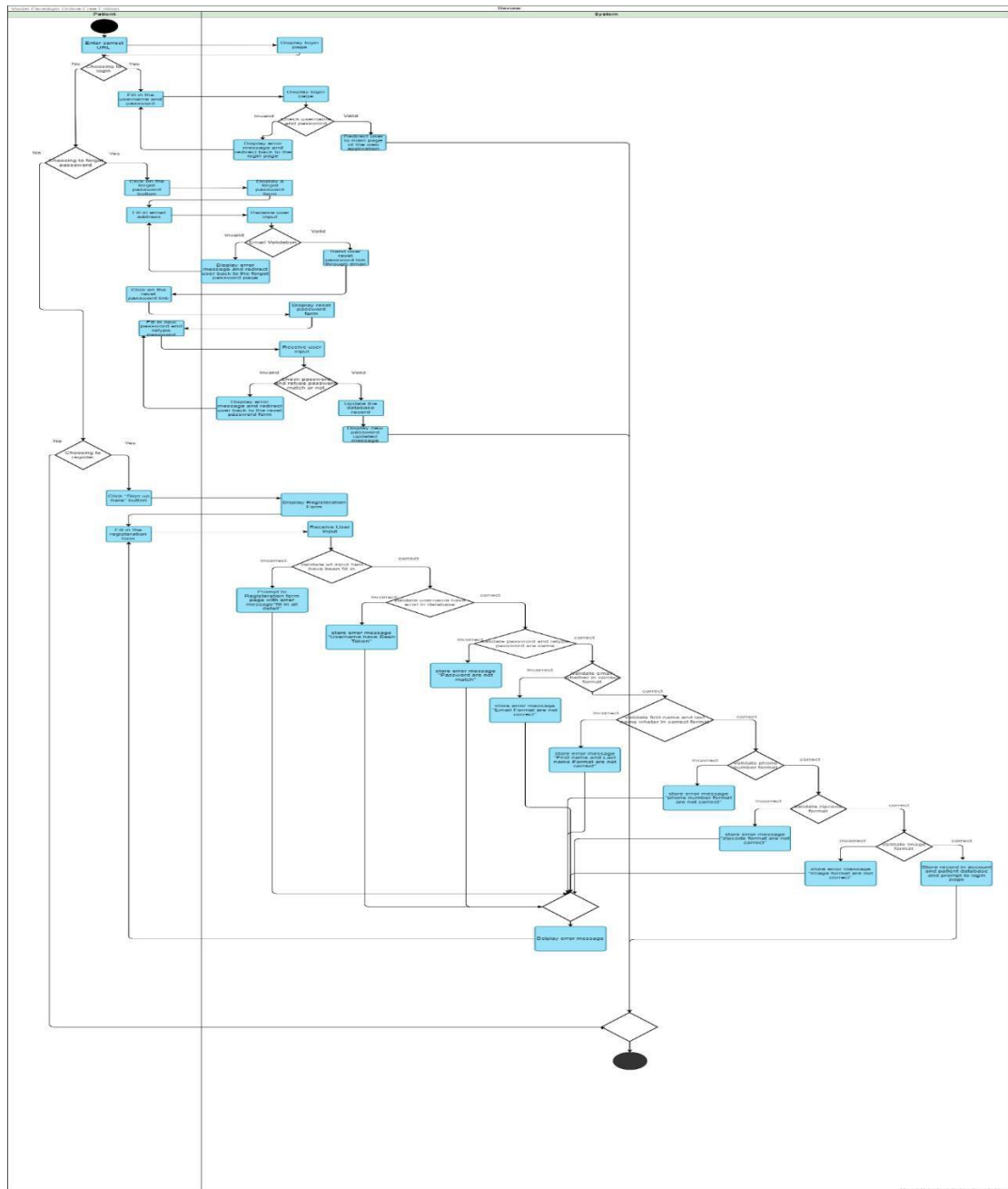
Figure 4. 13 Login - Activity Diagram

The above activity shows the flow of the login activity. The above activity had shown the way that patient actor interacts with the system to accomplish user goal. When the user enters the correct URL of the web application. The system will display a login form to the user. User have to enters his/her username and password. After user press on submit button, the system will receive the user input and validate their username and password. If the username and password are not correct, the system will redirect user to the login page and display the error message. If the username and

passwords are correct, the system will redirect user to the main page of the web application. When the user forgot his/her password, user can click on "forgot password" button. The system will display a forgot password form to the user and asking the user to enter his/her email address. Next, system will validate the email address, if the email address is not existed in the database, the system will redirect user to the forgot password page and display error message, if the email address found in the database, the system will send the reset password link through user's email to the user and system will display a success message to acknowledge user that email had send. Next, user can rest their password by using the rest password link that system generated. The user has to fill in new password and retype password. After the user submit the form, the system will validate the new password and retype password. If both input is not match, the system will display error message, else the system will update the database record according to the username and password. Moreover, when the user wishes to register a new account. User can click on "sign up" button, the system will display a registration form, asking user to fill in the detail. After user fill in the input field and click on submit button, the system will receive the user input and validate the user input. If the user input is invalid and the username or email existed in the database will redirect user to the sign-up form and display error message, else the system will store the user input into database and display register an account successfully messages and redirect user to the login page.

4.3.12 View Patient Health Historical Record - Practitioner Perspective
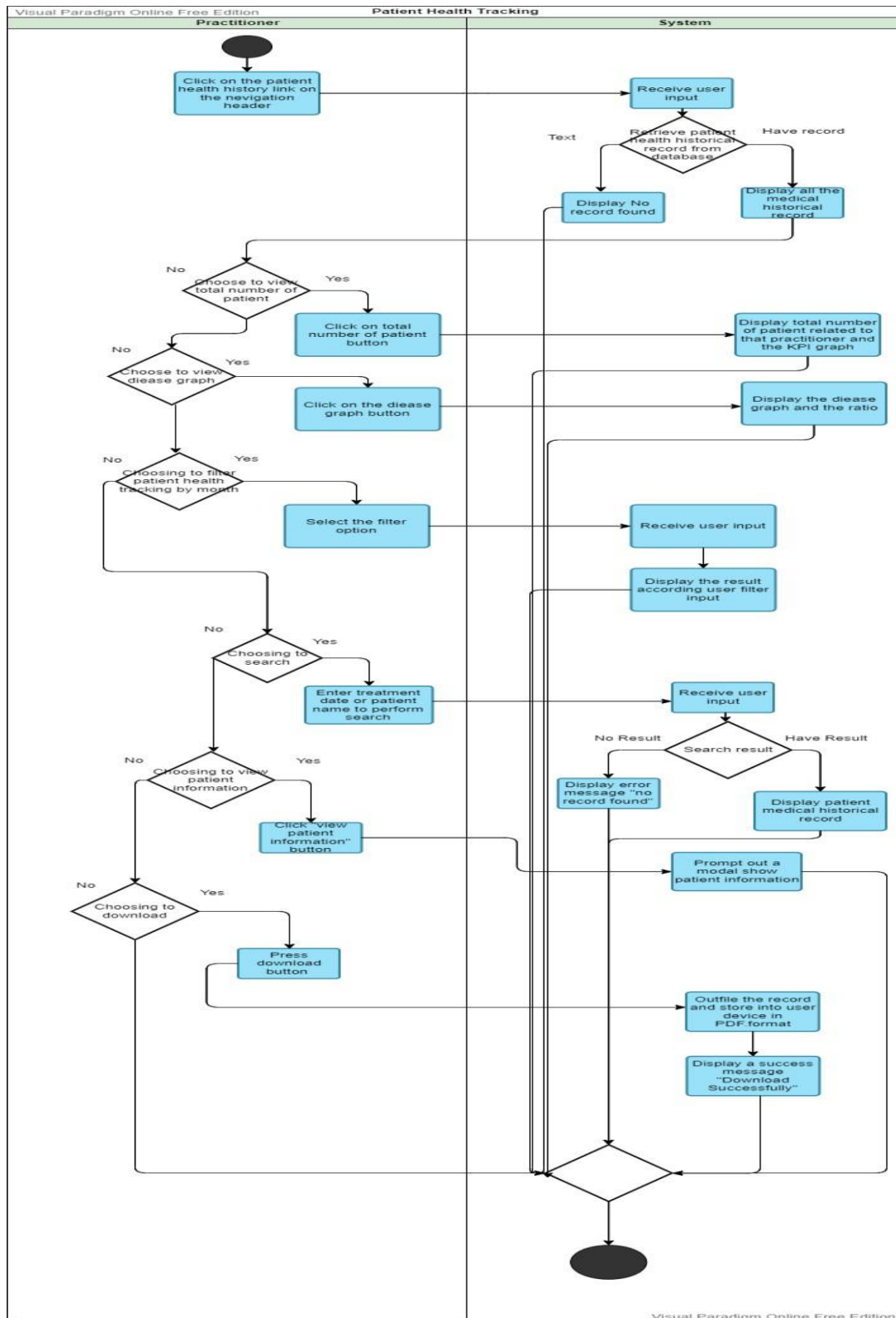
Figure 4. 14 View Patient Health Historical Record - Activity Diagram
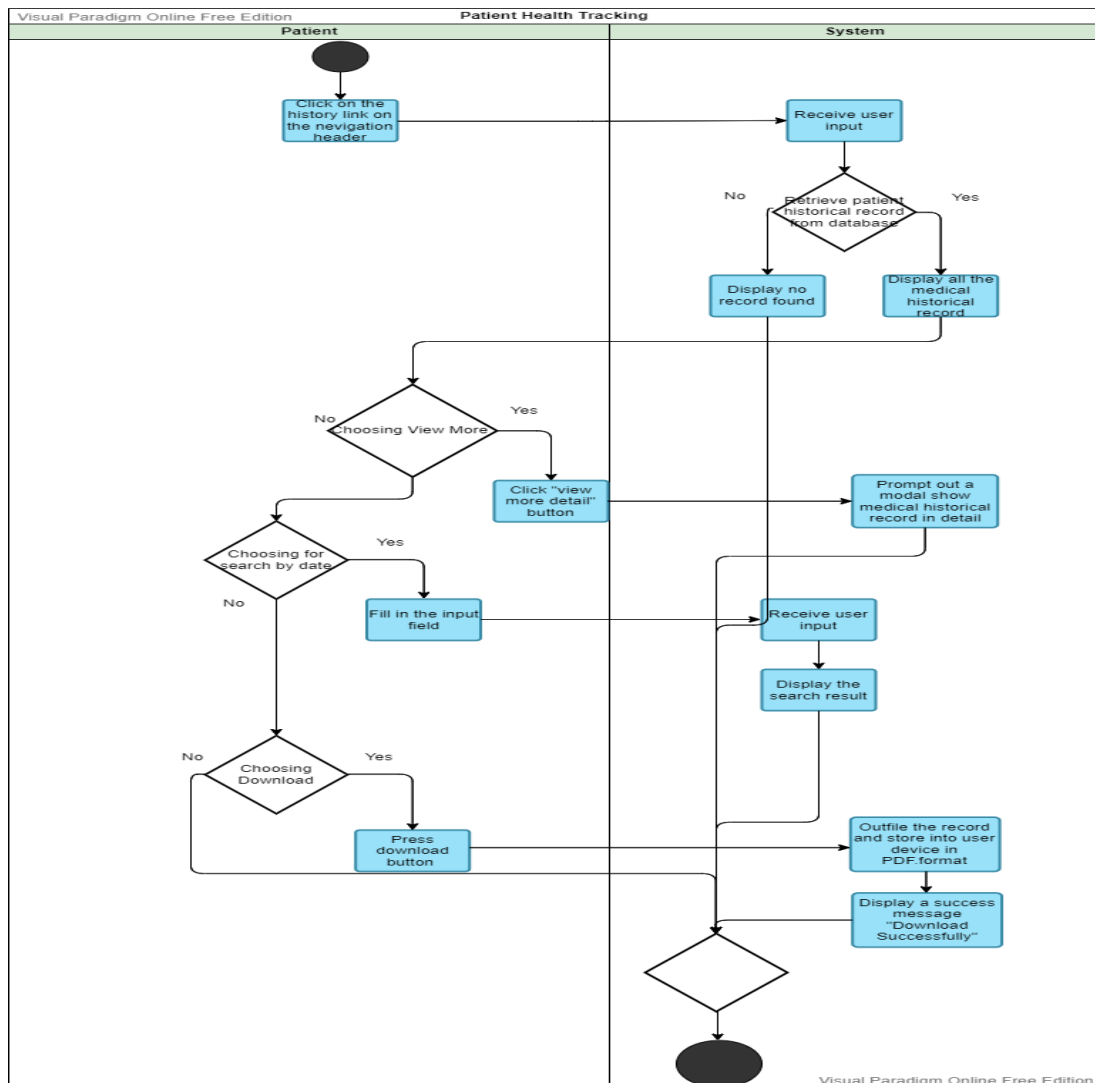
The above activity shows the flow of the patient health tracking activity. The above activity had shown the way practitioner actor interacts with the system to accomplish user goal. When the practitioner clicks on the "Patient Health Tracking" link on the navigation header, the system will receive user input and query the database to retrieve the patient health historical record. If the result is found, the system will display patient historical treatment record in table format. If no result is found, the system will display no record found. Next, user click on "view more" button, the system will display Patient historical treatment record in detail by modal basic. Next, if user wishes to perform searching historical treatment record by treatment date or patient name. User will fill in the search input field and press on submit button. The system will receive user input and search the historical treatment record by the treatment date or patient name given by the user. If query have result found, the system will display the search result, if not, the system will display no record found to the user. Besides that, if user wish to perform download patient health historical record. User click on the "download" button, and user select which directory that file will save. System will outfile the patient health historical record into PDF file format. After the file is successfully store in user device, system will prompt out a download successfully message. If user wishes to view patient information, user click on "view patient information" button. The system will receive the user input and prompt out patient information in detail in modal basic. If user wish to perform filtering patient treatment historical record by month. User click on the filter button, and the system will display a drop-down option. Next, user select an option and press on submit button. The system will display the patient health historical record according user filter input. If user wishes to view the total number of patients, user can click on the "total number of patients" button, and the system will generate the total number of patient report and the KPI to the user to view. If user wishes to view the disease graph, user can click on "disease graph" button, and the system will generate the disease graph and the disease ratio to the user to view.

4.3.13 View Practitioner Personal Information - Practitioner Perspective
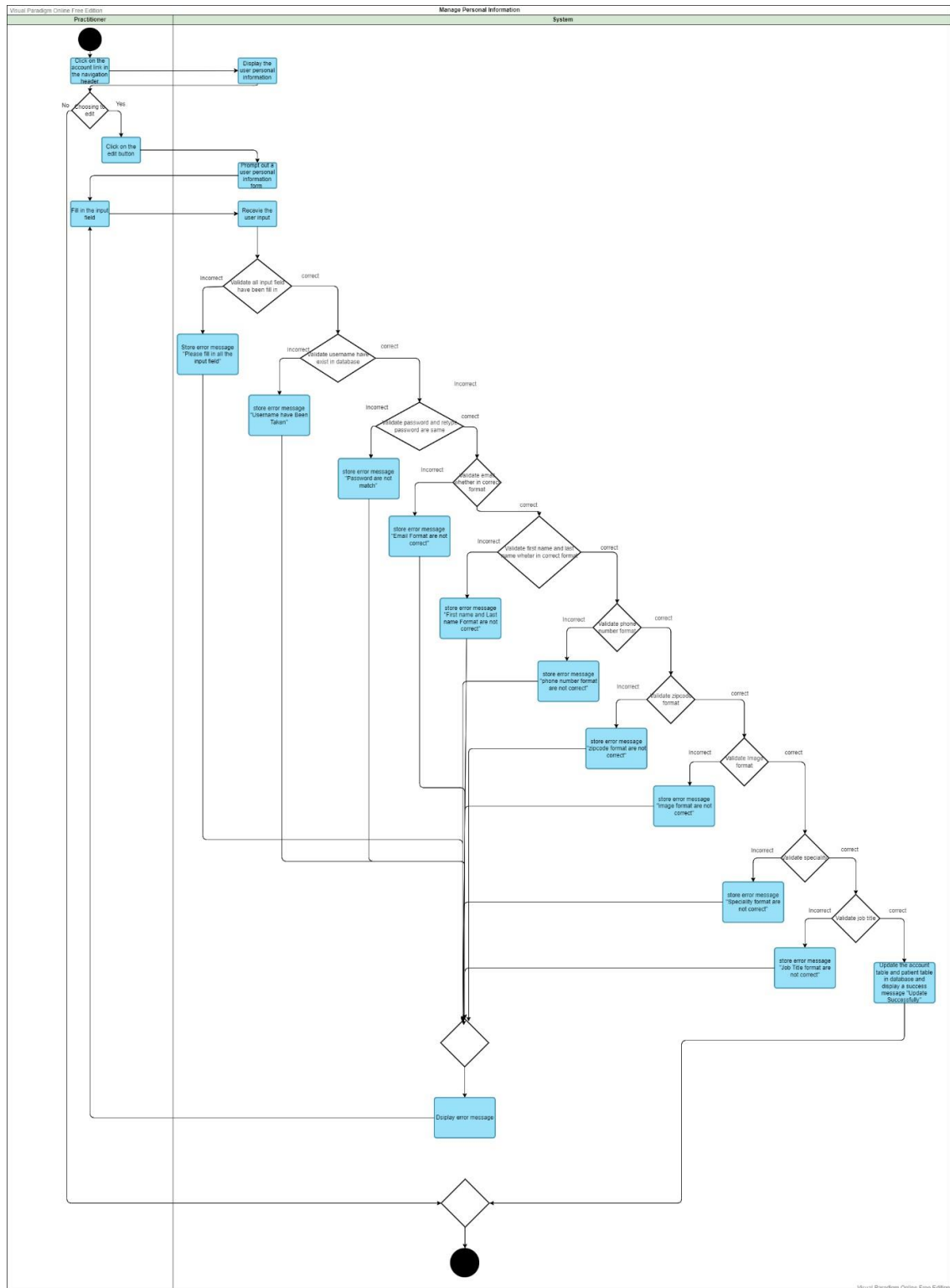
Figure 4. 15 View Practitioner Personal Information - Activity Diagram

The above activity shows the flow of the view practitioner personal information activity. The above activity had shown the way practitioner actor interacts with the system to accomplish user goal. When the practitioner clicks on the "account" link on

the navigation header, the system will receive the user input and display the user personal information in table basic. If the user wishes to perform editing for their account information, user can click on the edit button. The system will prompt out a user personal information editing form in modal basic, user will fill in the input field and press on submit button. The system will receive the user input and validate the user input. The system also checks the username and email address to avoid duplicate username and email, if the user input is not valid, the system will redirect user back to the personal information editing form and display error message. If the user input is valid, the system will update the database record according to the user input and prompt out a success message "Personal information have been updated" to the user.

4.3.14 View Historical Leave Information - Practitioner Perspective
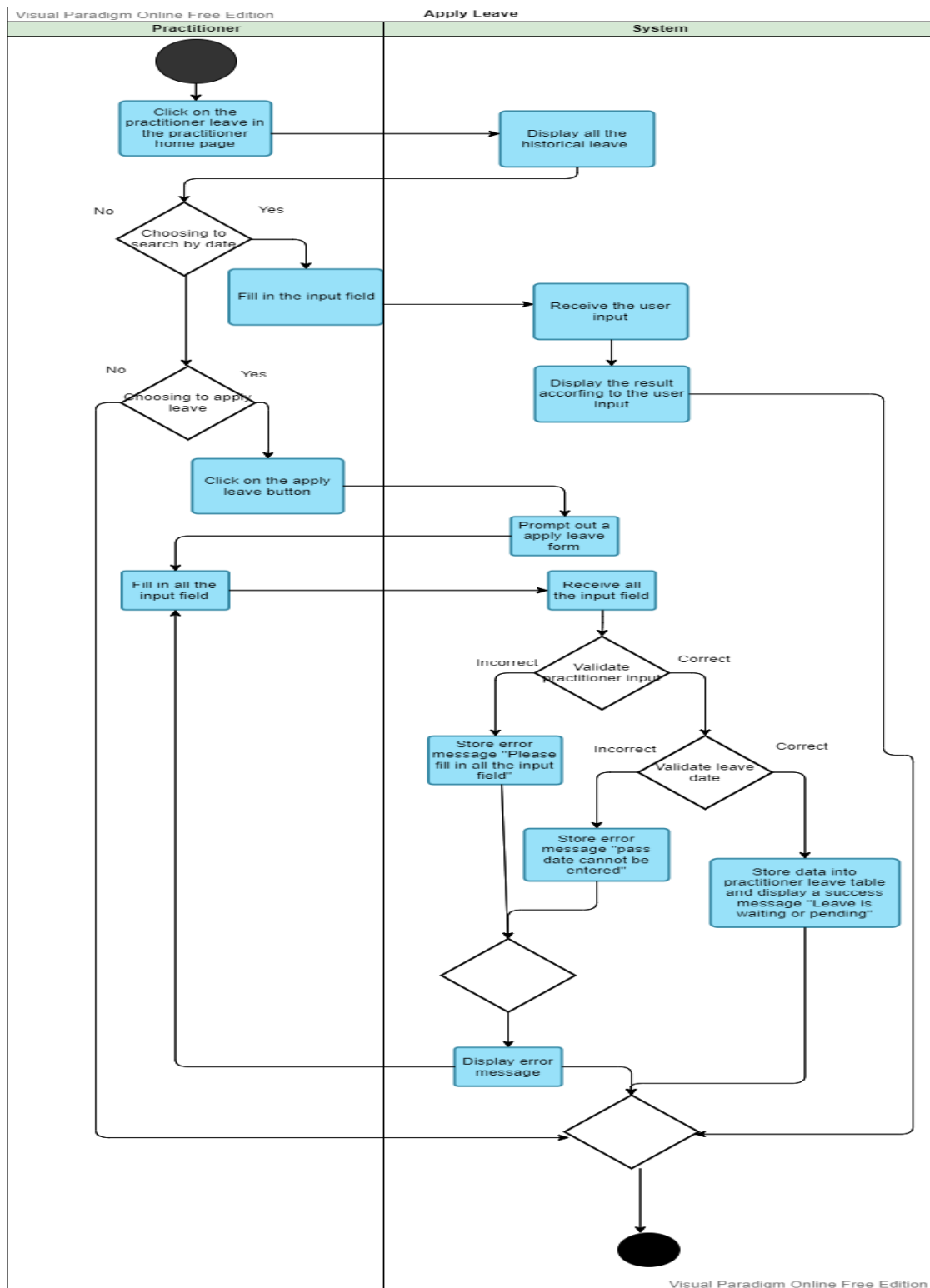
Figure 4. 16 View Historical Leave Information - Activity Diagram

The above activity shows the flow of the view historical leave information activity. The above activity had shown the way practitioner actor interacts with the system to accomplish user goal. When the practitioner clicks on the "Leave" link on

the navigation header, the system will receive the user input and display practitioner historical leave information. If the user wishes to perform searching his/her historical leave information by date. User need to fill in the search input field and press submit button. Next, system will receive user input and validate user input and display the search result to user if result is found. Otherwise, the system will display no record found messages to the user. If user want to perform apply leave. User have to click on "Apply Leave" button. System will prompt out a apply leave form in modal basic. Furthermore, user need to fill in the input field and press on submit button. The system will receive user input and validate user input. If invalid user input, system will redirect user back to the apply leave form and display error message, else system will store the user input into database and display leave is pending successfully message to the user.

4.3.15 View Schedule - Practitioner Perspective
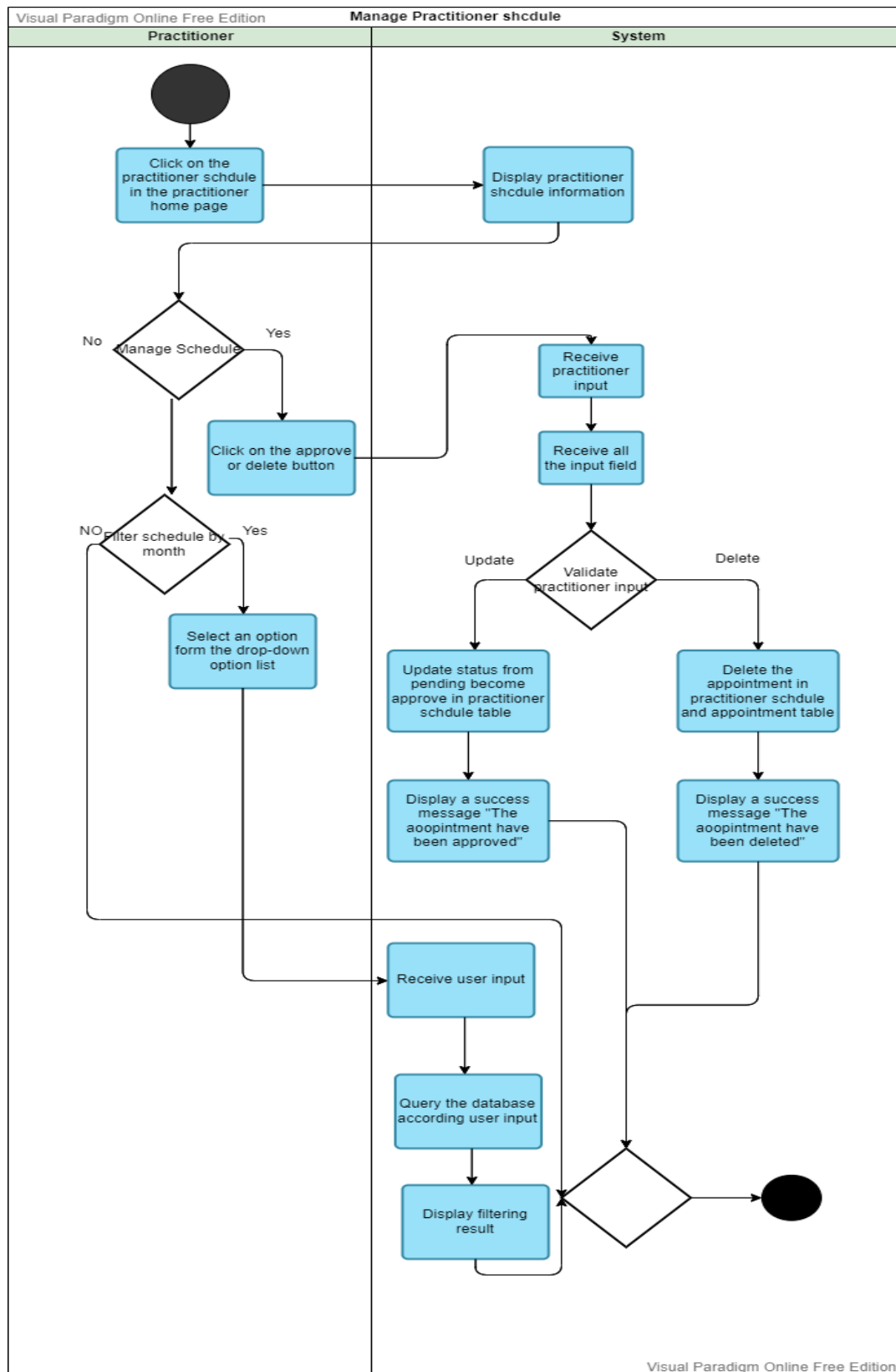
Figure 4. 17 View Schedule - Activity Diagram

The above activity shows the flow of the manage practitioner schedule activity. The above activity had shown the way practitioner actor interacts with the system to accomplish user goal. When the practitioner clicks on the "practitioner schedule" link on the navigation header, the system will receive the user input and display practitioner schedule in table basic. If user wishes to approve the pending appointment. User have to click on the "approve" button. The system will receive the user input and update the database record. Next, system will prompt out an appointment approve successfully message and send notification to the patient to acknowledge user that their appointment has been approved. If user wish to delete the pending appointment. User have to click on the "delete" button. The system will receive user input and delete the database record and prompt out an appointment deleted successfully message. Next, the system will send notification to the patient to acknowledge user that their appointment has been cancelled. Moreover, when the practitioner intended to perform filtering to reduce the number of results. Practitioner can choose of the option from the drop-down option list and click on the submit button. The system will receive user input and display correct output according to the input given by the practitioner.

4.3.16 View Patient Review - Practitioner Perspective
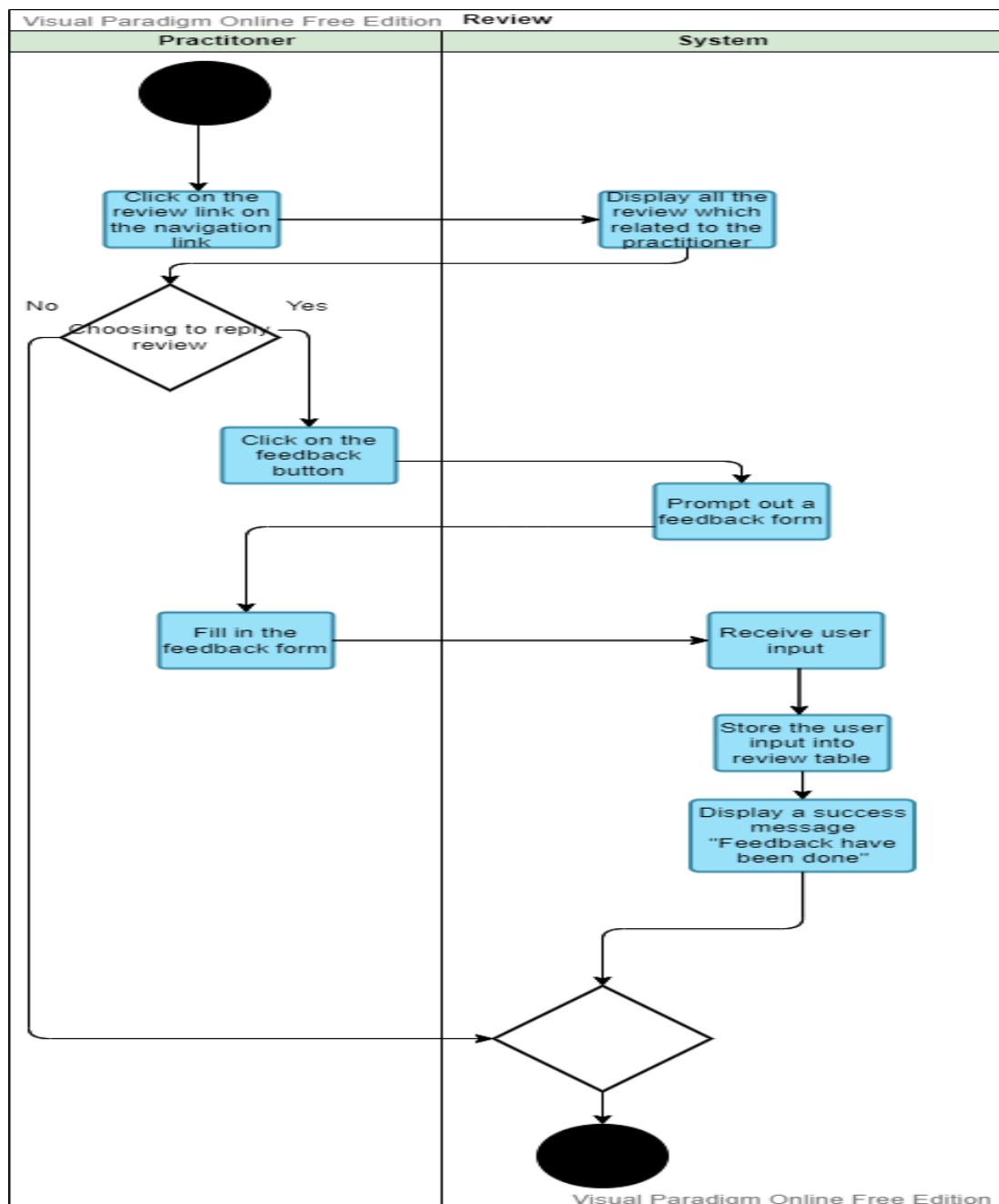
Figure 4. 18 View Patient Review - Activity Diagram

The above activity shows the flow of the review activity. The above activity had shown the way that practitioner actor interacts with the system to accomplish user goal. When the practitioner clicks on the "Feedback" link on the navigation header, the system will receive the user input and display all the feedback information which related to the particular practitioner in new web page. User can scroll through the web application to view all the current review and testimonial that make by the patient.

Besides that, if the user wishes to give feedback to the user's review, user can click on the "Provide Feedback" button. The system will receive the user input and prompt out a feedback form in modal basic. Next, user fill in all the input flied and press on submit button. The system will receive the user input and store the user input into review table database. After that, system will prompt user a success message "Feedback have been sent" to notified user that he/she review had been send successfully.

4.3.17 View Patient Detail - Business Owner Perspective

Figure 4. 19 View Patient Detail - Activity Diagram

The above activity shows the flow of the view patient detail activity. The above activity had shown the way that business owner actor interacts with the system to accomplish user goal. When the business owner clicks on the "patient" link at the navigation link. The system will display all the patient information in pagination format. Next, user can click on next or previous button to view the following or previous practitioner information. The system will display the practitioner information according to the user pagination input. Besides that, if the user wishes to perform searching patient detail by name. Users need to fill in the search input field and press on submit button. The system will receive user input and validate the user input. Next, system will query the database record according to the user input, if have record found, the system retrieves the result and display it to the user. If no record found, the system will display no record found to the user. Moreover, when the user wishes to perform update patient detail. The user has to click on the editing button and the system will change the input field from read only into editable, and the user have to fill in all the input field and press on submit button. The system will receive the user input and validate the user input, if the user input is invalid, the system will redirect the user to the edit form and display the error message. If the user input is valid will update the database record according to the user input. Next, the system will display a patient information successfully updated message. Furthermore, if the user wishes to perform inactivate or activate patient account. The user has to click on "inactivate or activate" button. After the user click on the button, the system will receive the user input and update the database record and will display a patient account inactivate or activate successfully message.

4.3.18 View Practitioner Detail – Business Owner Perspective

Figure 4. 20 View Practitioner Detail - Activity Diagram

The above activity shows the flow of the view practitioner detail activity. The above activity had shown the way that business owner actor interacts with the system to accomplish user goal. When the business owner clicks on the "practitioner" link at the navigation link. The system will display all the practitioner information in pagination format. Next, user can click on next or previous button to view the following or previous practitioner information. The system will display the practitioner information according to the user pagination input. Besides that, if the user wishes to perform searching practitioner detail by name. Users need to fill in the search input field and press on submit button. The system will receive user input and validate the user

input. Next, system will query the database record according to the user input, if have record found, the system retrieves the result and display it to the user. If no record found, the system will display no record found to the user. Moreover, when the user wishes to perform update practitioner detail. The user has to click on the editing button and the system will change the input field from read only into editable, and the user have to fill in all the input field and press on submit button. The system will receive the user input and validate the user input, if the user input is invalid, the system will redirect the user to the edit form and display the error message. If the user input is valid will update the database record according to the user input. Next, the system will display a practitioner information successfully updated message. Furthermore, if the user wishes to perform inactivate or activate practitioner account. The user must click on "inactivate or activate" button. After the user click on the button, the system will receive the user input and update the database record and will display a practitioner account inactivate or successfully activate message. Next, if the user wishes to perform create new practitioner account, the user can click on "create new practitioner account" button and the system will display a create account form to let user fill in the input. After the user fill in the input field and press on submit button, the system will receive the user input and validate user input. If the user input is invalid, the system will redirect the user to the create practitioner form and display the error message. If the user input is valid will store user input into database and display a practitioner account successfully created message.

4.3.19 View All Review - Business Owner Perspective
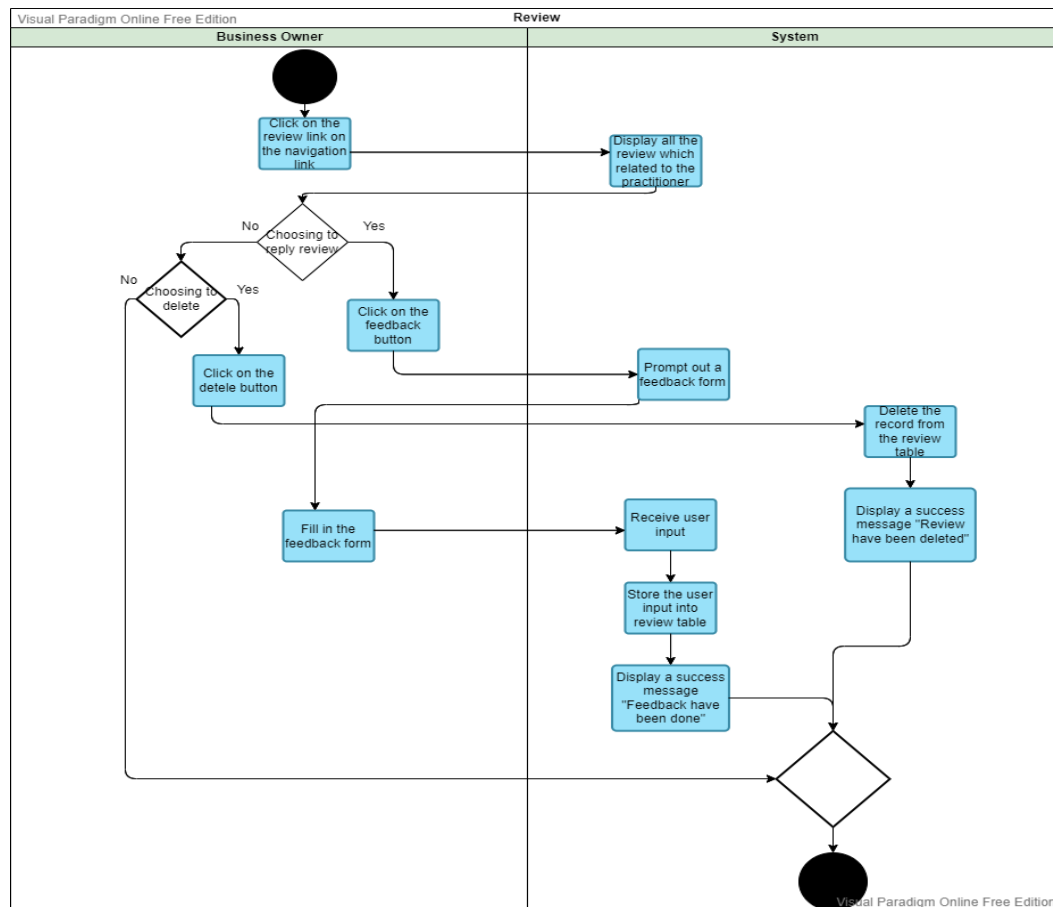
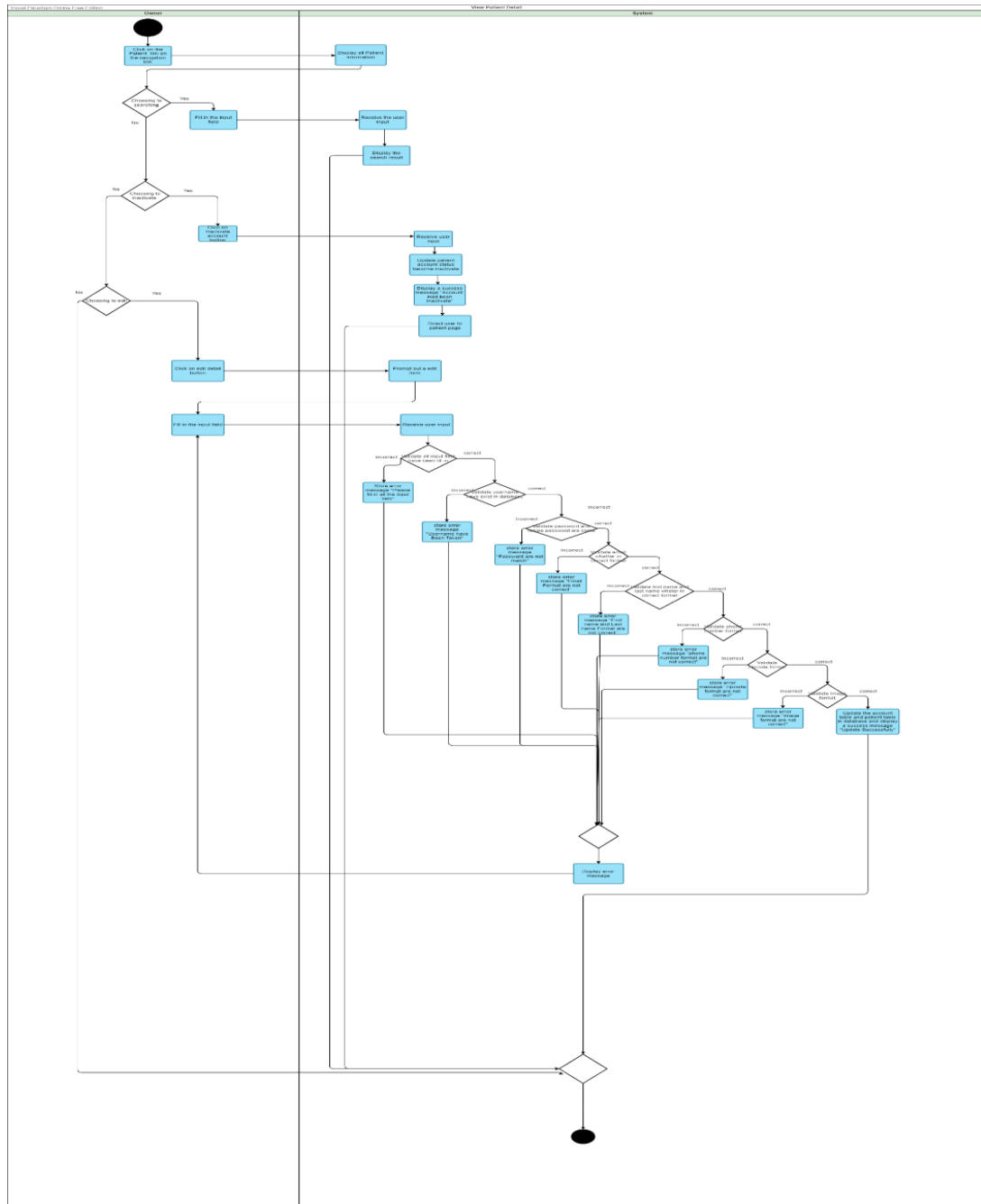*Figure 4. 21 View All Review - Activity Diagram*

The above activity shows the flow of the view all review activity. The above activity had shown the way that business owner actor interacts with the system to accomplish user goal. When the business owner clicks on the "Review" link on the navigation header, the system will receive the user input and display all the patient's review and testimonial and practitioner feedback in new page. Besides that, if business owner wishes to reply to the review. The business owner can click on the "reply review" button. The system will receive user input and prompt out an input box modal, asking user to enter all the input. After, user fill in all the input field and press on submit button. The system will receive the user input and validate user input and store user input into database. Next, the system will prompt out feedback have been sent successfully message. If the user wishes to delete the review, the user can click on the "delete review" button. The system will prompt out a delete confirmation form. After user fill in "DELETE" keyword at the input field and press submit, the system will receive user input and delete the database record. Next, the system will prompt out a review successfully deleted message.

4.3.20 View Practitioner Leave Detail - Business Owner Perspective
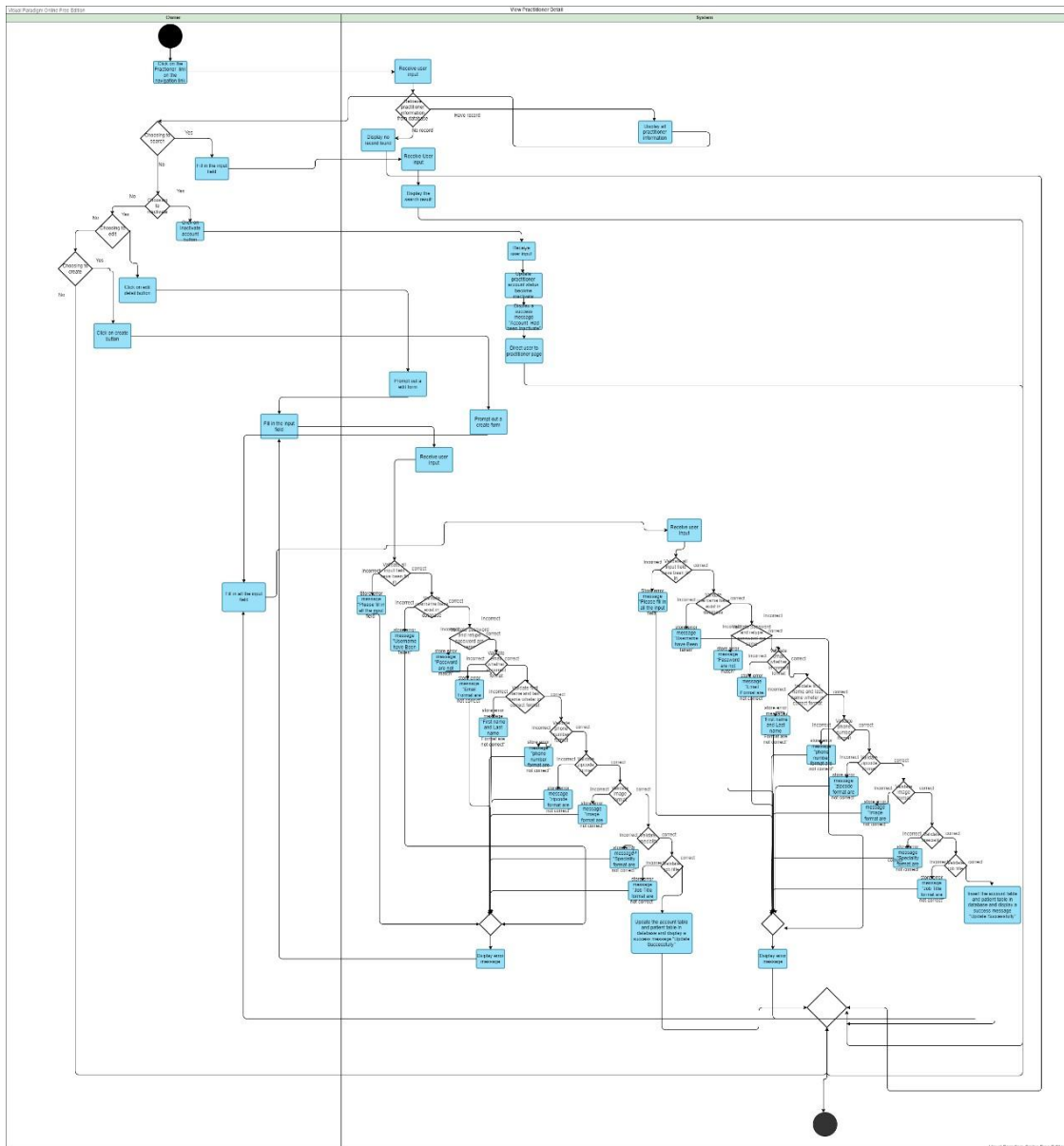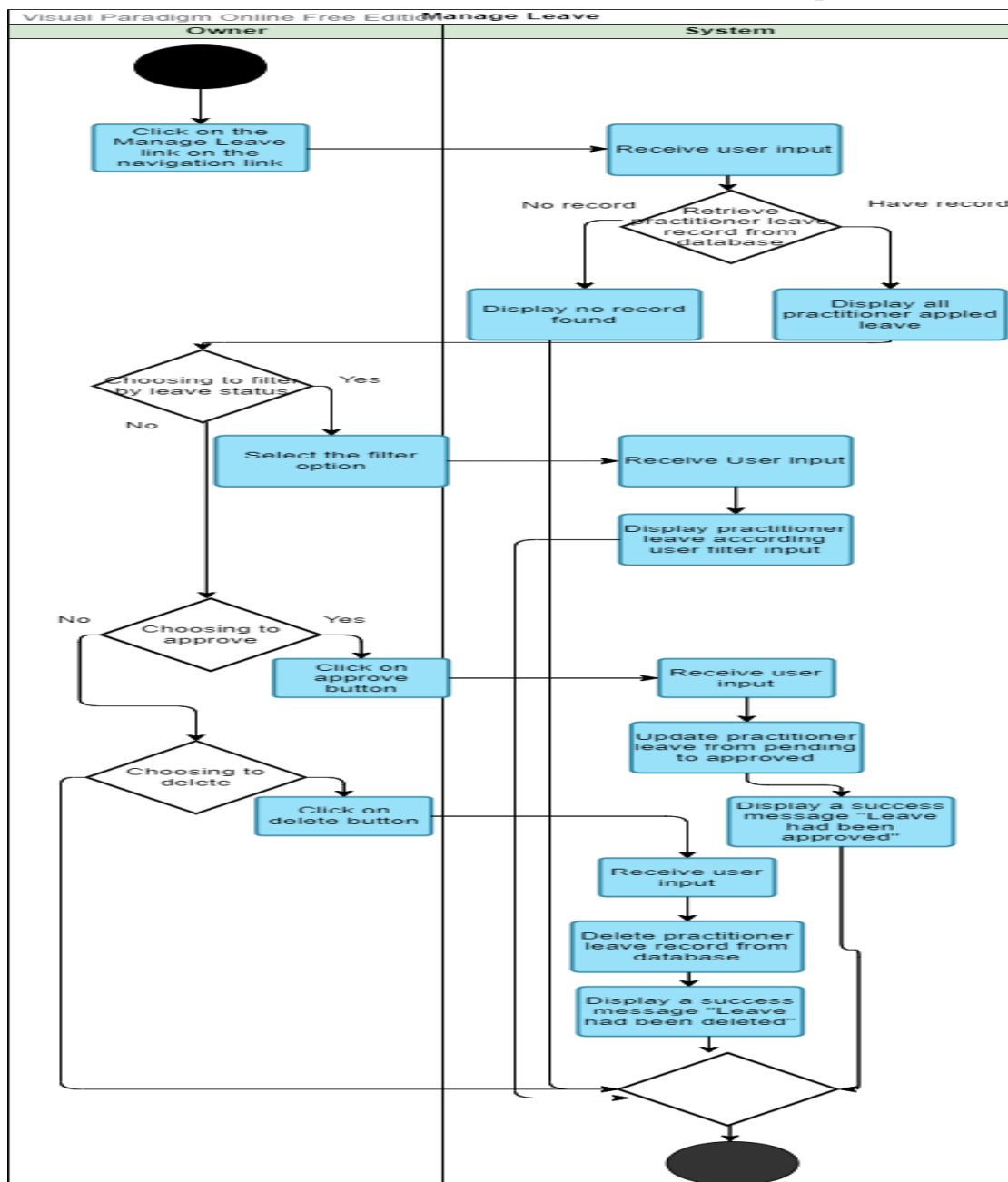

Figure 4. 22 View Practitioner Leave Detail - Activity Diagram

The above activity shoes the flow of the view practitioner leave detail activity. The above activity had shown the way business owner actor interacts with the system accomplish user goal. When user click on the "practitioner leave" link on the navigation header. The system will query the database to retrieve the practitioner leave information, if have result found, the system will display the result to the user, else the system will display no result found. If user wishes to perform filtering by the leave status, the user clicks on the filter button. Next, the system will display a drop-down option to let the user select the option, after user select the option and press submit button. The system

will receive the user input and validate the user input. Next, the system will display the filtering result according user selection. If the user wishes to approve the pending leave. The user can click on the "approve" button. The system will receive the user input and update the database record. Next, the system will prompt out a leave have been approved successfully message and send notification to the practitioner. Moreover, the user can click on the "delete" button. The system will receive the user input and display a delete practitioner leave form. User can insert "DELETE" and click on submit button to remove the leave from the database. After user press on submit button, the system will validate the user input, if user input is match with "DELETE", the database record will be deleted and display success message to user and send notification to practitioner. If the user input is incorrect, the system will display user with an error message and redirect user to the delete practitioner leave form.

4.4 Sequence Diagram
4.4.1 View Review – Patient Perspective
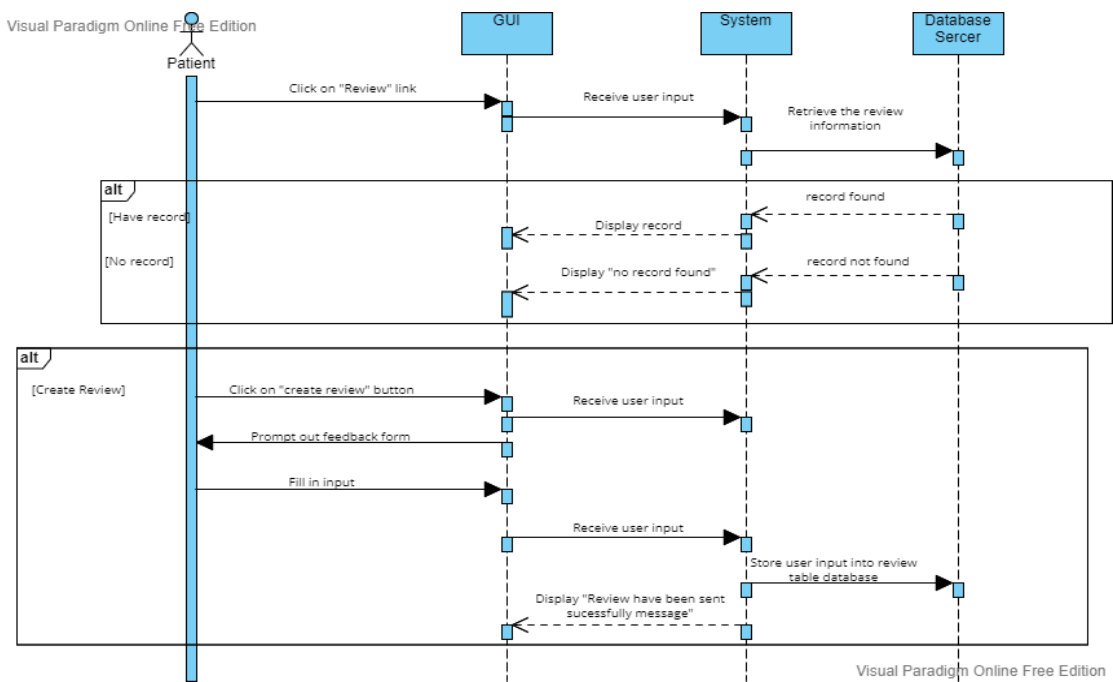
Figure 4. 23 View Review - Sequence Diagram

4.4.2 View Treatment – Patient Perspective
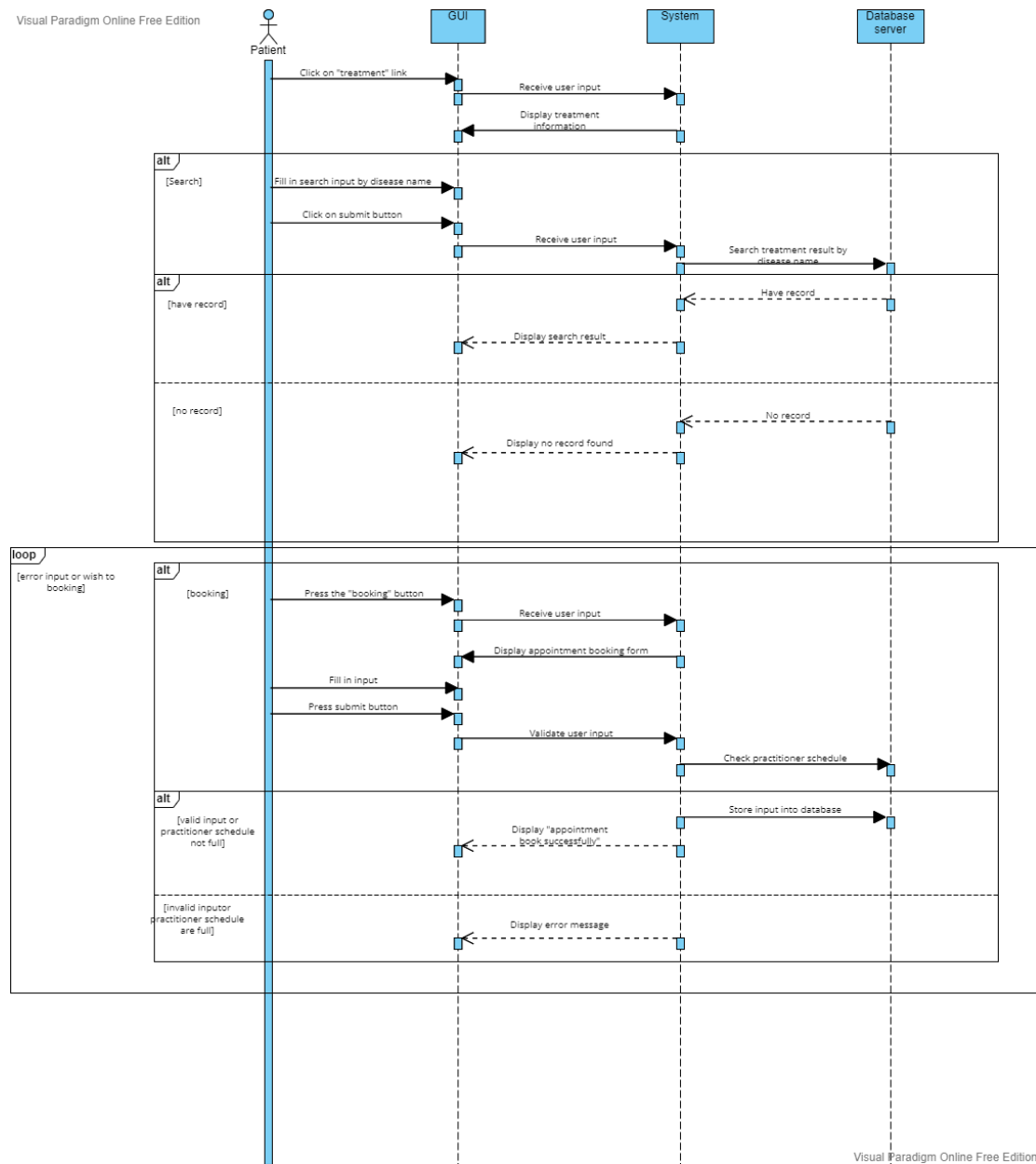
Figure 4. 24 View Treatment - Sequence Diagram

4.4.3 View Appointment Detail - Patient Perspective
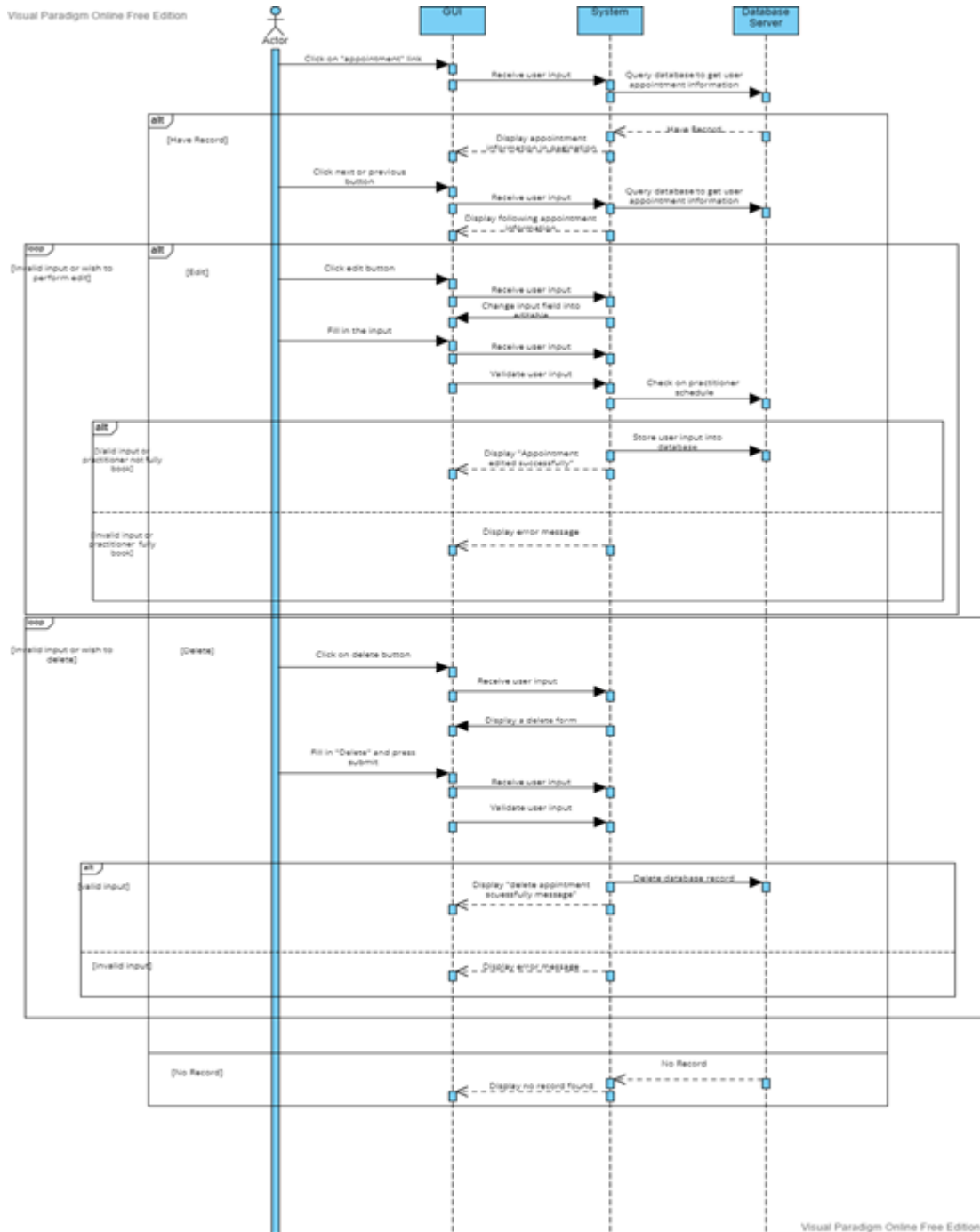
Figure 4. 25 View Appointment - Sequence Diagram

4.4.4 Doctor on Chat – Patient Perspective
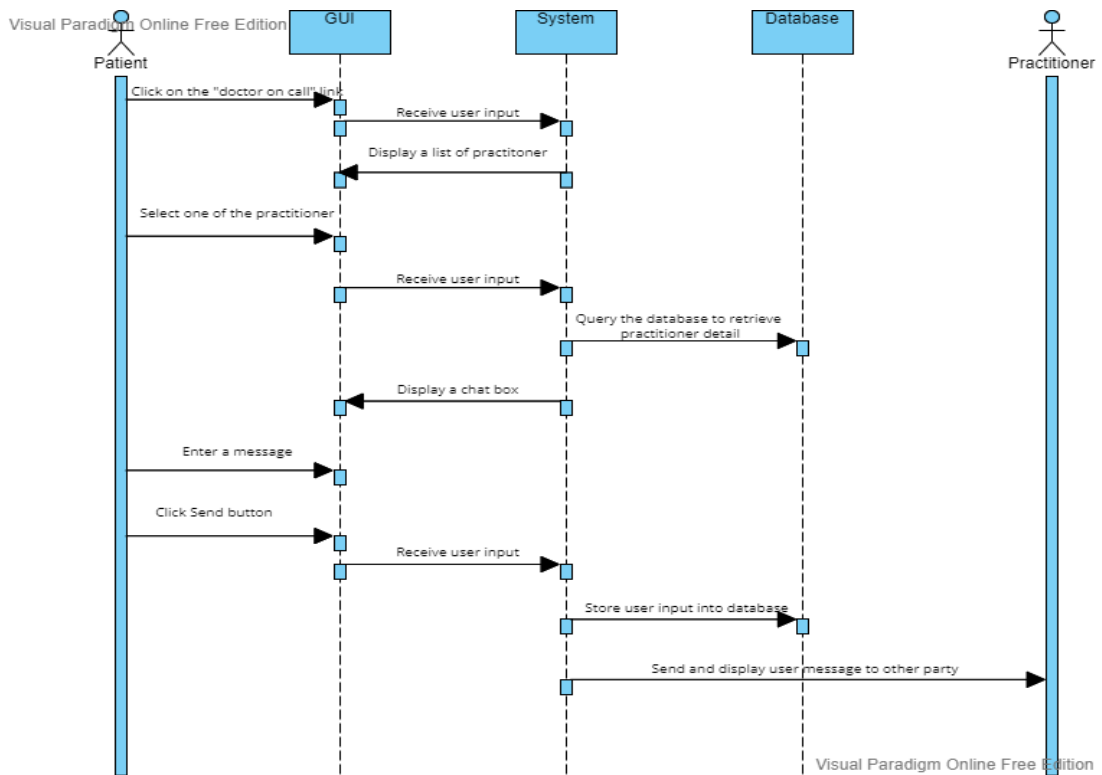
Figure 4. 26 Doctor On Chat - Sequence Diagram

4.4.5 View Practitioner – Patient Perspective
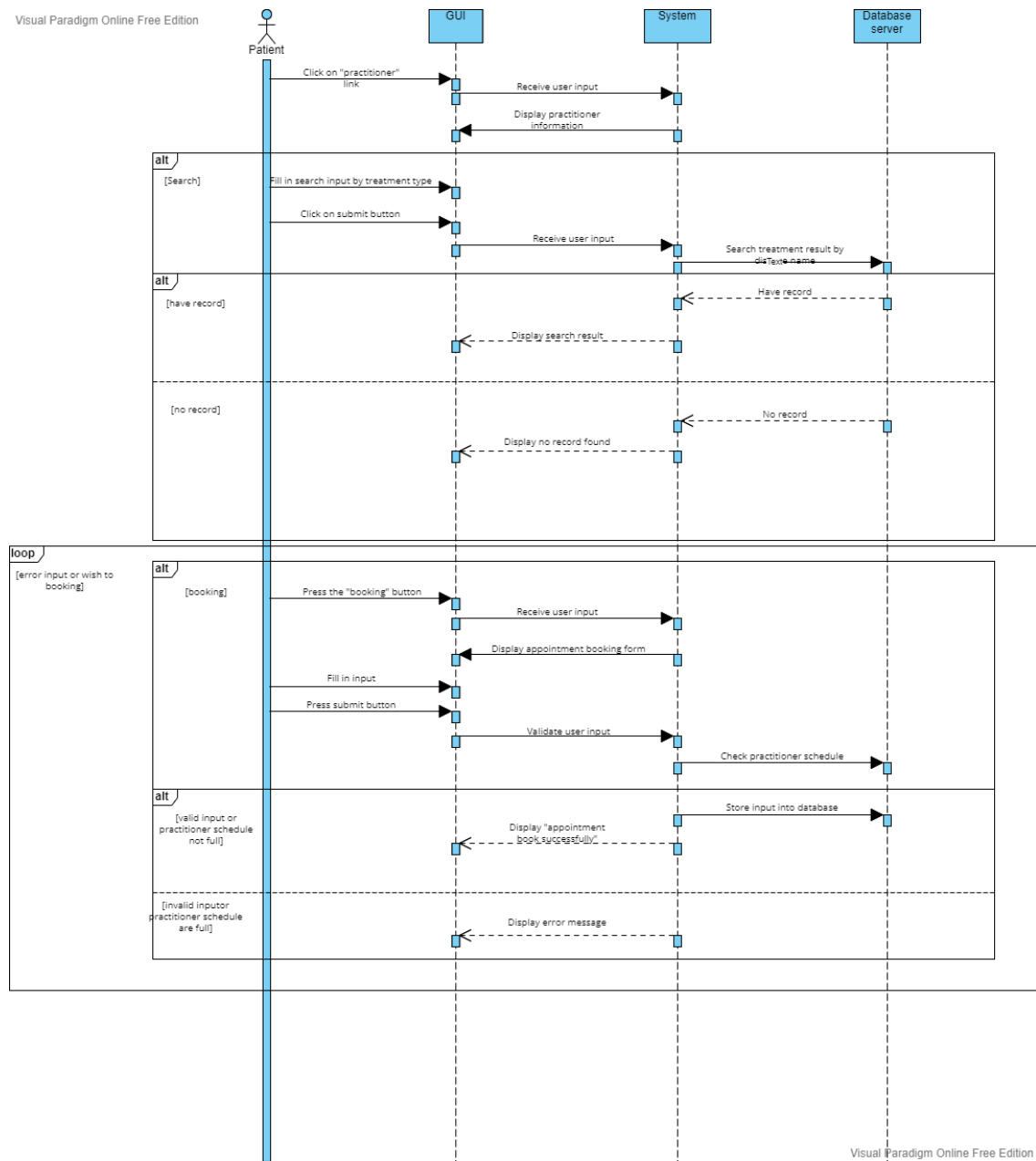
Figure 4. 27 View Practitioner - Sequence Diagram

4.4.6 Make Fast Appointment – Patient Perspective
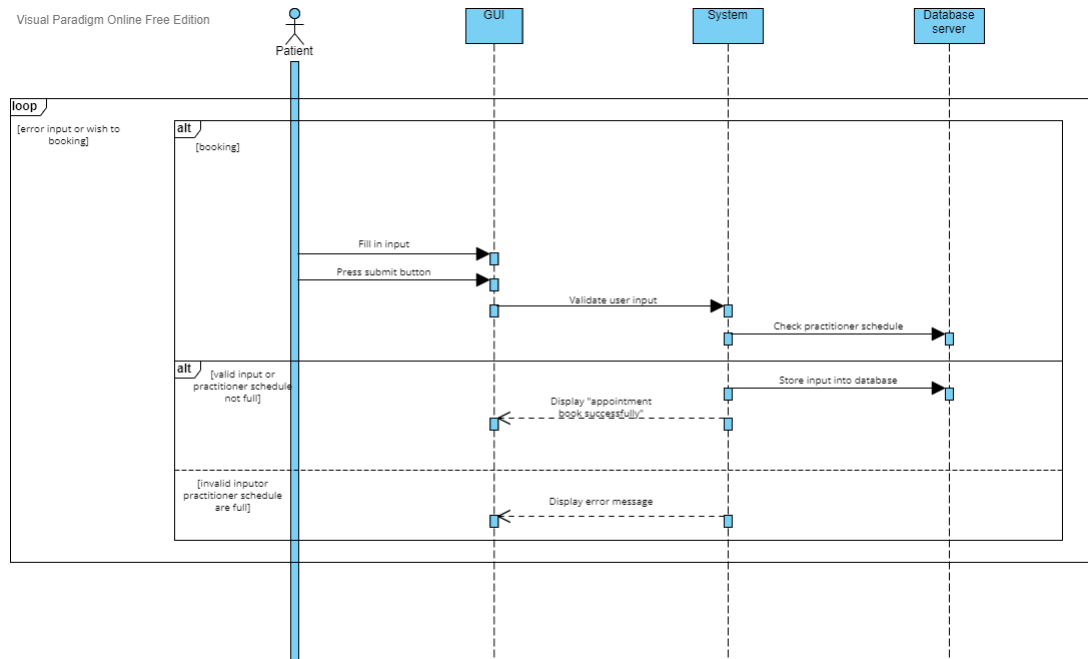
Figure 4. 28 Make Fast Appointment - Sequence Diagram

4.4.7 View User Personal Information – Patient Perspective
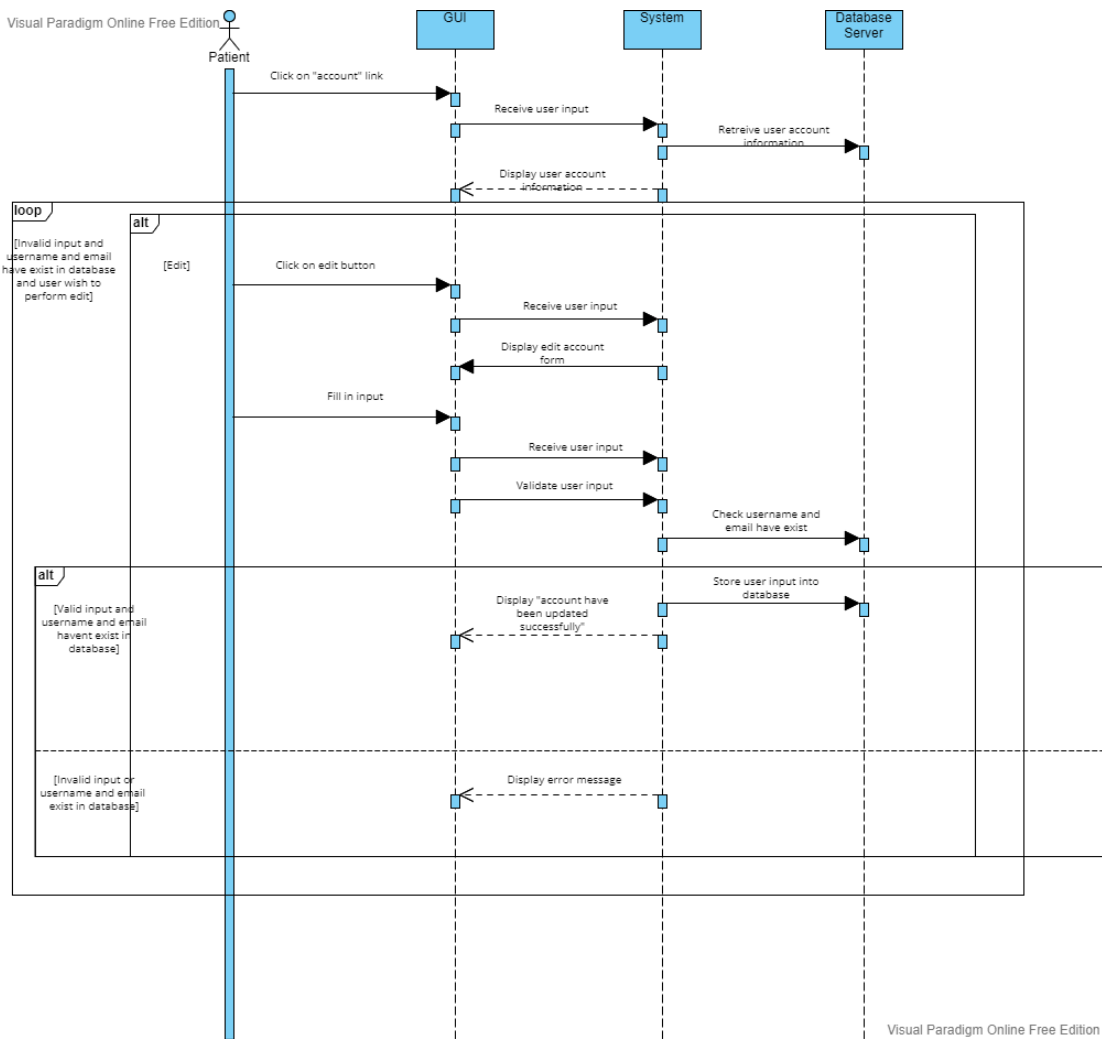
Figure 4. 29 View User Personal Information - Sequence Diagram

4.4.8 Trading Article – Patient Perspective
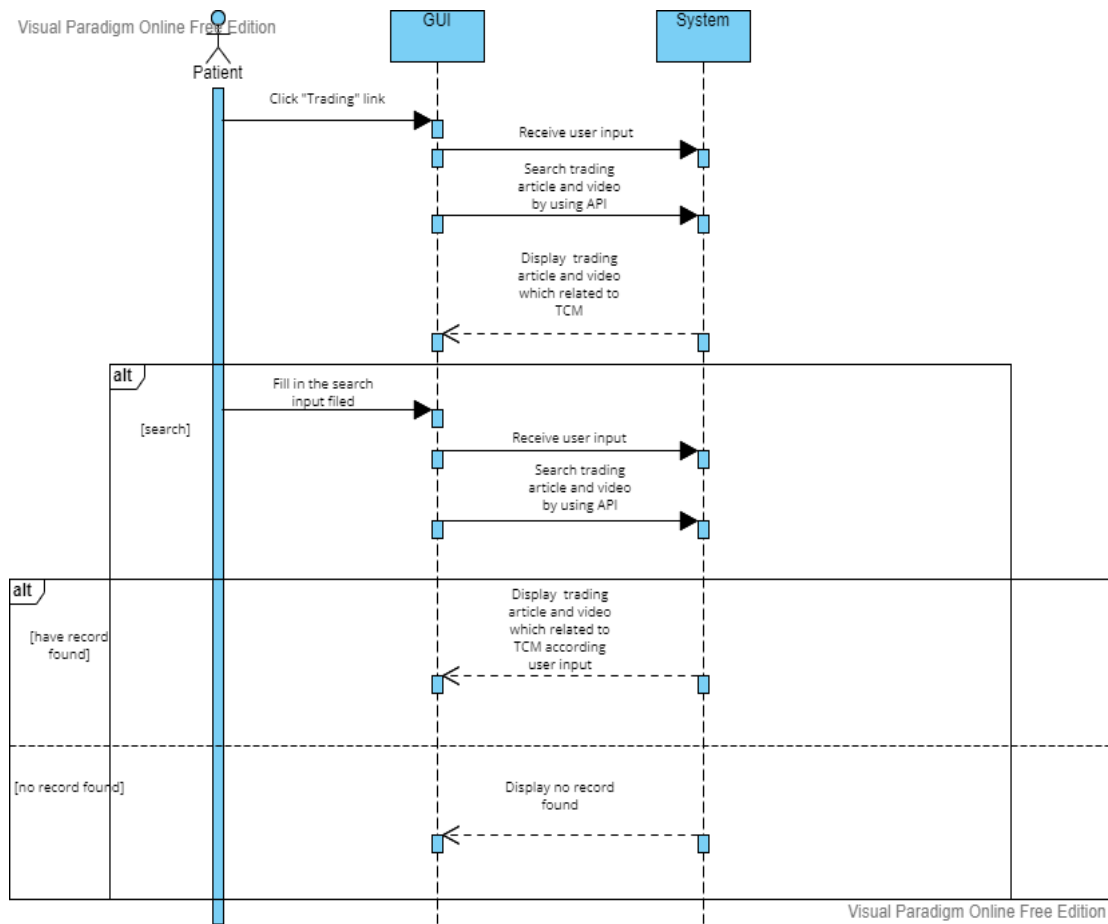
Figure 4. 30 Trading Article - Sequence Diagram

4.4.9 View Patient Health Historical Record - Patient Perspective
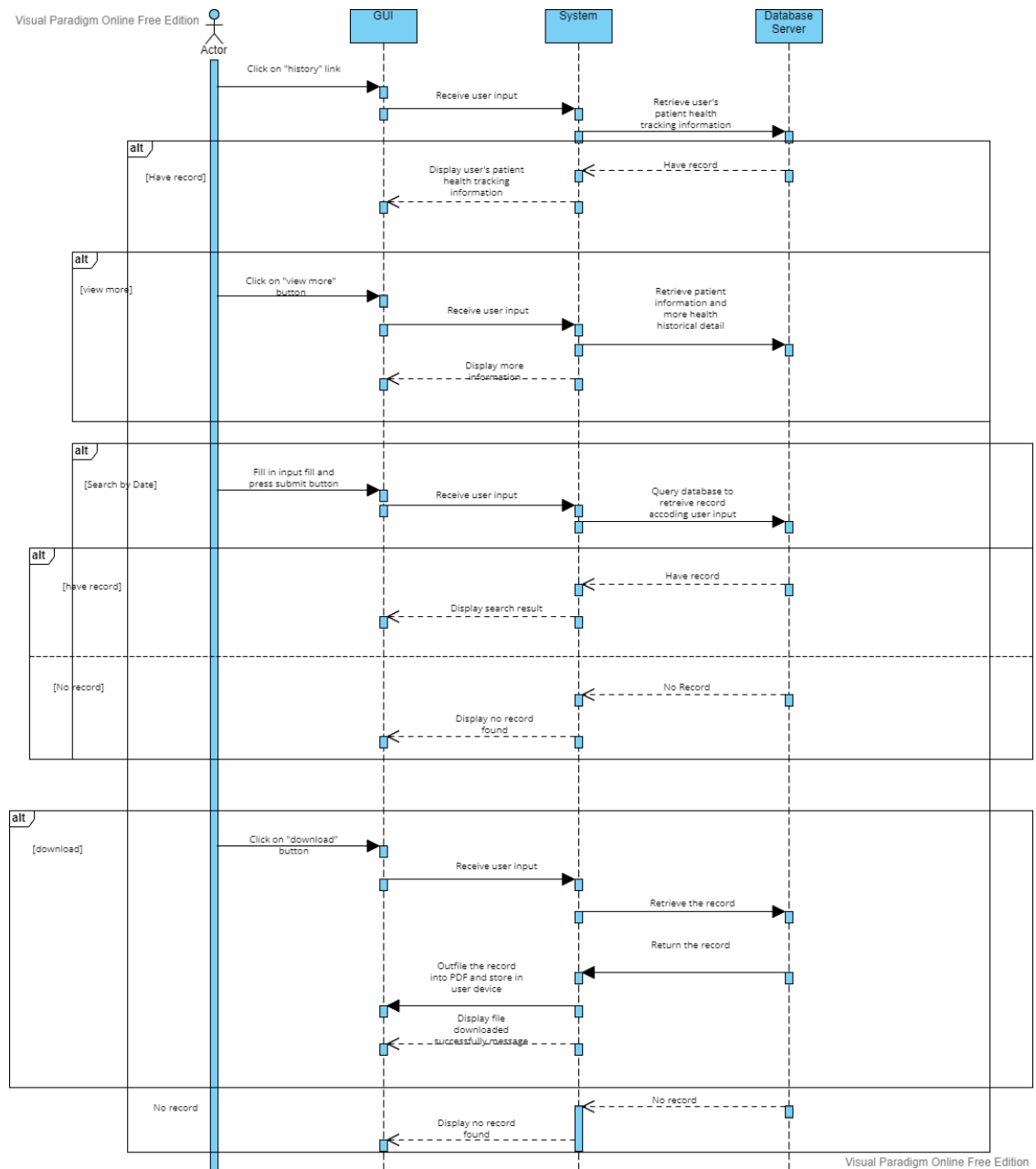
Figure 4. 31 View Patient Health Historical Record - Sequence Diagram

4.4.10 Logout – Patient Perspective
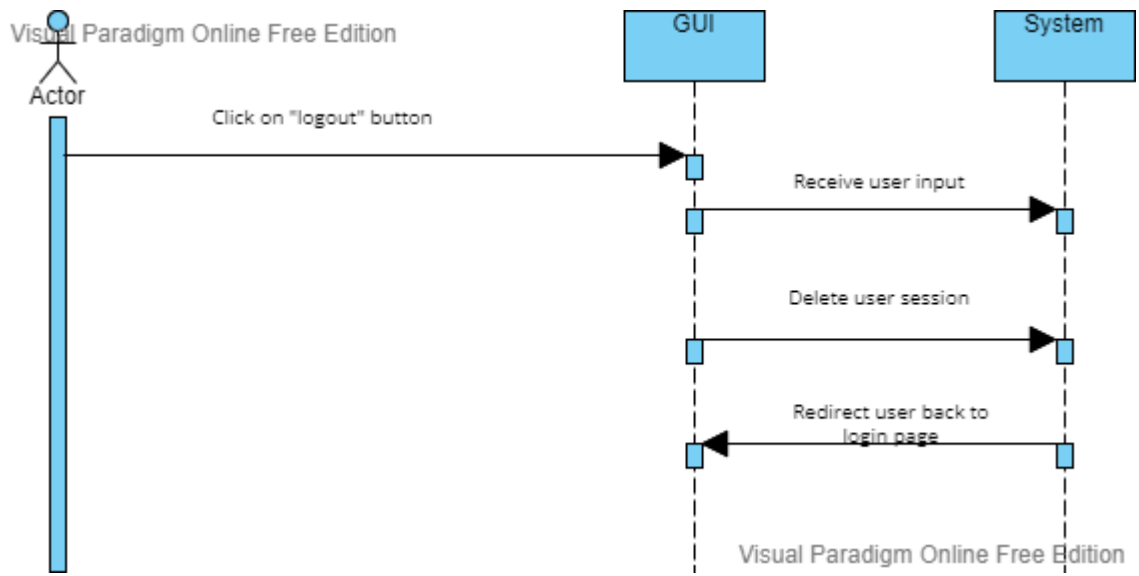
Figure 4. 32 Logout - Sequence Diagram

4.4.11 Login - Patient Perspective
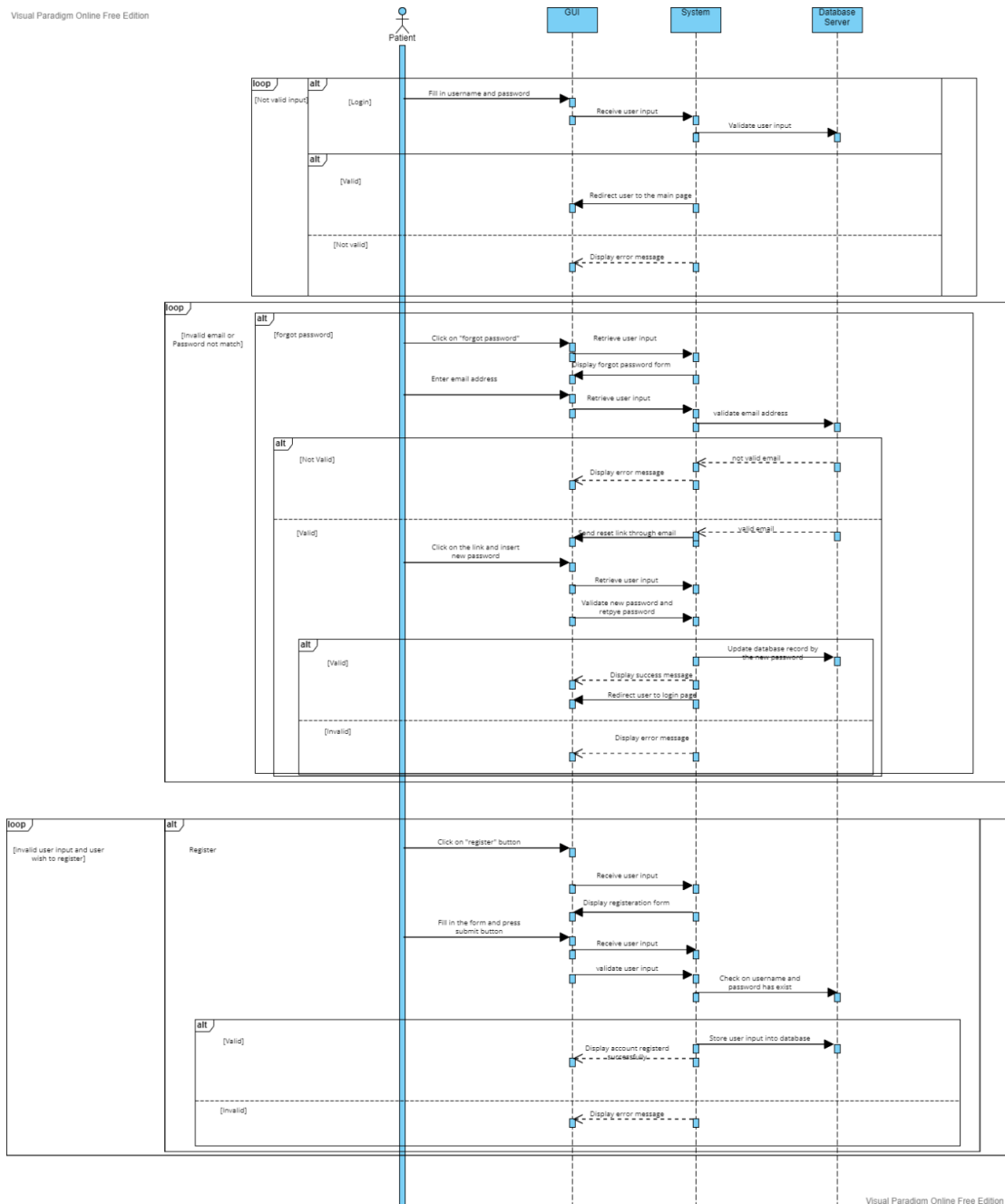
Figure 4. 33 Login - Sequence Diagram

4.4.12 View Patient Health Historical Record - Practitioner Perspective
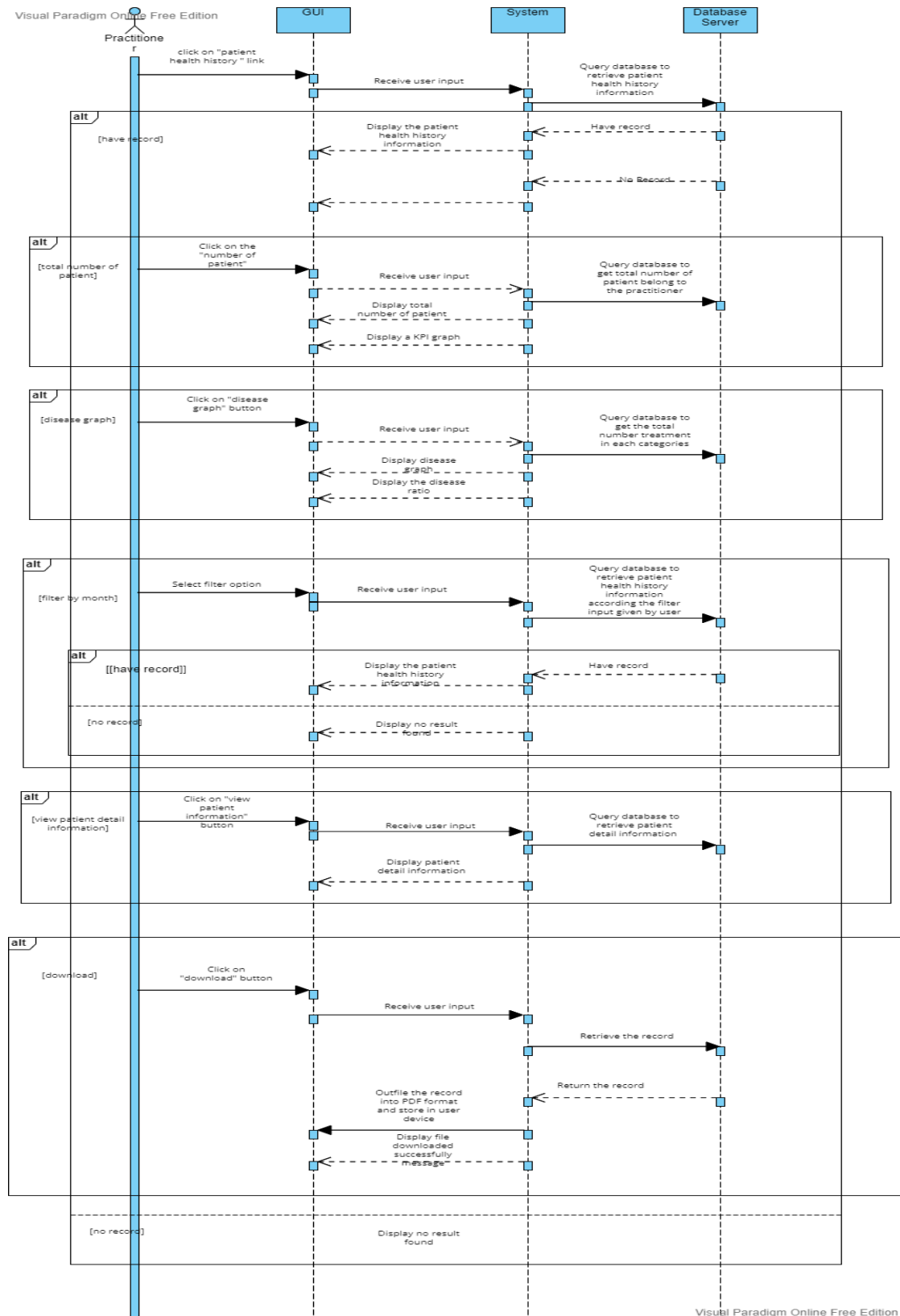
Figure 4. 34 View Patient Health Historical Record - Sequence Diagram

4.4.13 View Practitioner Personal Information - Practitioner Perspective
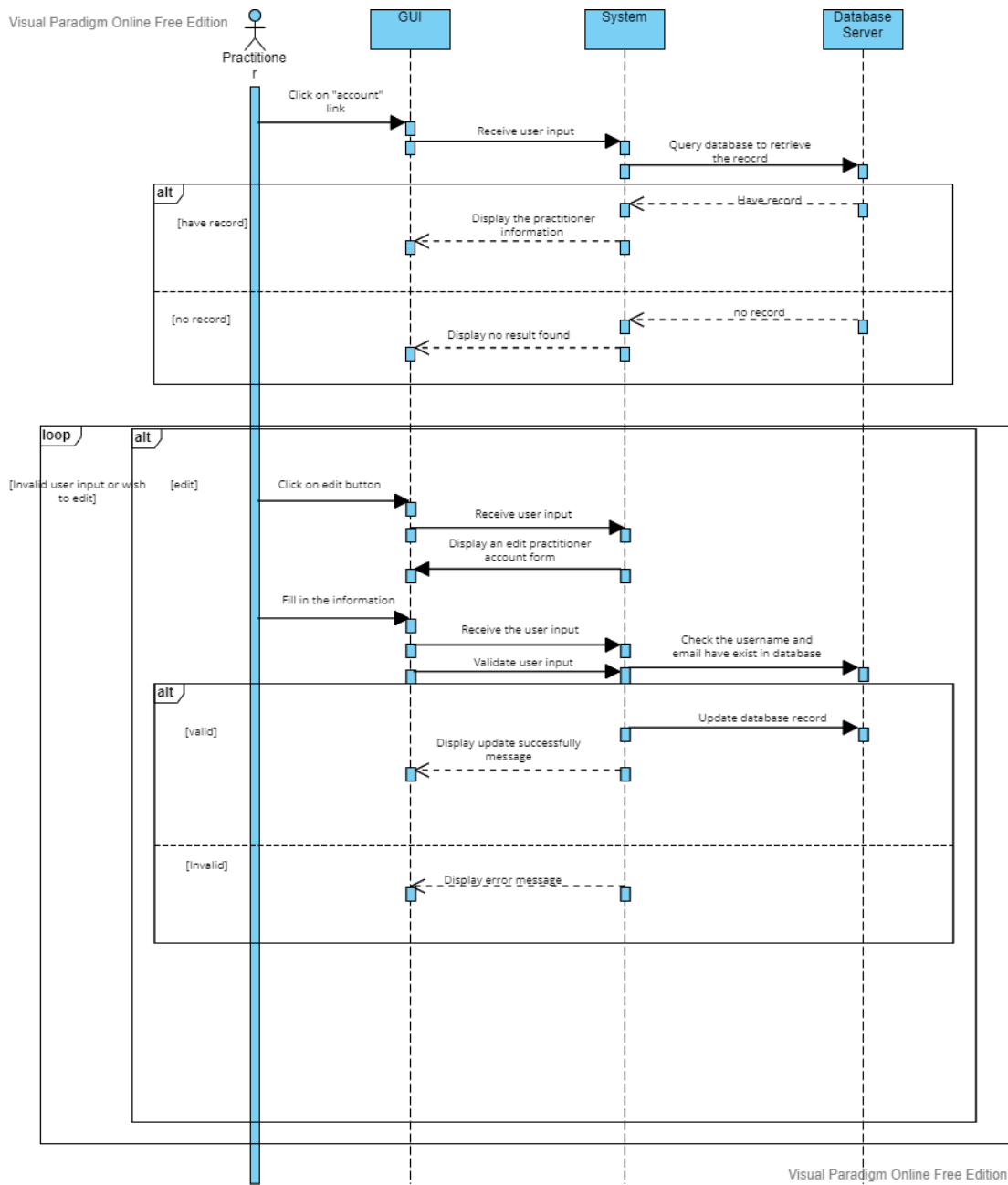
Figure 4. 35 View Practitioner Personal Information - Sequence Diagram

4.4.14 View Historical Leave Information - Practitioner Perspective
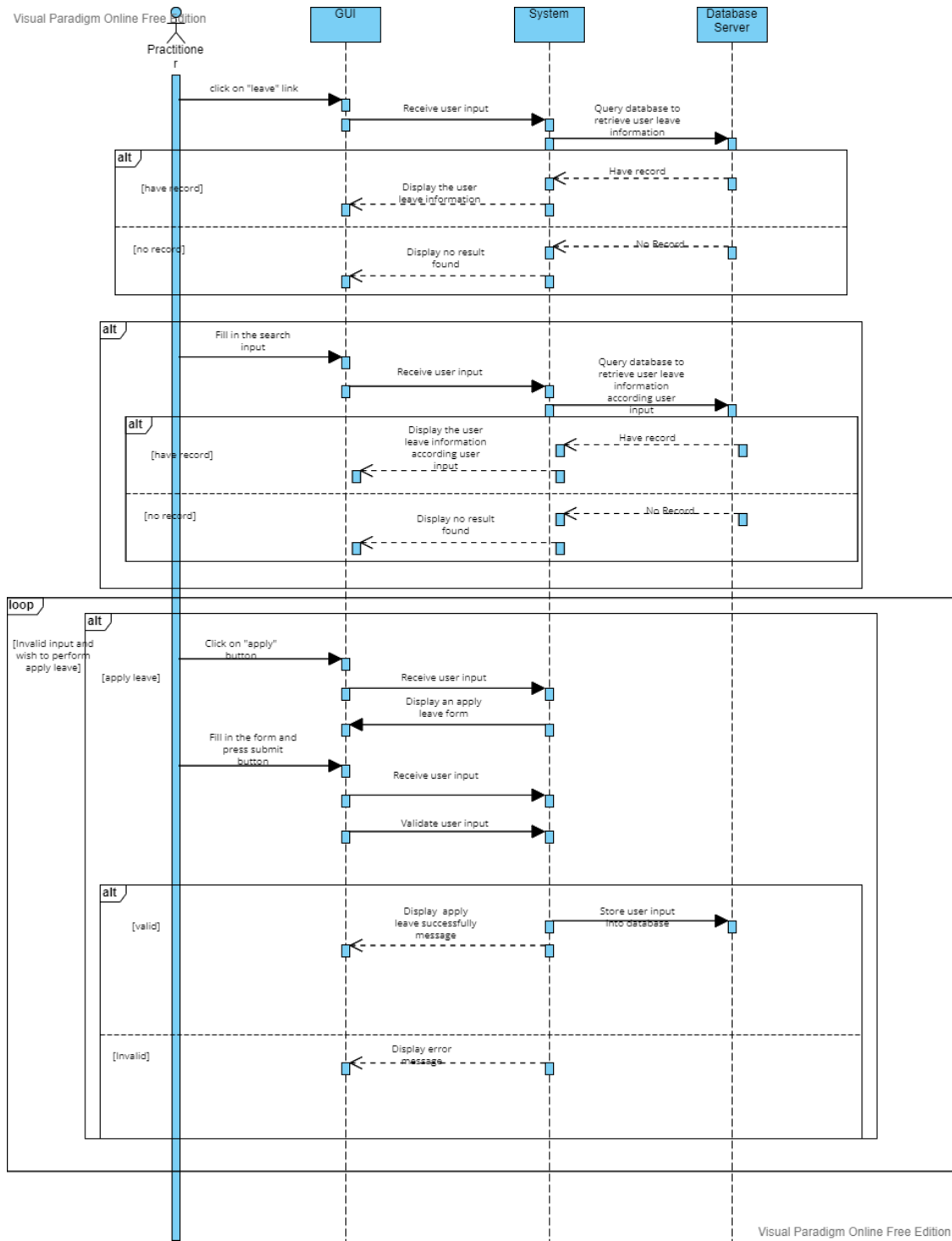
Figure 4. 36 View Historical Leave Information - Sequence Diagram

4.4.15 View Schedule - Practitioner Perspective
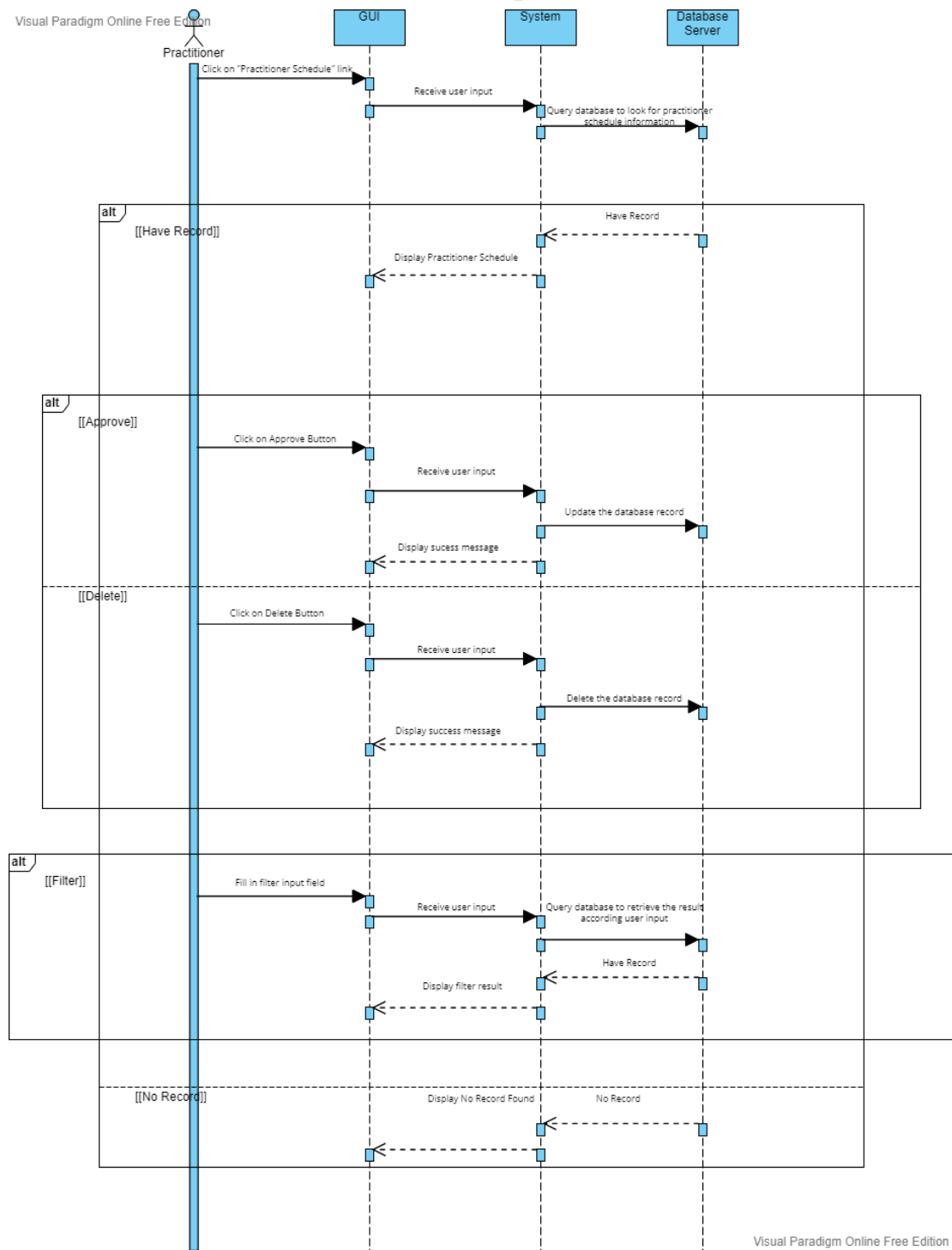
Figure 4. 37 View Schedule - Sequence Diagram

4.4.16 View Patient Review - Practitioner Perspective
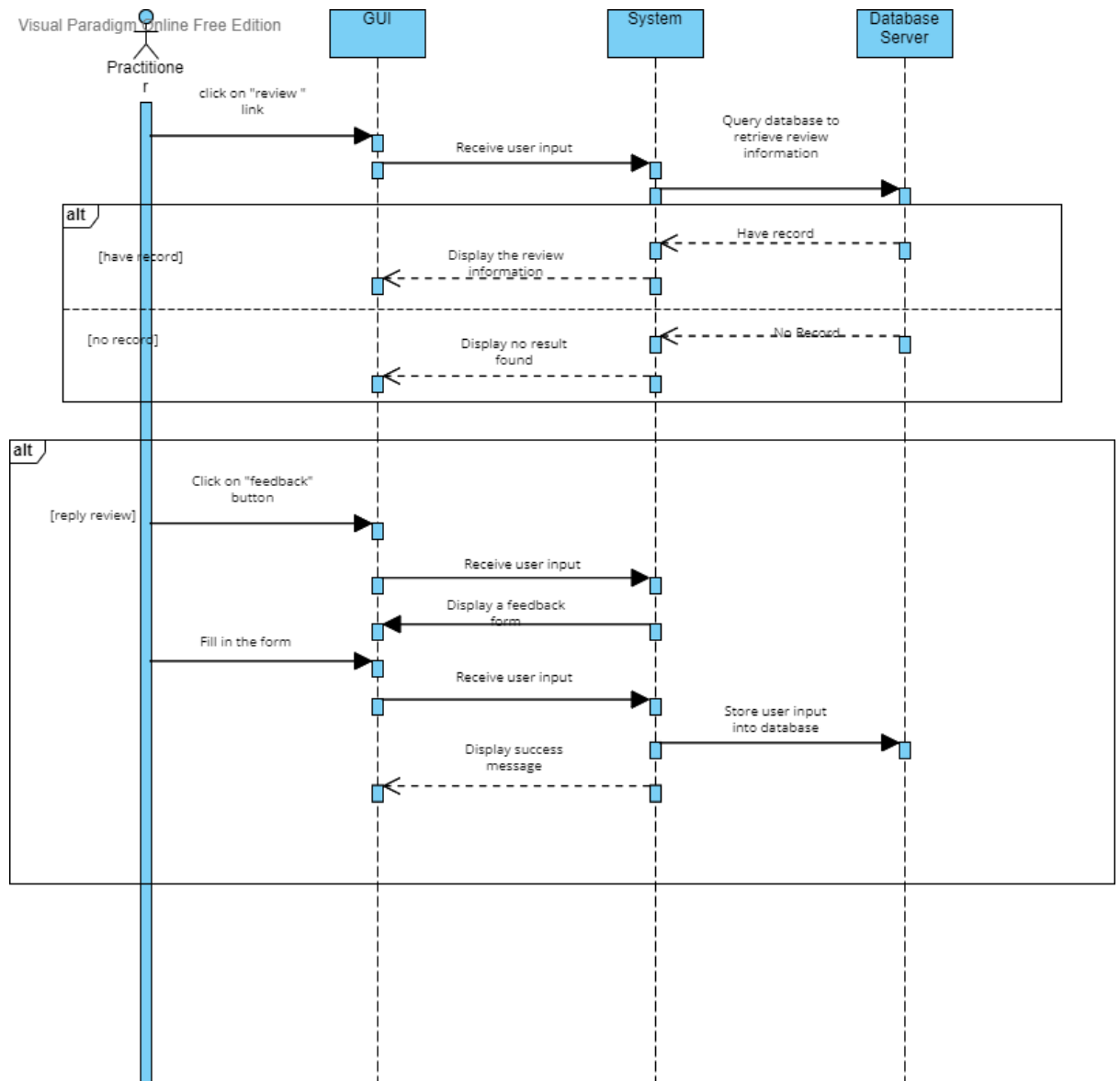
Figure 4. 38 View Patient Review - Sequence Diagram

4.4.17 View Patient Detail - Business Owner Perspective
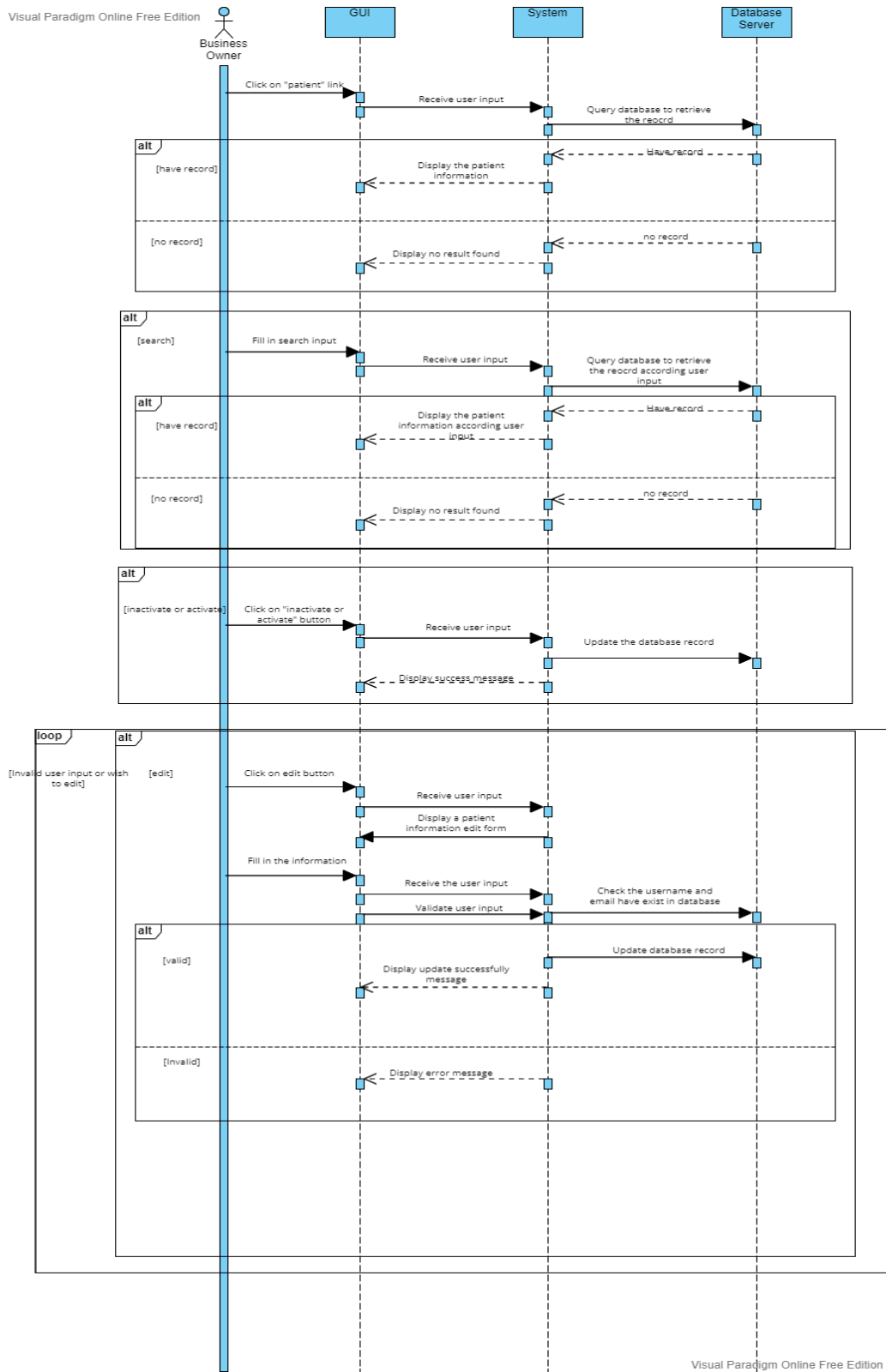
Figure 4. 39 View Patient Detail - Sequence Diagram

4.4.18 View Practitioner Detail – Business Owner Perspective
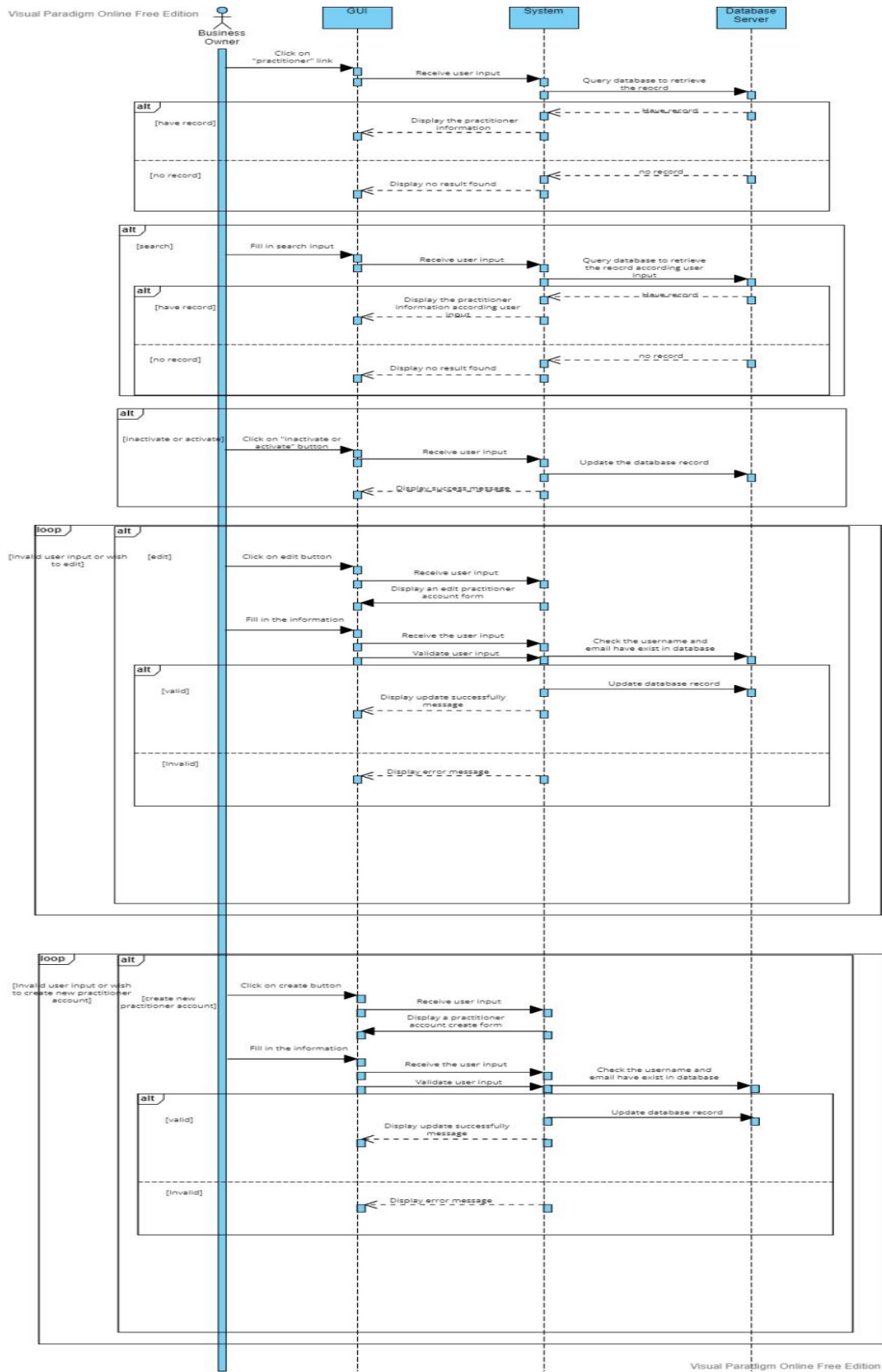
Figure 4. 40 View Practitioner Detail - Sequence Diagram

4.4.19 View All Review - Business Owner Perspective
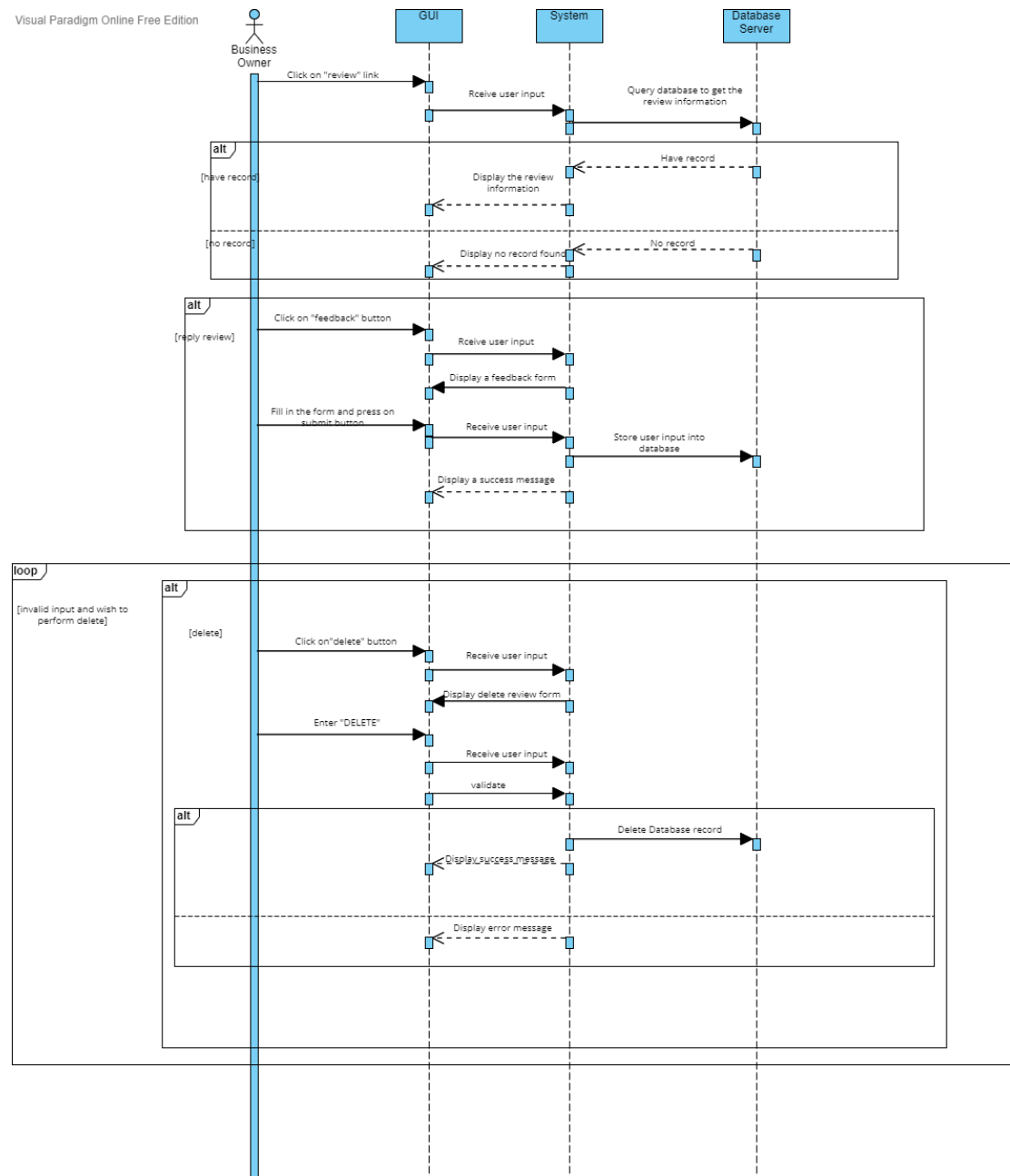
Figure 4. 41 View All Review - Sequence Diagram

4.4.20 View Practitioner Leave Detail - Business Owner Perspective
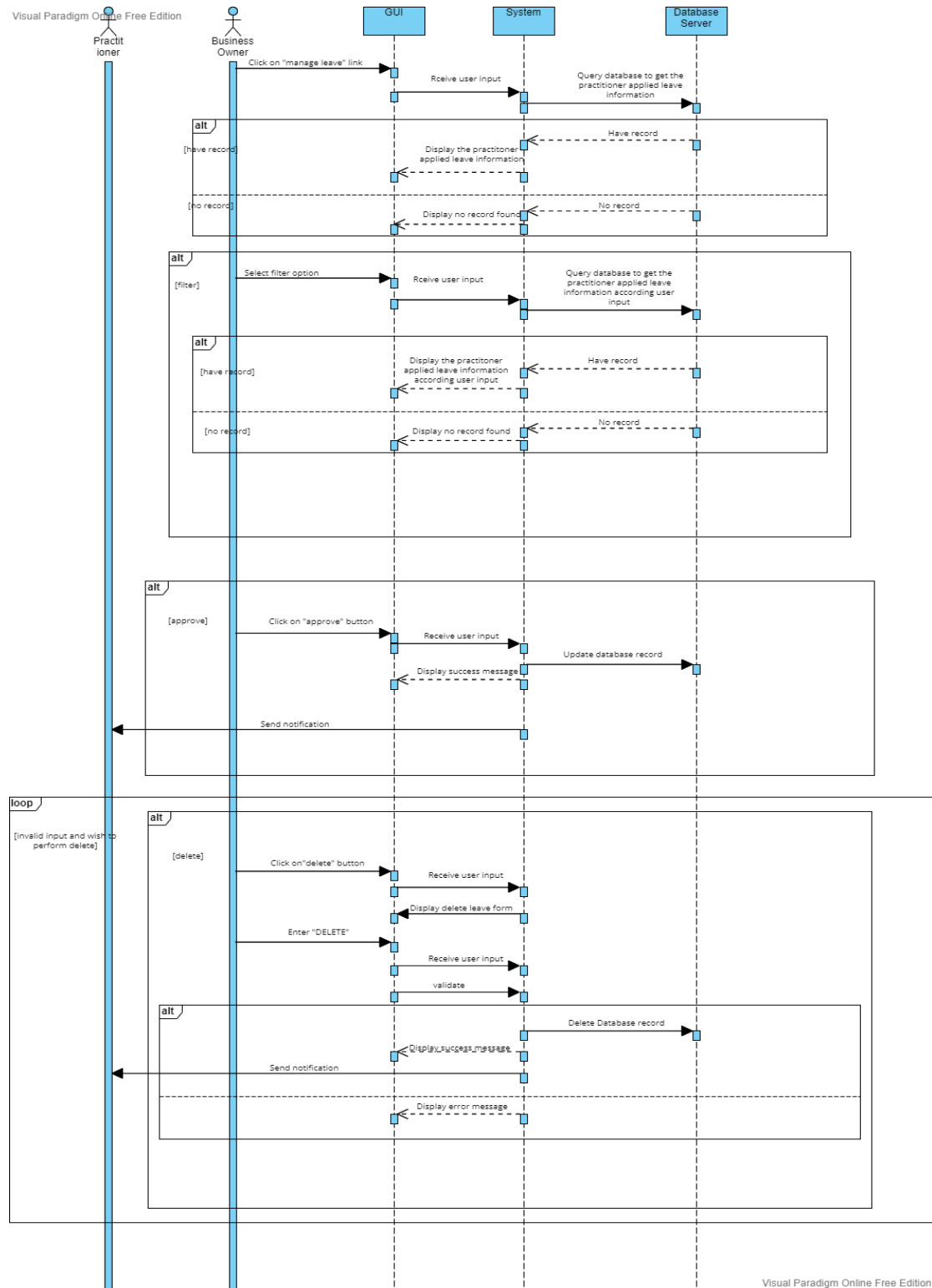
Figure 4. 42 View Practitioner Leave Detail - Sequence Diagram

4.5 System Architecture Diagram
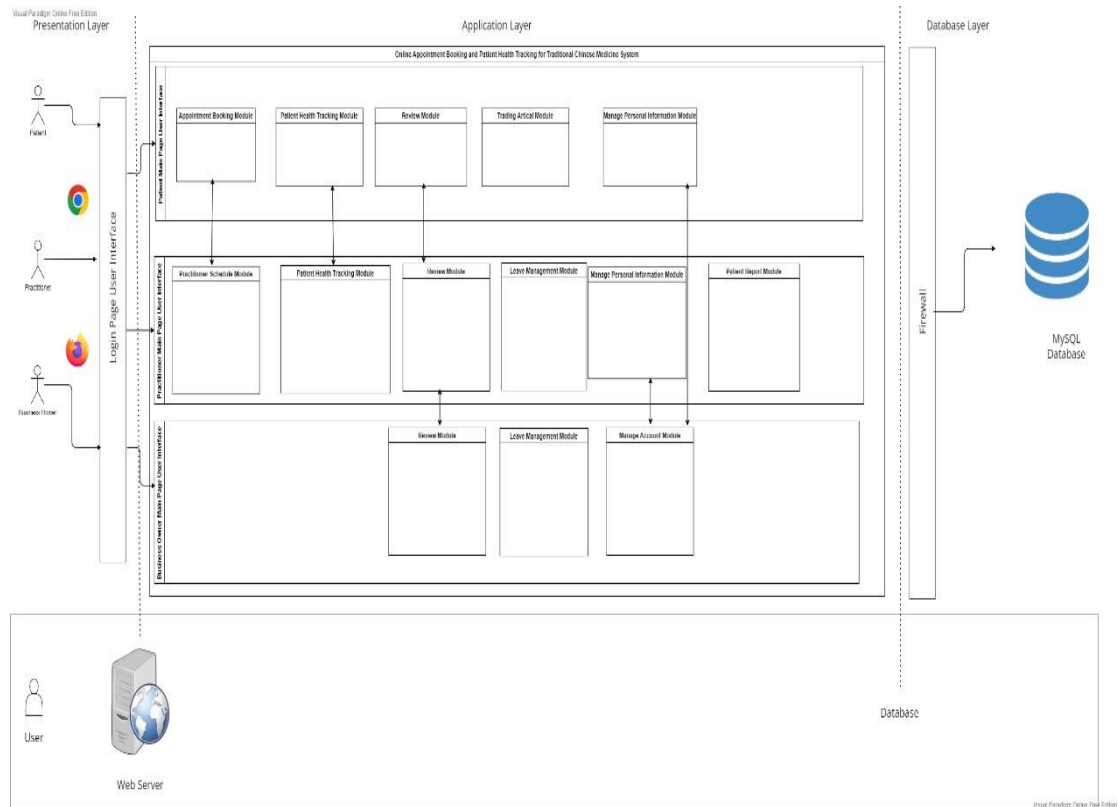
Figure 4. 43 System Architecture Diagram

4.6 Wireframe Diagrams

4.6.1 Wireframe Diagram- Patient Actor

4.6.1.1 App

Figure 4. 44 Appointment Booking Wireframe Diagram

The appointment scheduling function's wireframe diagram is depicted in the diagram up top. The patient actor is capable of performing this function. Before making an appointment, the patient had to log into their account. Each input field in the "create an enquiry appointment" section can be filled out by the patient. Once every input field has been filled out, the patient can move on to the next step of their application by clicking the "make an appointment" button. The system will check their input, and if it is valid, it will store it in a database and display a message to the patient indicating that the booking was successful.

4.6.1.2 Appointment Management Wireframe Diagram- Patient Actor
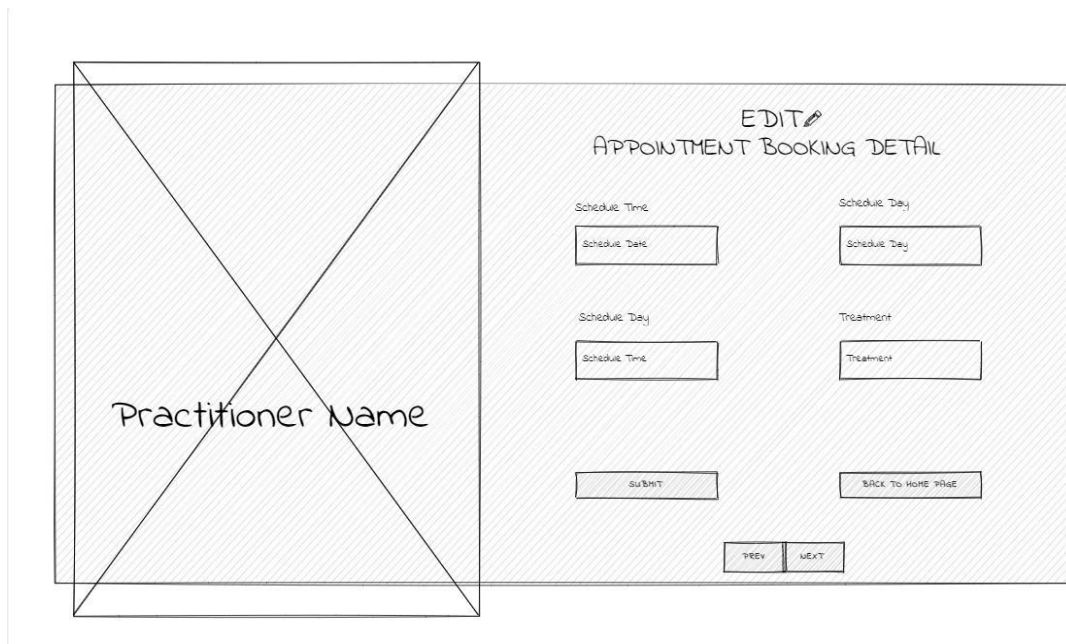
Figure 4. 45 Appointment Management Wireframe Diagram (Before Edit Button Clicked)
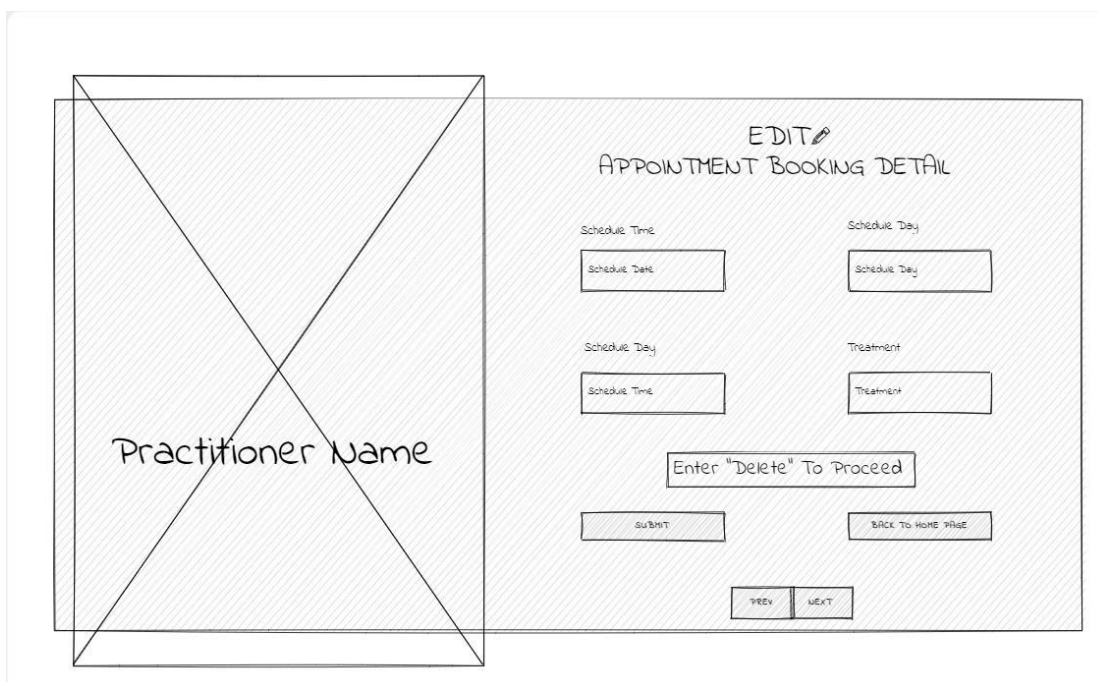
Figure 4. 46 Appointment Management Wireframe Diagram (After Edit Button Clicked)

The wireframe diagram for the appointment management feature is depicted in the diagram. After making an appointment booking, the patient can use this function to manage their appointment further. When a patient clicks the appointment link in the navigational header, this feature is activated. The patient can use paging to view

their recent appointment history. The next step is for the patient to click the pen symbol, which will turn the input field from read-only to editable. In order to manage and amend their appointment by alter the input field value. Additionally, the patient can delete their appointment by typing the word "DELETE" in the delete input field.

4.6.1.3 Doctor on Chat Wireframe Diagram- Patient Actor

Figure 4. 47 Doctor On Chat Wireframe Diagram

The wireframe diagram for the doctor on chat function is depicted in the diagram above. The purpose of this feature is to enable real-time communication between patients and practitioners without requiring a face-to-face encounter. When a patient or practitioner clicks the doctor's chat button in the navigational header, this function will be activated. They'll have access to a chat box. To allow another person to view their information, a user can input messages and click the send button. Next, the name of the other party will be shown on top of the chat box so that the user may more easily identify who they are communicating with.

4.6.1.4 Feedback Wireframe Diagram- Patient Actor
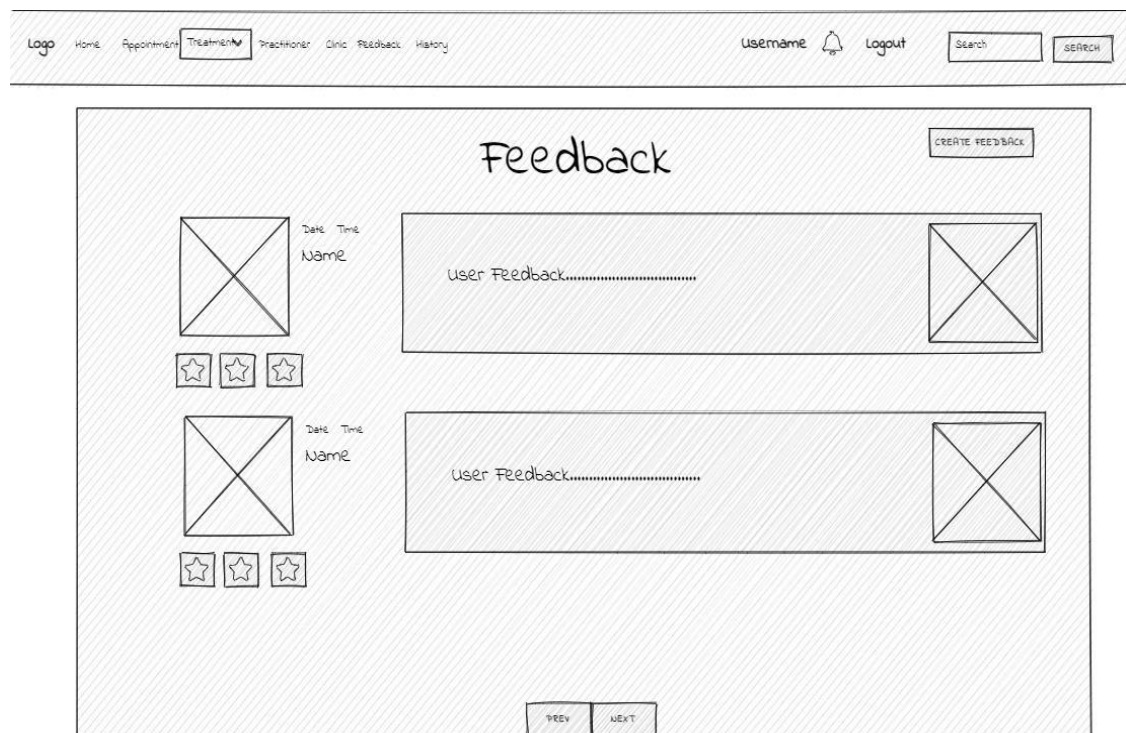
Figure 4. 48 Feedback Wireframe Diagram

The diagram above displays the wireframe diagram of the feedback function. The patient performs this task. The patient then chose the navigational header's feedback link. They can simply review all of the patient feedback data in paging format because to the huge volume of data. The comments are then presented in reverse chronological order, with the most recent comments appearing first. The patient can modify the information on the page by using the previous and next buttons. After that, the patient can click the feedback button to launch a bootstrap modal form. When the patient logs into their account, only then can this function be activated. The patient can provide their input and update the database by filling out the feedback form and pressing the submit button.

4.6.1.5 Trading News and Article Wireframe Diagram- Patient Actor
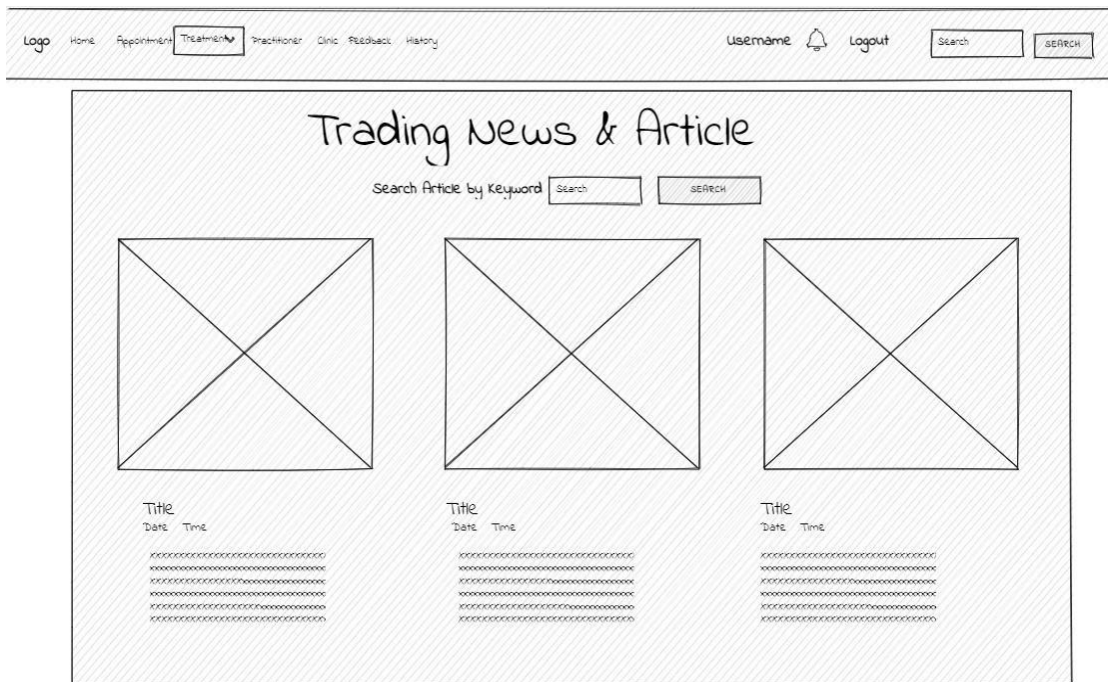
Figure 4. 49 Trading News and Article Wireframe Diagram

The wireframe diagram for the trading article and news function is depicted in the diagram. This feature is intended to help the patient increase their understanding of traditional Chinese medicine. When a patient clicks the trading article link in the navigational header, this feature is activated. The patient has access to all of the most recent trade news and publications that concern TCM. Users can perform a search to find the article or news they want to watch or possibly read.

4.6.1.6 Patient Health Tracking Wireframe Diagram- Patient Actor

Figure 4. 50 Patient Health Tracking Wireframe Diagram

The historical health record function's wireframe diagram is depicted in the diagram above. The patient actor is capable of performing this function. This feature is available if the patient has logged into their account. The system will take the patient to the health tracking web page when they click the "health tracking" link in the navigation header. The past health record can be viewed by the patient in paging format. Additionally, the patient can click the "view more" button to obtain a more detailed version of their prior health and treatment records. Thus, by entering the treatment date, the patient can do a search to eliminate the large amount of displayed record. The report, which is in PDF format, can be downloaded into the patient's device by clicking the download button.

4.6.1.7 Login Wireframe Diagram- Patient Actor

Figure 4. 51 Login Wireframe Diagram

The login function's wireframe diagram is depicted in the diagram above. The patient, the practitioner, and the business owner can use this function. The system will verify their credentials when they enter their username and password. If the username and password are correct, the user will be taken to the appropriate page according to their user type. When a user forgets their password, they can then click the forgot password link. Moreover, only the patient actor is eligible to use the sign-up account feature.

4.6.1.8 Registration Wireframe Diagram- Patient Actor

Figure 4. 52 Registration Wireframe Diagram

The registration function's wireframe diagram is depicted in the diagram above. The patient is the actor who interacts with this function. When a patient clicks the sign-up button on the login page, this feature is activated. The patient will see a registration form, which the user just needs to fill in the form and submit. The system will check the input, and if the information is accurate, it will record the user's input in a database. If a user accidentally clicks the sign-up button, they can use the back button to go back to the login page. In order to reduce the time, it takes to delete each input field one at a time, the user can use the reset button.

4.6.1.9 Treatment Wireframe Diagram- Patient Actor
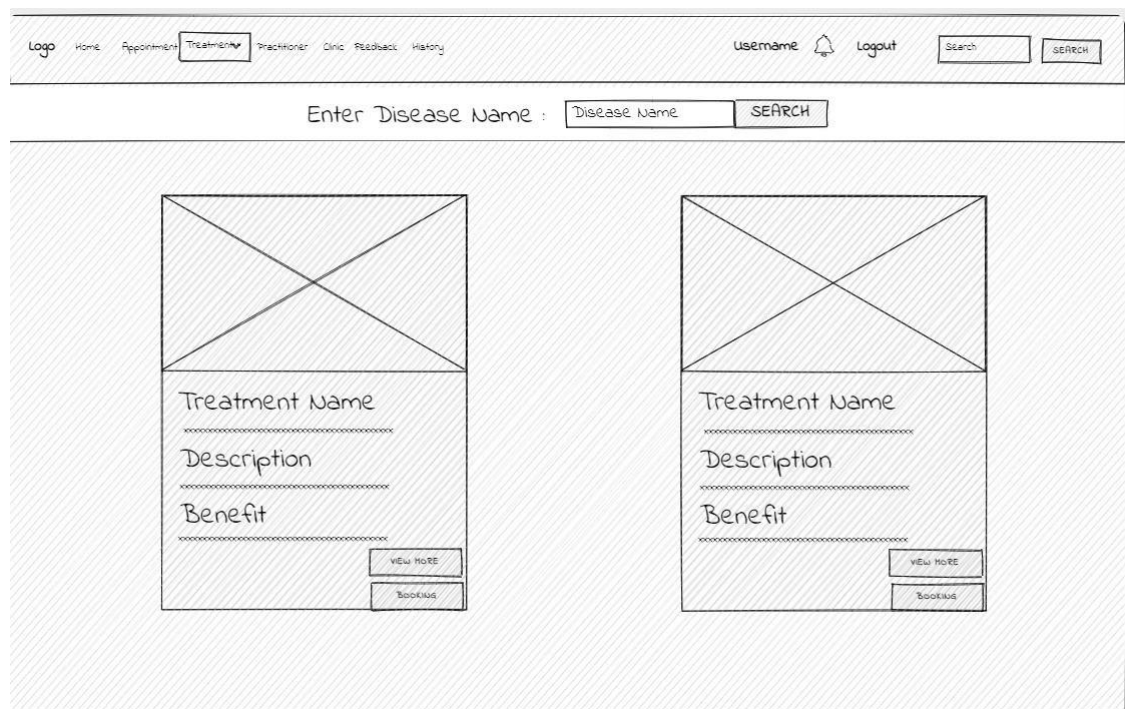
Figure 4. 53 Treatment Wireframe Diagram

The diagram above depicts the wireframe diagram of the accessible treatment page. This action is under the patient's control. To reach the patient, click the treatment link in the navigation header. The patient has access to all treatment-related information that is currently available. The treatment data is shown in the bootstrap card view. Patients can click the "view more" button to discover more about the TCM treatment. By clicking the booking option, the patient can then proceed to schedule an appointment for that sort of treatment. Additionally, the patient can use the disease name as an input while searching for a certain treatment type to narrow in on the results that are displayed. The search algorithm will look for the kind of treatment that can effectively manage and treat the disease.

4.6.1.10 Practitioner Wireframe Diagram- Patient Actor
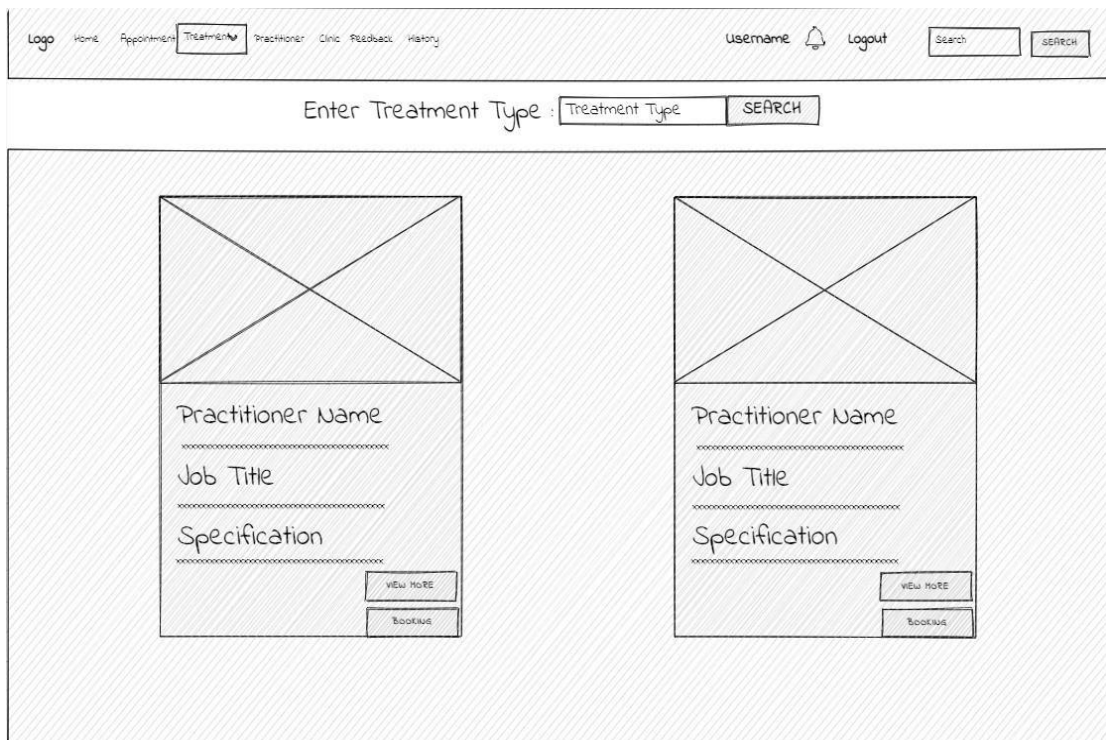
Figure 4. 54 Practitioner Page Wireframe Diagram

The available practitioner page's wireframe diagram can be shown in the diagram above. The patient can control this function. Click the practitioner link in the navigation header to access the patient. All the practitioner's information is accessible to the patient. In bootstrap card view, the practitioner information is displayed. To learn more about the practitioner's background, patients can click the "view more" button. The patient can then proceed to arrange an appointment with that practitioner by clicking the booking button. Additionally, the patient can select the treatment type to narrow down the displayed result. The searching algorithm will search for the practitioners who have expertise in a particular treatment type.

4.6.2 Wireframe Diagrams- Practitioner Actor
4.6.2.1 Practitioner Schedule Wireframe Diagram- Practitioner Actor
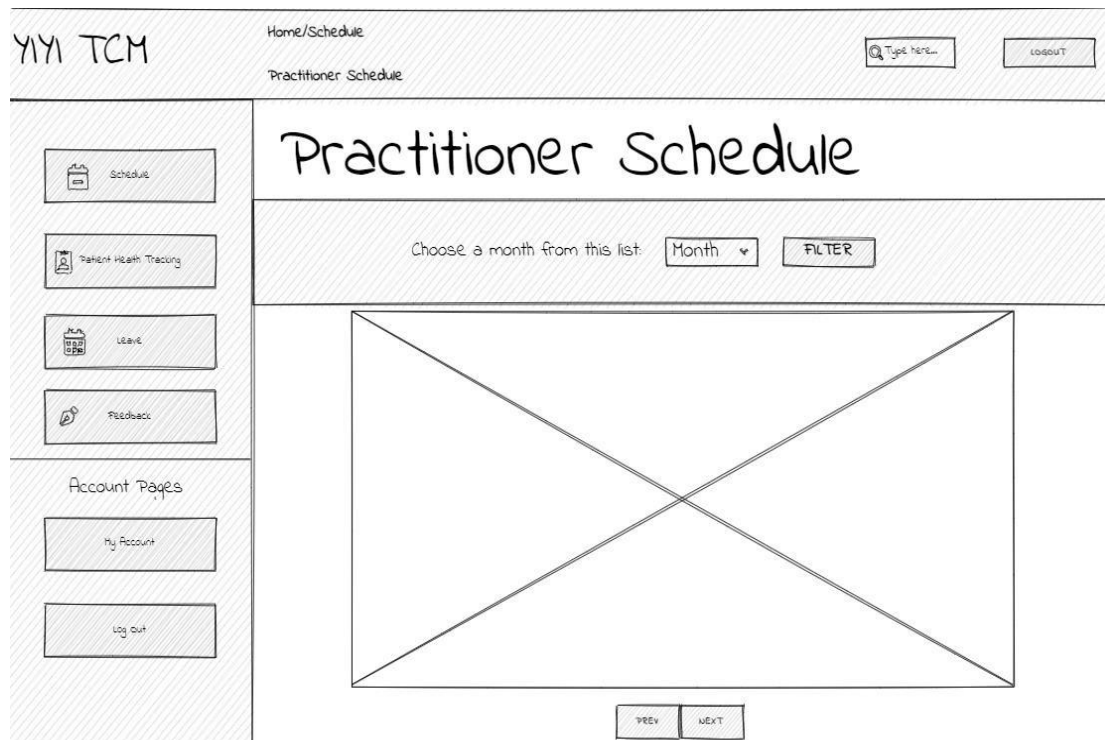
Figure 4. 55 Practitioner Schedule Wireframe Diagram

The practitioner schedule function's wireframe diagram is depicted in the diagram above. The practitioner can influence by this function. Only when the practitioner has logged into their account can they access this feature. When the practitioner clicks the "Schedule" button on the left vertical navigation bar, the practitioner can view his/her appointment schedule in a calendar format. The practitioner can examine their schedule details for the upcoming or previous month by clicking the prior and next buttons. Additionally, this website has a filter bar at the top of the page. The doctor can click the filter button after entering the month. Their schedule information, as it relates to the month provided by the practitioner, will be shown by the system. Next, the practitioner can click on the date column to perform approve or cancel appointment function, and the result will update to the database.

4.6.2.2 Practitioner Account Wireframe Diagram- Practitioner Actor

Figure 4. 56 Practitioner Account Wireframe Diagram

The practitioner account page wireframe diagram, which allows the practitioner to play an actor and control the function, is depicted in the diagram above. Practitioners have access to their personal account information in bootstrap card format when they log into their accounts. His/her profile image and contact information will be shown on each card. The input field will change from read-only to editable when the practitioner clicks on the pen icon to update or alter their personal information.

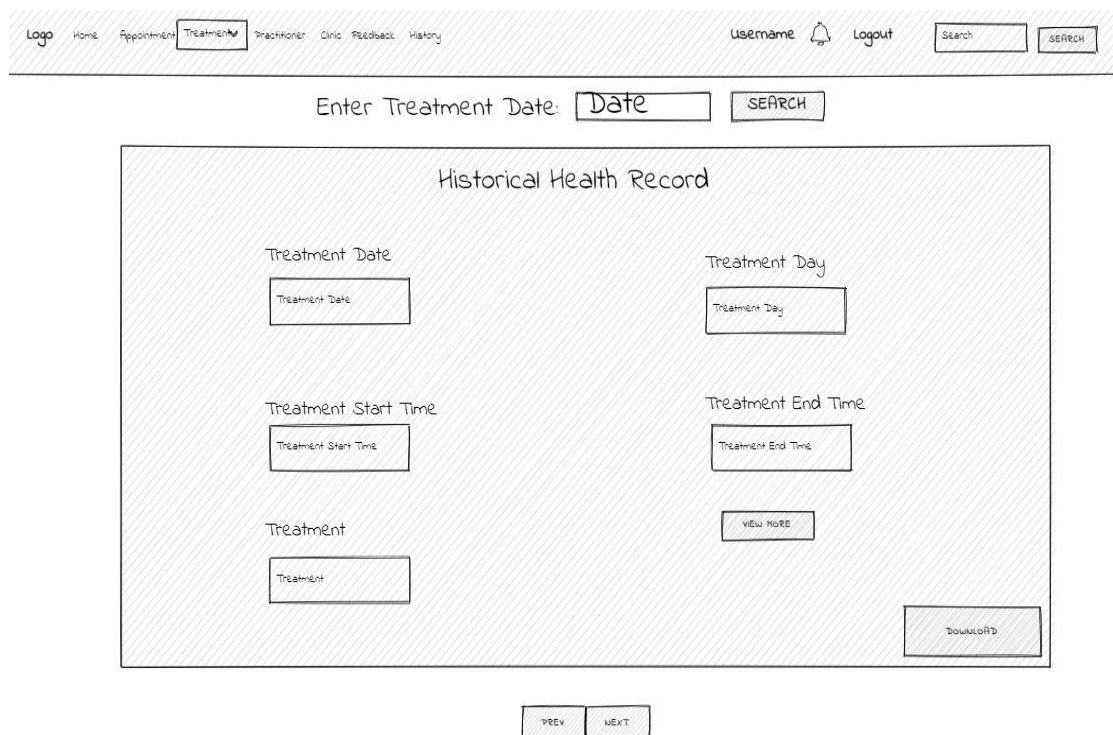**4.6.2.3 Patient Health Tracking Wireframe Diagram- Practitioner Actor**
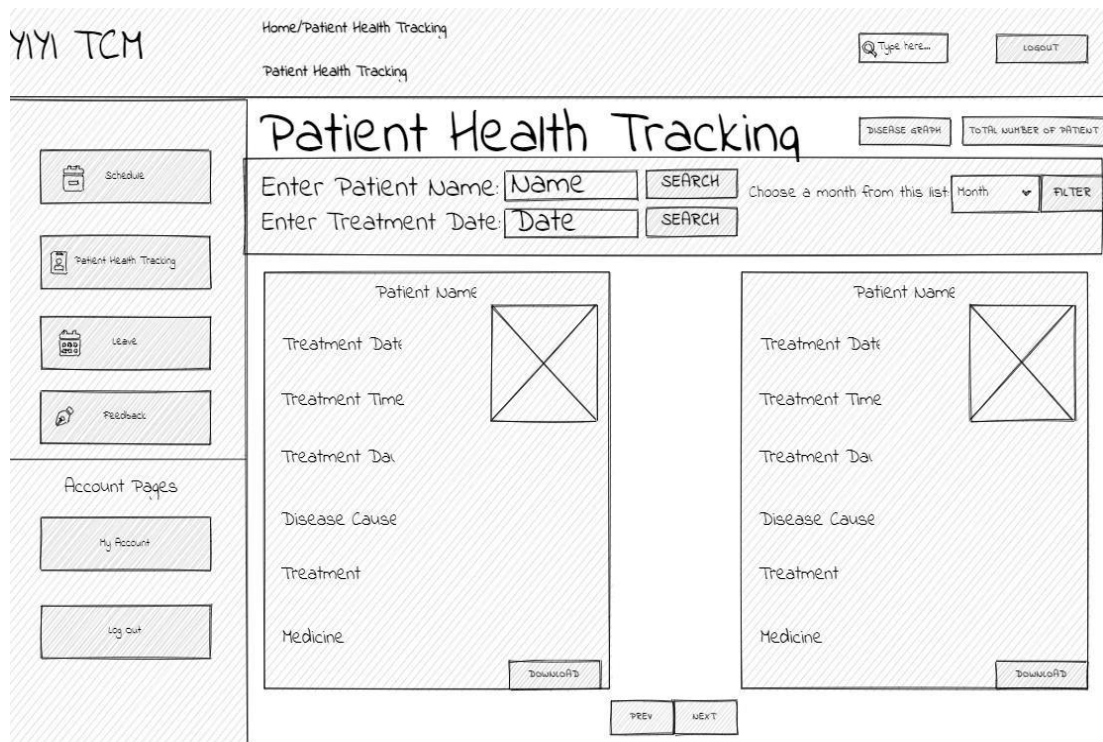
Figure 4. 57 Patient Health Tracking Wireframe Diagram

The historical health record function's wireframe diagram is depicted in the diagram above. The practitioner actor is capable of performing this function. This feature is available if the practitioner has logged into their account. The system will take the practitioner to the patient health tracking web page when they click the "patient health tracking" button on the left vertical navigation bar. The past patient health record can be viewed by the practitioner in paging format. Thus, by entering the treatment date or patient name, the practitioner can do a search to eliminate the large amount of displayed record. Next, the practitioner can filter the displayed data by month. The report, which is in PDF format, can be downloaded into the practitioner's device by clicking the download button.

4.2.2.4 Practitioner Leave Wireframe Diagram- Practitioner Actor
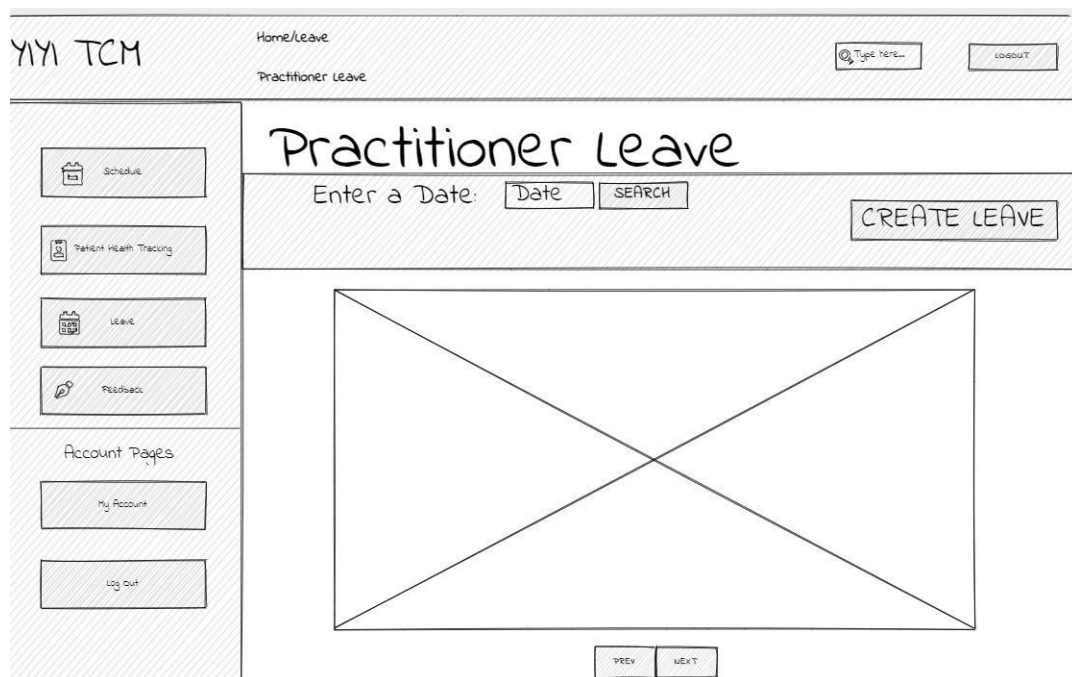
Figure 4. 58 Practitioner Leave Wireframe Diagram

The practitioner leaves function's wireframe diagram is depicted in the diagram above. The practitioner can influence by this function. Only when the practitioner has logged into their account can they access this feature. When the practitioner clicks the "Leave" button on the left vertical navigation bar, the doctor can view their previously requested and currently requested leaves in a calendar format. The practitioner can examine their leave details for the upcoming or previous month by clicking the prior and next buttons. Additionally, this website has a search bar at the top of the page. The doctor can click the search button after entering the date. Their leave information, as it relates to the date provided by the practitioner, will be shown by the system. Additionally, the doctor can make leave by clicking the leave button. A form that asks for the practitioner's leave information will pop up. Following the practitioner's submission, the form's data is uploaded to a database and sent to the site of the business owner.

4.2.2.5 Practitioner Feedback Wireframe Diagram- Practitioner Actor
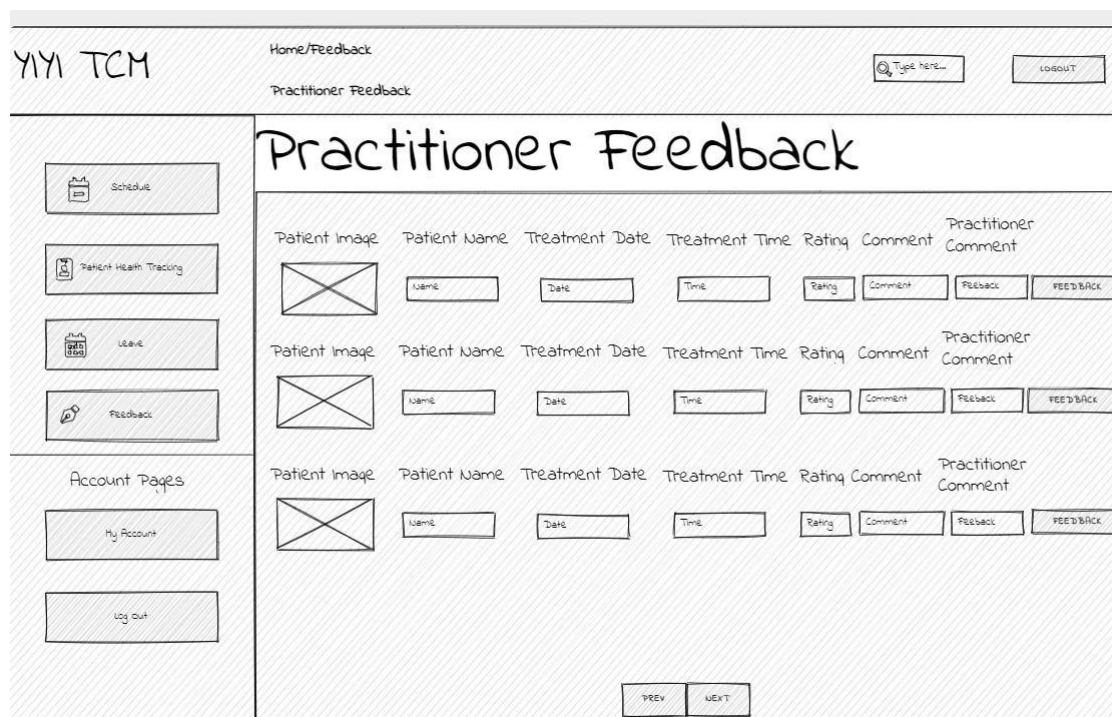
Figure 4. 59 Practitioner Feedback Wireframe Diagram

The feedback function's wireframe diagram is shown in the diagram above. The practitioner handles this function. The practitioner then clicked the feedback option in the left vertical navigation header after logging into their account. As a result of the sheer volume of data, they may easily examine all of their patient-generated feedback in paging format. The feedback is then arranged in descending order, with the most recent feedback appearing on the first page. The previous and next buttons allow the page's information to be changed by the practitioner. The practitioner can then click the feedback button, which will trigger a bootstrap modal form. The practitioner can fill in the feedback detail and hit submit button to send their feedback and update the database.

4.6.3 Wireframe Diagrams- Business Owner Actor
4.6.3.1 Business Owner Feedback Wireframe Diagram- Business Owner Actor
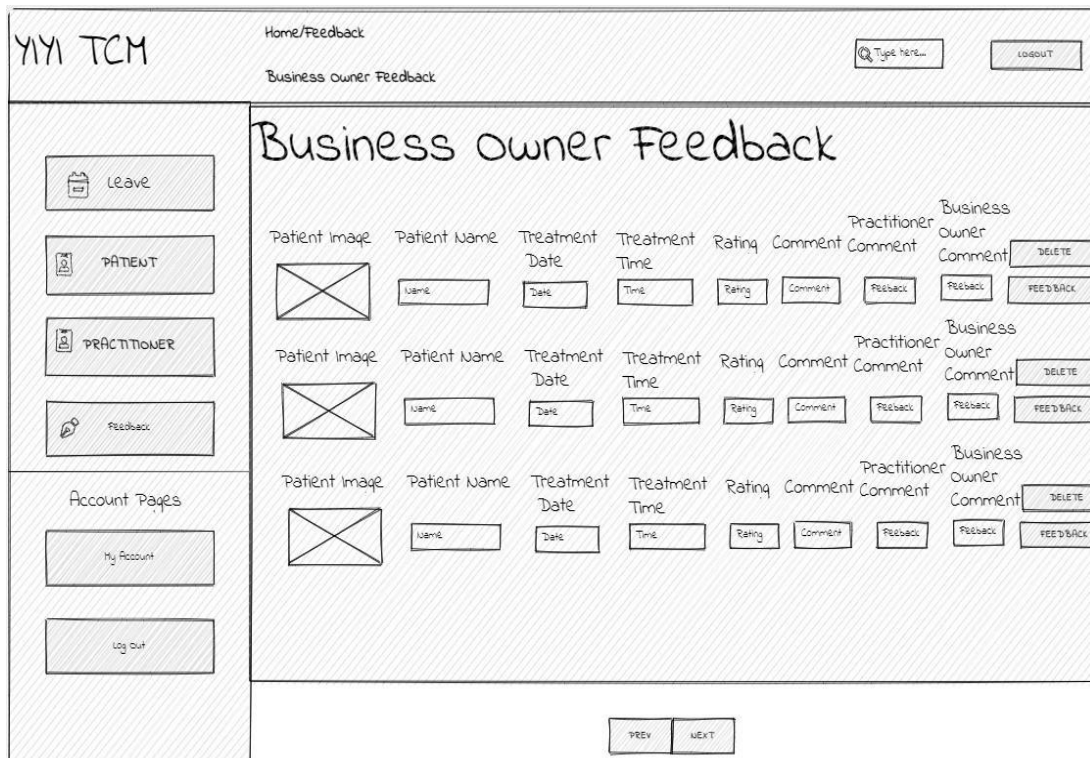
Figure 4. 60 Business Owner Feedback Wireframe Diagram

The feedback function's wireframe diagram is shown in the diagram above. The business owner handles this function. The business owner then clicked the feedback option in the left vertical navigation header after logging into their account. As a result of the sheer volume of data, they may easily examine all of the patient-generated feedback as well as practitioner-generated feedback in paging format. The feedback is then arranged in descending order, with the most recent feedback appearing on the first page. The previous and next buttons allow the page's information to be changed by the business owner. The owner of the business can then click the feedback button, which will trigger a bootstrap modal form. The business owner can fill in the feedback detail and hit submit button to send their feedback and update in the database. The owner of the business can then delete the feedback by clicking the delete button. After the business owner has resolved their issue, they can delete the negative feedback due to this tool, which helps to keep the company's positive reputation.

4.6.3.2 Patient Account Wireframe Diagram- Business Owner Actor
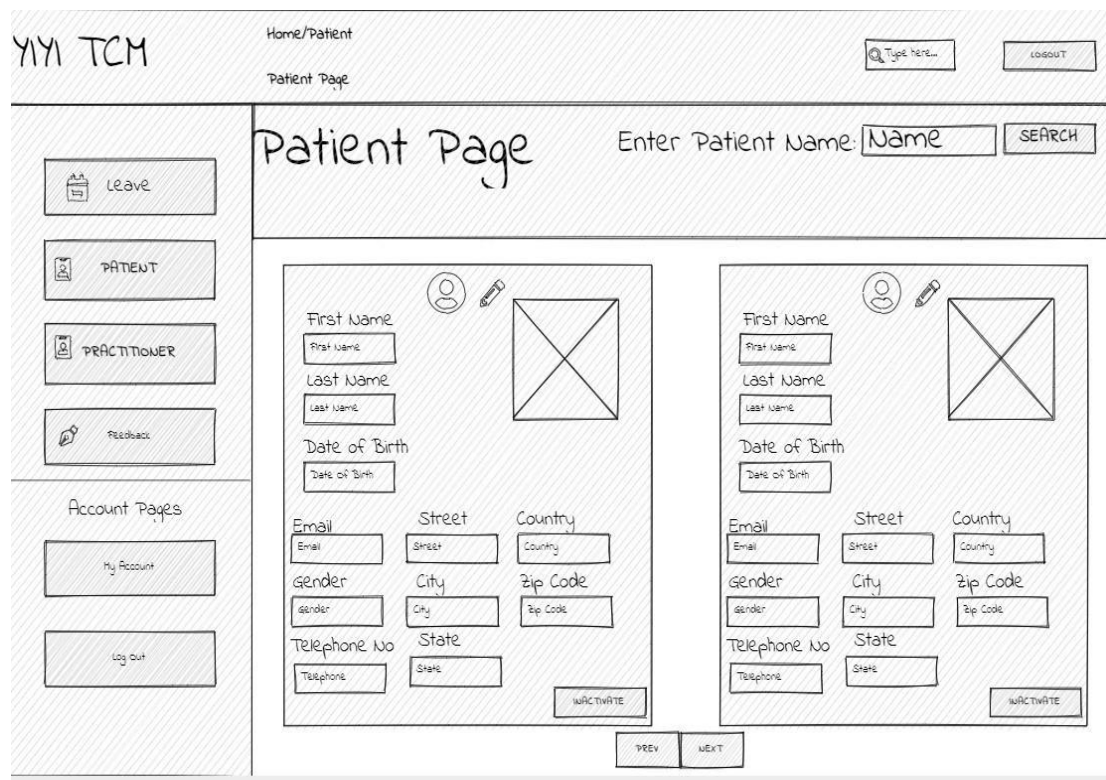
Figure 4. 61 Patient Account Wireframe Diagram

The patient account page wireframe diagram, which allows the business owner to play an actor and control the function, is depicted in the diagram above. Business owners have access to all patient account information in bootstrap card format when they log into their accounts. The patient's profile image and contact information will be shown on each card. The "prev" and "next" buttons will allow the business owner to access the following or previous patient account information since the patient account information will be provided in a pagination manner. The input field will change from read-only to editable when the company owner clicks on the pen icon to update or alter the patient information. The business owner can then update the account status by clicking on the inactivate or activate button. When the patient account is inactivated, they will not be able to log in to their account. The business owner can then search by entering the patient's name and directly examine the patient's personal information.

4.6.3.3 Practitioner Account Wireframe Diagram- Business Owner Actor
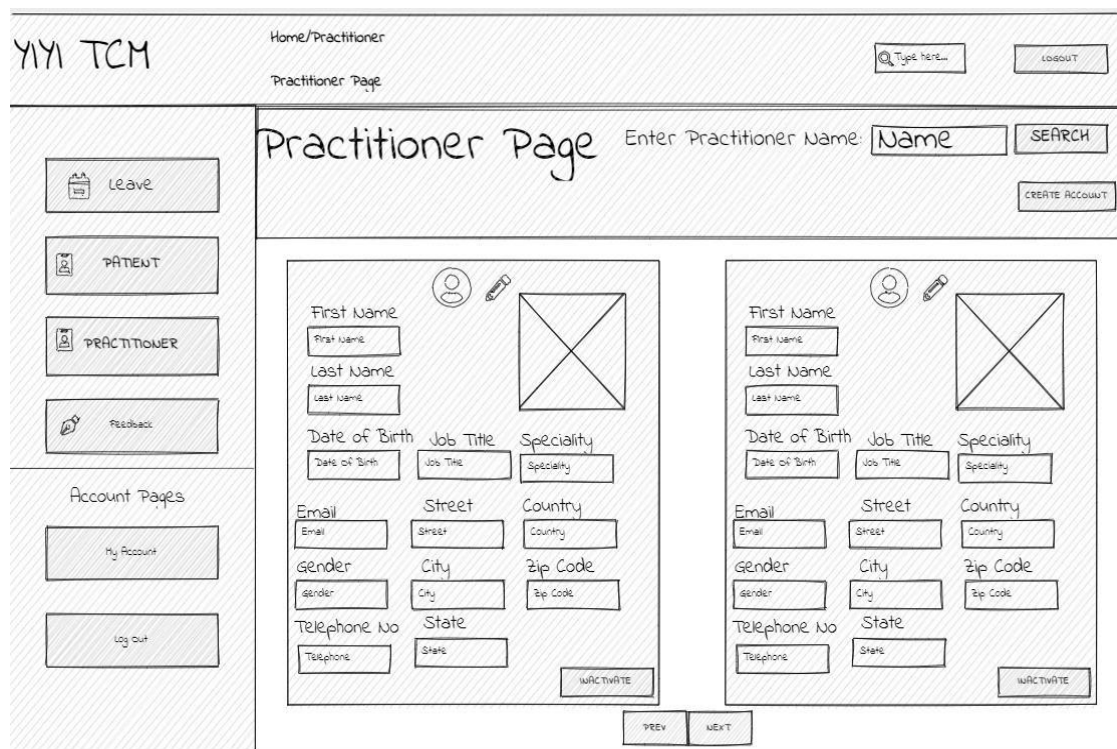
Figure 4. 62 Practitioner Account Wireframe Diagram

The practitioner account page wireframe diagram, which allows the business owner to play an actor and control the function is depicted in the diagram above. Business owners have access to all practitioner account information in bootstrap card format when they log into their accounts. The practitioner's profile image and contact information will be shown on each card. The "prev" and "next" buttons will allow the business owner to access the following or previous practitioner account information since the practitioner account information will be provided in a pagination manner. The input field will change from read-only to editable when the company owner clicks on the pen icon to update or alter the practitioner information. The business owner can then update the account status by clicking on the inactivate or activate button. When the practitioner account is inactivated, they will not be able to log in to their account. The business owner can then search by entering the practitioner's name and directly examine the practitioner personal information.

**4.6.3.4 Practitioner Leave Management Wireframe Diagram- Business Owner Actor**
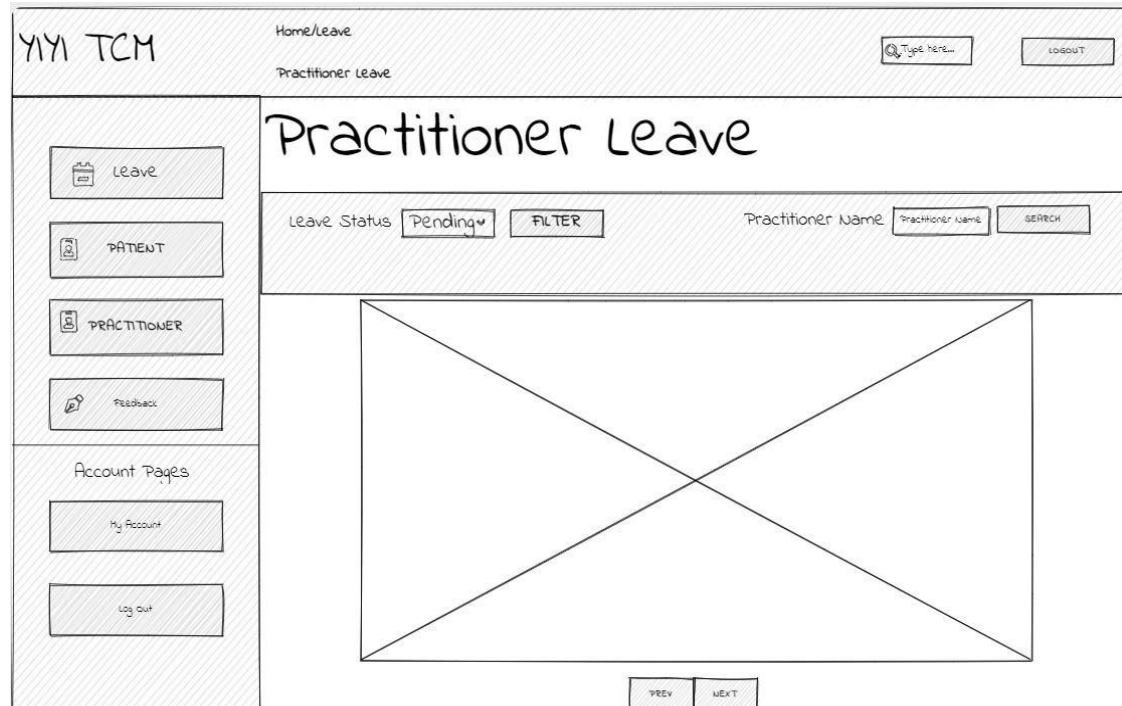
Figure 4. 63 Practitioner Leave Management Wireframe Diagram

The practitioner leave function wireframe diagram is shown in the diagram above. The owner of the business will be the actor who controls this function. Following account login by business owner, they can see the layout as demonstrated above. The information about the practitioner's leave will appear in a calendar format. If a practitioner applied for leave on a given date, the date column will be highlighted in blue. The business owner can then click "Prev" or "Next" to advance to the following month or the prior month. As a result, the business owner can filter the information displayed by leave status. If the business owner chooses "pending" as the input, all of the practitioners leave information is still pending approval. As a result, a modal will appear when a business owner clicks on the date column in the calendar. The business owner can select the approve or delete button to manage the practitioner leave once the modal window displays the practitioner's information and leave information. The business owner can then use the practitioner's name to search for leave information. As a result, this function can reduce the amount of information and enable the business owner to concentrate on certain facts.

4.7 Algorithm Design

4.7.1 Appointment Booking Algorithm

```php
if(isset($_POST['appointment'])){

    if((empty($_POST['name'])|| empty($_POST['email']) ||
empty($_POST['phone'])|| empty($_POST['date']) ||
empty($_POST['treatment'])||empty($_POST['time']))){
        header("Location: index.php?fastbookerror=Please fill in all the
detail#fastbookform");
        exit();
    }
    $check=null;
    $datecheck=null;
    $end=null;
    $hour=null;
    $reallycannotfound=null;
    if(preg_match('/^([a-zA-Z]+\s)*[a-zA-Z]+$/',
$_POST['name'])==false) {
        $nameerror="Name Cannot Contain numeric and special character";
        $check=1;
    }
    if(preg_match('/^[0-9]{10}+$/', $_POST['phone'])==false) {
        $phoneerror= "Invalid Phone Number";
        $check=1;
    }
    if (filter_var($_POST['email'], FILTER_VALIDATE_EMAIL)==false) {
        $emailerror = "Invalid email format";
        $check=1;
    }
    $time = $_POST['time'];
    $copytime =$time;
    if($_POST['treatment']==="default"){
        $treatmenterror ="Please select a treatment";
        $check=1;
    }else{
        $treatmenttype =$_POST['treatment'];
        $appdate =$_POST['date'];
        switch ($treatmenttype) {
            case "Acupuncture":
                $hour = 45;
                $time =strtotime($time);
                $end= date('H:i',strtotime('+45 minutes', $time));
              break;
            case "Cupping":
              $hour=45;
              $time =strtotime($time);
              $end= date('H:i',strtotime('+45 minutes', $time));
              break;
```

```php
        case "Tui Na":
            $hour=60;
            $time =strtotime($time);
            $end= date('H:i',strtotime('+60 minutes', $time));
        break;
        case "Gua Sha":
            $hour=30;
            $time =strtotime($time);
            $end= date('H:i',strtotime('+30 minutes', $time));
        break;
        case "Chiropractor":
            $hour=30;
            $time =strtotime($time);
            $end= date('H:i',strtotime('+30 minutes', $time));
        break;
        }
}
date_default_timezone_set("Asia/Kuala_Lumpur");
$appointment_date = date('l Y-m-d ', strtotime($_POST['date']));
$appointment_date=strtotime($appointment_date);
date_default_timezone_set("Asia/Kuala_Lumpur");
$currentdatetime = date('l Y-m-d ');
$currentdatetime=strtotime($currentdatetime);
date_default_timezone_set("Asia/Kuala_Lumpur");
if($appointment_date<$currentdatetime){
$dateerror="Please select future date";
$datecheck=1;
}
$currenttime = date('H:i');
if($datecheck !=1){
if($copytime <"07:00"){
    $timeerror="Please select business hour";
    $check=1;
}

if($copytime==$currenttime && $appointment_date==$currentdatetime){
    $timeerror="Please select time which is after 30 minute";
    $check=1;


}
if($copytime<$currenttime && $appointment_date==$currentdatetime){
    $timeerror="Please select future time";
    $check=1;


}
if($copytime>="19:00"){
    $timeerror="Please select business hour";
    $check=1;
```

```php
        }
}
    if($check==1){
        header("Location:
index.php?nameerror=$nameerror&phoneerror=$phoneerror&emailerror=$email
error&treatmenterror=$treatmenterror&dateerror=$dateerror&timeerror=$ti
meerror#fastbookform");
        exit();
    }

$fullname= $_POST['name'];
$name= (explode(" ",$fullname));
$lastname="";
$firstname="";
for($num=0; $num<count($name);$num++){
    if($num==0){
        $lastname=ucwords($name[$num]);
    }else{
        $firstname =$firstname . " ". ucwords($name[$num]);
    }
}
$copyappointment_date=$appointment_date;
date_default_timezone_set("Asia/Kuala_Lumpur");
$day = strtotime($copyappointment_date);
$dayvalue = date('l', $day);

$assignpractionersql ="SELECT * FROM practitioner p,account a WHERE
p.practitioner_id =a.practitioner_id";
$assignpractionerresult =mysqli_query($conn,$assignpractionersql);
$assignpractionerresultcheck =
mysqli_num_rows($assignpractionerresult);
$notactivesql ="SELECT * FROM practitioner p,account a WHERE
p.practitioner_id =a.practitioner_id AND a.status='sleep'";
$notactivesqlresult =mysqli_query($conn,$notactivesql);
$notactivepractitioner = array();

while($row3 = mysqli_fetch_assoc($notactivesqlresult)){
        if ($row3['status'] != "active") {
            array_push($notactivepractitioner,
$row3['practitioner_id']);
        }
}

if($assignpractionerresultcheck >0){
        $cookiearray = array();
    while($row = mysqli_fetch_assoc($assignpractionerresult)){
        do{
```

```php
        $random=(rand(1,$assignpractionerresultcheck));
        $charactercount= strlen($random);
        for($charactercount; $charactercount<4;$charactercount++){
            $random=strval($random);
            $random="0".$random;
        }
        $validate = false;
        $random="d".$random;
        $practitionerid=$random;

                    foreach($notactivepractitioner as $a){
                        if($practitionerid==$a){
                            echo "false";
                            $validate = true;
                        }else{
                            $validate = false;
                        }
                    }

                    }
            //echo $check cookie
                    $whileloop = false;
            $arrayData = json_decode($_COOKIE['pracid']);
            foreach($arrayData as $cid){
                if($cid==$practitionerid){
                    $whileloop = true;
                }else{
                    $whileloop = false;
                }
            }
    }while(($whileloop)||($validate));
    $tempid=$practitionerid;
    array_push($cookiearray, $tempid);
    setcookie('pracid', json_encode($cookiearray));
    //setcookie("pracid", $tempid);
    echo $tempid;
        $appointment_date = date('Y-m-d ', strtotime($_POST['date']));
        date_default_timezone_set("Asia/Kuala_Lumpur");
        $havebeenbooksql ="SELECT * FROM practitioner_schedule WHERE
practitioner_id='$random' and start_time<='$copytime' and
end_time >='$copytime' and schedule_date='$appointment_date'";
        $havebeenbookresult =mysqli_query($conn,$havebeenbooksql);
        $havebeenbookresultcheck =
mysqli_num_rows($havebeenbookresult);

        if(!($havebeenbookresultcheck >0 )){

            $reallycannotfound=false;
            date_default_timezone_set("Asia/Kuala_Lumpur");
```

```php
            $appointment_date = date('Y-m-d ',
strtotime($_POST['date']));
            $insertpractionerschedule="INSERT INTO
practitioner_schedule
VALUES(null,'$appointment_date','$dayvalue','$copytime','$end','$hour',
'Incomplete','$treatmenttype','$practitionerid')";
            if(mysqli_query($conn,$insertpractionerschedule)){
            $getpatientidsql ="SELECT * FROM account where
username='$user_name' and userid='$userid'";
            $getpatientidresult
=mysqli_query($conn,$getpatientidsql);
                $row = mysqli_fetch_assoc($getpatientidresult);
                $patient_id =$row['patient_id'];
                $getpractitioner_scheduleid ="SELECT * FROM
practitioner_schedule ORDER BY schedule_id DESC LIMIT 1";
                $getscheduleidresult=
mysqli_query($conn,$getpractitioner_scheduleid);
                $row = mysqli_fetch_assoc($getscheduleidresult);
                $schduleid=$row['schedule_id'];
                $insertappointment="INSERT INTO appointment VALUES
(null,'$treatmenttype','$appointment_date','$copytime','incomplete','$p
atient_id','$practitionerid',' $schduleid')";
                if(mysqli_query($conn,  $insertappointment)){
                    $_SESSION['status']="Appointment Booking
Successfully!";
                    header("Location: index.php");
                }
                break;
            }else{
                    $_SESSION['status']="Appointment Booking Not
successfully!";
                header("Location: index.php");
                }
                break;
        }else{
            $reallycannotfound=true;
            continue;
        }
    }if($reallycannotfound){
        $_SESSION['status']="Practitioner Appointment Fully Booked!";
        header("Location: index.php");
    }
}else{
    $_SESSION['status']="Practitioner Not Found!";
    header("Location: index.php");
}

}
```

When the user submits the form to make an appointment. The system will check the user input to determine if it was accurate and whether all required fields were filled in completely. The system will then utilize preg match and the pattern to check the user input. The system will then compute the treatment end time following the selected treatment by the user. The booking date will then be verified by the system. The scheduled appointment date cannot be prior. The system will then verify that the appointment time is within the business hours, which are from 7 am to 7 pm. The system will redirect the user to the appointment booking page and provide an error message if the user input does not meet the criteria and does not adhere to the constraint. The practitioner database table will then be queried by the system to determine the total number of records. The system will identify how many practitioners are present in the clinic. As a result, a while loop will be executed by the system. The number of practitioners working in the clinic determines how many times the loop is iterated. To ensure that the random number is generated differently for each iteration, the system will execute a do-while loop. Additionally, the system will generate a random number using the rand() function. The rand() function's parameter will be (1, the total number of practitioners in the clinic). For instance, if there are two practitioners in the clinic, rand() will be the parameter (1,2). The practitioner id was storing a string value in the database (d0001). As a result, the system will run a for loop to insert the zero before the random number. The random number is then preceded by the letter "d." and convert it to string value. "d0002" will be the result of this rand() function. Additionally, the rand function's output in array will be stored in the user's browser cookie. This cookie makes sure that no two randomly generated numbers are the same in each iteration of loop and ensure the range of random numbers falls within the total number of practitioners. Thus, the system will query the practitioner schedule database table according to the random practitioner id generated just now. The system will validate the practitioner's schedule is free or not according to the date and time given by the user. The appointment booking only will be accepted if the time given by the user does not fall within the treatment start time and treatment end time. If one of the practitioners is available during that period, the system will assign the appointment to that practitioner and insert the booking information into the practitioner schedule database table by using their practitioner id and exit the while loop. The next loop will be triggered, and the schedule of the next practitioner will be validated if the practitioner holding the practitioner id that is identical to the randomly generated practitioner id is not free and available at that time.

4.8 Integrate Third Parties API

4.8.1 OAUTH with GoogleAPIClient
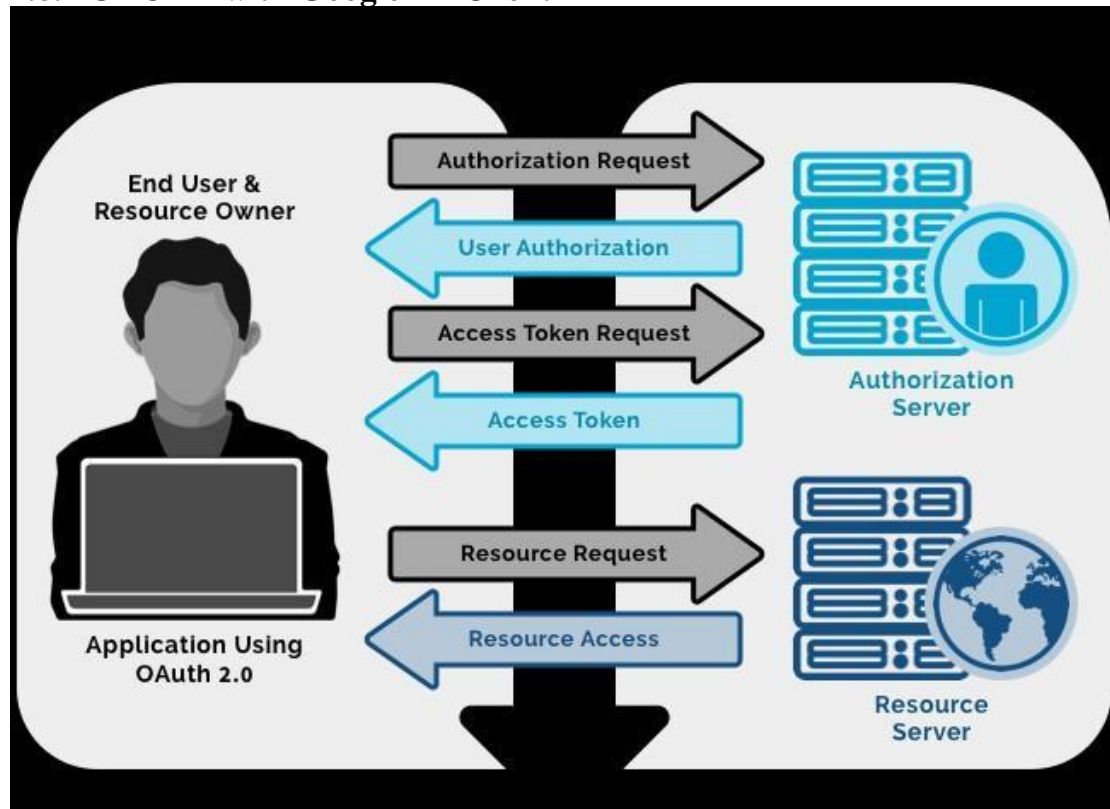
Figure 4. 64 OAUTH with GoogleAPIClient

Open Authorization 2.0 (OAuth 2.0) is a standard that enables a website or application to access resources hosted by other web apps on behalf of a user. Access Tokens are used with OAuth 2.0. An Access Token is a piece of information that symbolizes the end-authority users to access resources. The Client must first obtain its own credentials from the Authorization Server (Google Api Client), a client id and client secret, to identify and authenticate itself when requesting an Access Token before OAuth 2.0 may be used. At first, the client submits an authorization request to the authorization server, identifying themselves by providing their client id and secret. They also include the scopes and an endpoint URI (redirect URI) to which the access token or authorization code should be sent. The Client's identity is verified by the Authorization server, which also confirms that the requested scopes are authorized. To allow access, the resource owner communicates with the authorization server. Depending on the type of grant, the Authorization server reroutes back to the Client with either an Authorization Code or an Access Token. The refund may also include a Refresh Token. In the end, the user is able to interact with the Resource server to request access to the resource (user homepage) using the Access Token.

```php
<?php
require_once 'vendor/vendor/autoload.php';
$google_client = new Google_Client();
$google_client->setClientId('877592102748-
icfcet6fm33i19k5brsmfb1g0u8cicas.apps.googleusercontent.com');
$google_client->setClientSecret('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');
$google_client->setRedirectUri('http://localhost/fyp/Oauthaccount.php')
;
$google_client-> addScope('email');
$google_client-> addScope('profile');
session_start();
?>
```

The resource owner will instantly trust the client when they download and install XAMPP and import the project file because the ClientID and ClientSecret are stored directly on localhost. Consequently, when the user signs in using a Google account. The ClientID and Client Secret must match with the Authentication server for the Client to receive the access token.

4.8.2 Integrate Contextual Web Search API

```html
<div class="jumbotron">
    <h1 class="display-4">Trading NEWS | ARTICLE</h1>
    <div class="form-container"  data-aos="fade-up"
     data-aos-duration="3000">
                    <h3 class="title">Filter by Keyword</h3>
        <form action="healthnews.php" method="GET" class="form-
horizontal">
        <div class="form-group">
        <label>Search
        <input type="text" name="search" id="search">
        <input type="submit" class="sbutton btn btn-outline-primary"
name="submit" id="submit">
        </label>
        </form>
                    </div>
                    </div>
</div>
<?php
if (isset($_GET['submit'])){
    if(empty($_GET['search'])){
        $query="traditional chinese medicine";
    }else{
        $query=$_GET['search'];
    }
}else{
    $query="traditional chinese medicine";
}
```

```php
$curl = curl_init();

curl_setopt_array($curl, [
    CURLOPT_URL => "https://contextualwebsearch-websearch-
v1.p.rapidapi.com/api/search/NewsSearchAPI?q=$query&pageNumber=1&pageSi
ze=10&autoCorrect=true&withThumbnails=true&fromPublishedDate=null&toPub
lishedDate=null",
    CURLOPT_RETURNTRANSFER => true,
    CURLOPT_FOLLOWLOCATION => true,
    CURLOPT_ENCODING => "",
    CURLOPT_MAXREDIRS => 10,
    CURLOPT_TIMEOUT => 30,
    CURLOPT_HTTP_VERSION => CURL_HTTP_VERSION_1_1,
    CURLOPT_CUSTOMREQUEST => "GET",
    CURLOPT_HTTPHEADER => [
        "X-RapidAPI-Host: contextualwebsearch-websearch-
v1.p.rapidapi.com",
        "X-RapidAPI-Key:
7ce4257eecmsh14ec94f49410016p1d4696jsnb3287e87136d"
    ],
]);
curl_setopt($curl, CURLOPT_RETURNTRANSFER, 1);
curl_setopt($curl, CURLOPT_HEADER, 1);
$response = curl_exec($curl);
$err = curl_error($curl);
// Then, after your curl_exec call:
$header_size = curl_getinfo($curl, CURLINFO_HEADER_SIZE);
$header = substr($response, 0, $header_size);
$body = substr($response, $header_size);
if ($err) {
    echo "cURL Error #:" . $err;
} else {


    $body= json_decode($body,true);
    ?>
    <div class="container-fuild">
        <?php
    if(empty($body['value'])){
        echo "no result found";
    }else{


    foreach($body['value'] as $body){
        ?>
        <div class="row NewsGrid" data-aos="zoom-in-left">
            <div class="col-md-4">
```

```php
            <img src="<?php echo (string)$body['image']['url'];?>"
alt="News Thumbnail" class="img-thumbnail rounded float-start">
            </div>
            <div class="col-md-8">
                <h2> <?php echo (string)$body['title'];?></h2>
                <h5> <?php echo (string)$body['description'];?></h5>
                <p> <?php echo
substr((string)$body['body'],0,250);?>...</p>
                <h6>Aurther: <?php echo
(string)$body['provider']['name'];?></h6>
                <h6>Published: <?php echo
(string)$body['datePublished'];?></h6>
                <h6>Link: <a href="<?php echo
(string)$body['image']['webpageUrl'];?>"><?php echo
(string)$body['image']['webpageUrl'];?></a></h6>
    </div>
        </div>


    <?php }?>
    </div>

<?php }curl_close($curl);}
?>
```

Contextual search is a method of improving web-based search results by considering the context that the user and the computer being used to make the query have provided. When the user presses the submit button after filling out the filter by keyword input box. The information that the user has provided will be retrieved by the system. The user input will also be saved in the $query variable. The CURL must be initialized next. To exclude some search engine results, the system will initially bind the $query variable into the param of the contextualwebsearch URL. And CURLOPT URL will store this URL. After that, the CURL HTTPHEADER must be filled with the API key. The API's result will be in JSON format after it has been invoked. The system will convert the JSON body into a PHP array so that it may be used in PHP by JSON decoding it. The system will combine HTML markup and CSS style techniques to provide the PHP array result to the user in a pleasing and attractive manner.

CHAPTER 5: SYSTEM IMPLEMENTATION

5.1 Hardware Setup

To set up a hardware environment for using XAMPP, MySQL you need the following:

1. A computer or laptop with a modern operating system like Windows, macOS, or Linux.
2. A minimum of 2GB of RAM and at least 10 GB of free hard drive space.
3. A web browser like Google Chrome, Mozilla Firefox, or Safari.
4. A stable and fast internet connection for downloading and installing XAMPP and other required software.

5.2 Software Setup

To set up a software environment for using XAMPP, MySQL, and PHP, you need the following:

1. Download XAMPP – The first step is to download XAMPP from the official Apache Friends website (https://www.apachefriends.org/download.html). Choose the version that is suitable for your operating system.
2. Install XAMPP – Once the download is complete, double-click on the downloaded file to start the installation process. Follow the on-screen instructions to complete the installation process.
3. Start XAMPP – Once the installation is complete, start XAMPP by clicking on the XAMPP Control Panel icon. The control panel will open and show the status of Apache and MYSQL.
4. Start Apache and MySQL – Click on the "Start" button for both Apache and MySQL to start these services. Once started, the status will change to "running".
5. Test XAMPP – To test XAMPP, open a web browser and type http://localhost in the address bar. This should open the XAMPP start page, which confirms that XAMPP is running correctly.

5.3 Setting and Configuration

1. Start the XAMPP Control Panel and click on the "Start" button for Apache and MySQL.

2. Open a web browser and go to "http://localhost".

3. Click on the "phpMyAdmin" link on the XAMPP home page.

4. Enter "root" as the username and leave the password field blank.

5. In the phpMyAdmin interface, create a database for your PHP application.

6. Create a PHP file in the "htdocs" folder in the XAMPP folder and test your PHP code by accessing it through "http://localhost/yourfile.php".

7. Create a PHP file and name it as ConnectDB.php and enter following code:

```php
<?php
$host = "localhost";
$username = "root";
$password = "";
$dbname = "fyp2";
// Create connection
$conn = mysqli_connect($host, $username, $password, $dbname);
// Check connection
if (!$conn) {
   die("Connection failed: " . mysqli_connect_error());
   }
   echo "Connected successfully";
   ?>
```

8. If everything is working properly, your XAMPP, MySQL, and PHP setup is complete.

5.4 Screenshot of the System Implementation

5.4.1 Patient Perspective

5.4.1.1 Login Page
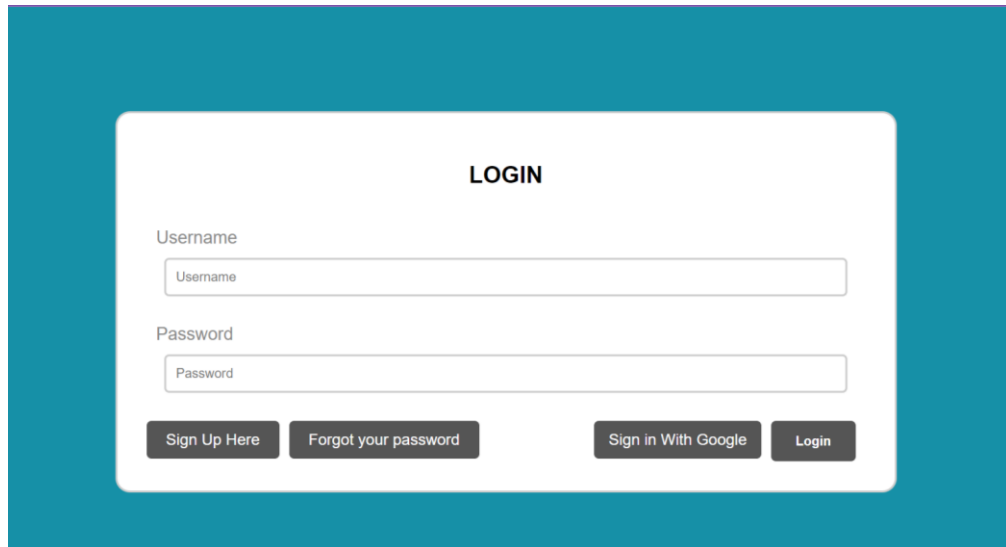
Figure 5 1 Login Page

When a user clicks on the login button which is located on the right side of the navigational header. The login page is displayed to the user. The user is required to fill in his/her username and password into the correct input field. After the user clicks on the login button. The system will receive his/her input and validate his/her credential. If the username and password are correct, the system will navigate the user to the web page according to the type of his/her account.

Integrated Google Sign-In into the web application. Therefore, user also able to login into account with his/her valid google account. The "Sign in With Google" button takes the user directly to the Google OAuth page, where they only need to provide their email address and password. The client secret key and client id are authenticated by the authorization server. The access token will be sent to the user if the key and ID are legitimate. The system will then direct the user to their homepage after they have successfully logged into their account.

5.4.1.2 Registration Page

Figure 5 2 Registration Page

When the user clicks on the sign-up button which located in the login page. The registration form will display to the user. All of the fields on the form must be filled by the user, including name, birthdate, gender, email, password, phone number, address, and profile image. The system will verify that the user has entered all necessary information and that it complies with the requirements once the user completes the form and clicks the "Submit" button. Additionally, the birthdate input field contained a restriction that prevented users under the age of 12 from creating an account. The system also checks the password, email address, and username. The system does not allow users to enter the existing username and email address from the database. Moreover, the password entered the first time and the second time should match. If every piece of information entered by the user is accurate and valid, it will be saved in the MySQL database and the system will prompt out a success message to the user. To view the decrypted version of the entered password, the user can tick the box below the
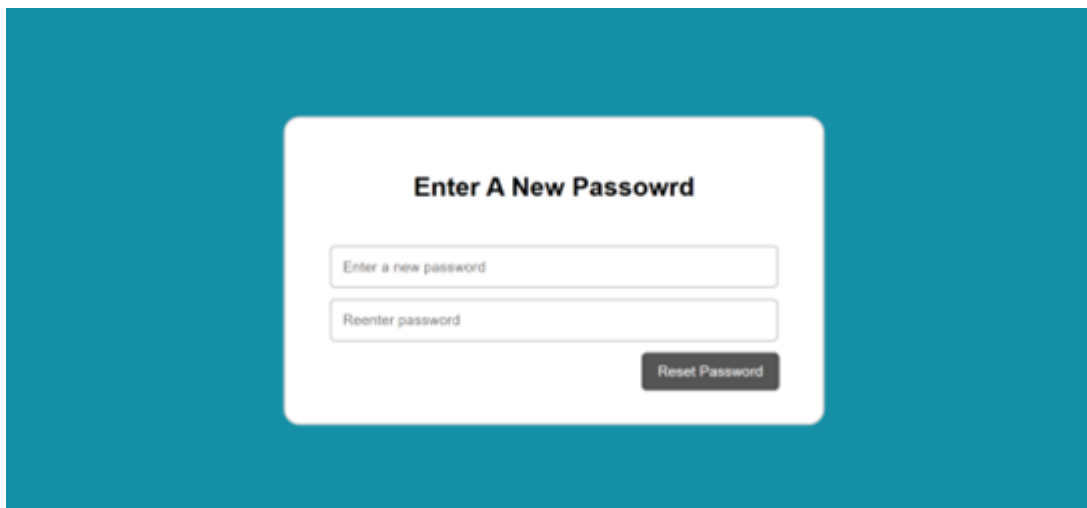
password and retype password input field. User can click on the Back button and the system will redirect user to the login page. This feature is useful when the user accidentally clicks on the sign-up button. Next, if a user is impatient to manually remove each input field, they can use the Reset button.

5.4.1.3 Forgot Password Page

Figure 5 3 Forgot Password Page 1

Figure 5 4 Forgot Password Page 2

When the user clicks on the forgot password button located on the login page. The reset password form will display to the user. A user requiring the user to input their email to obtain the link to reset their password through email. If the email address that the user provided does not exist in the database, the error message will prompt the user. Next, user can visit their email and click on the reset password link. The user will be taken to the following page. The user will encounter a form to enter a new password when it is displayed. The system will receive user input and validate it when the user fills out both input fields and clicks the Reset Password button. If the password entered

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users are not able to select the past date. Next, the user is unable to fill in the time when YIYI TCM is not during business hours. If every piece of information entered by the user is accurate and one of the practitioner schedules is available on that time and date, the record will be saved in the MySQL database and the system will prompt out an appointment booking successfully message to the user.

5.4.1.6 Appointment Management Page
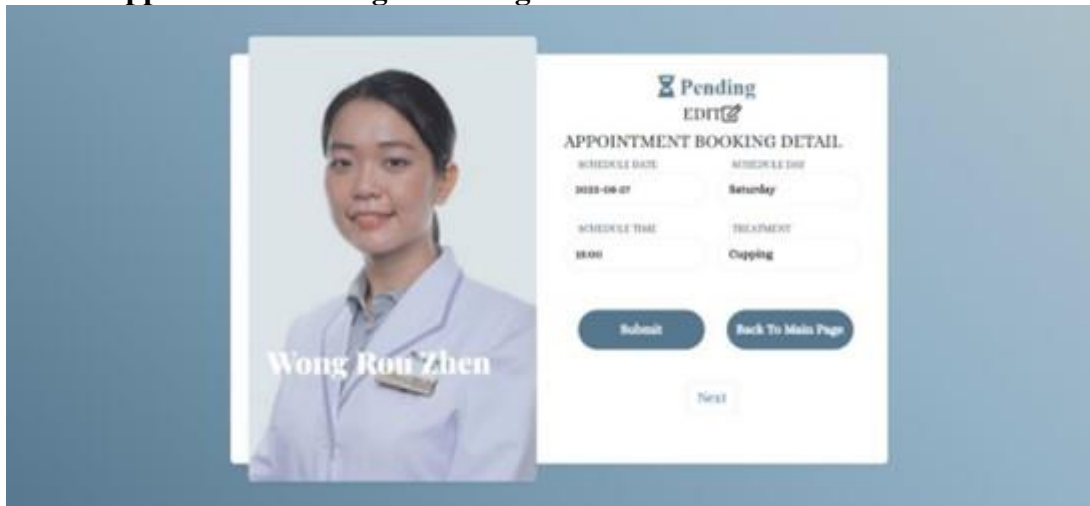
Figure 5 7 Appointment Management Page 1
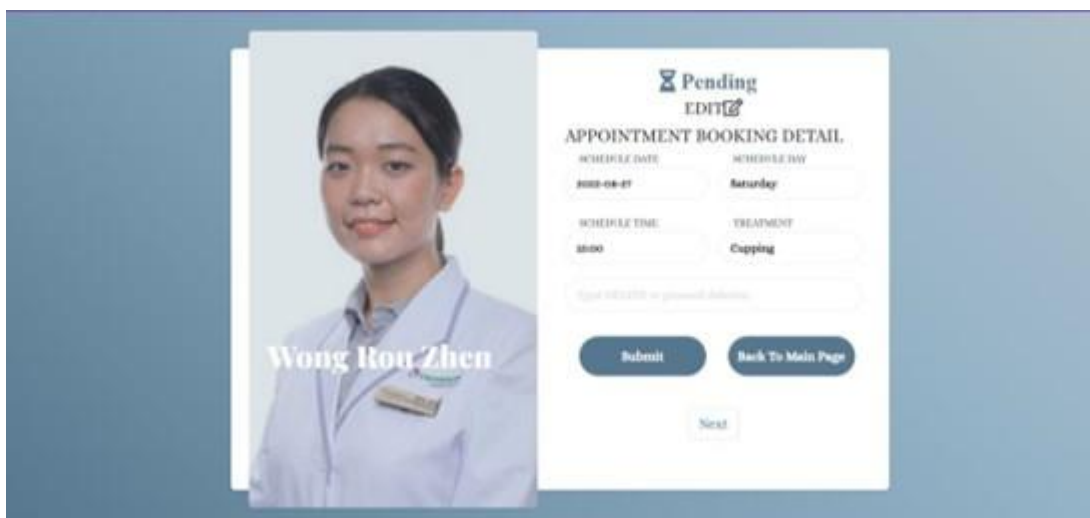
Figure 5 8 Appointment Management Page 2

When the user clicks on the Appointment link located on the left side of the navigational header. The appointment booking detail will display to the user in pagination form based. The left side will display the practitioner's image and his/her name according to the practitioner which the system assigns to the user. The user can click on the "prev" and "next" buttons to view the previous and following appointment booking information. On top of the edit button will show the status of the appointment

either are pending or approved. When the user intended to modify and make changes to his/her appointment booking detail. The user can click on the Edit button and the system will change the input field from read-only into editable and an input field for delete will be displayed. To manage and amend their appointment by altering the input field value. Additionally, the patient can delete their appointment by typing the word "DELETE" in the delete input field.

5.4.1.7 Clinic Page
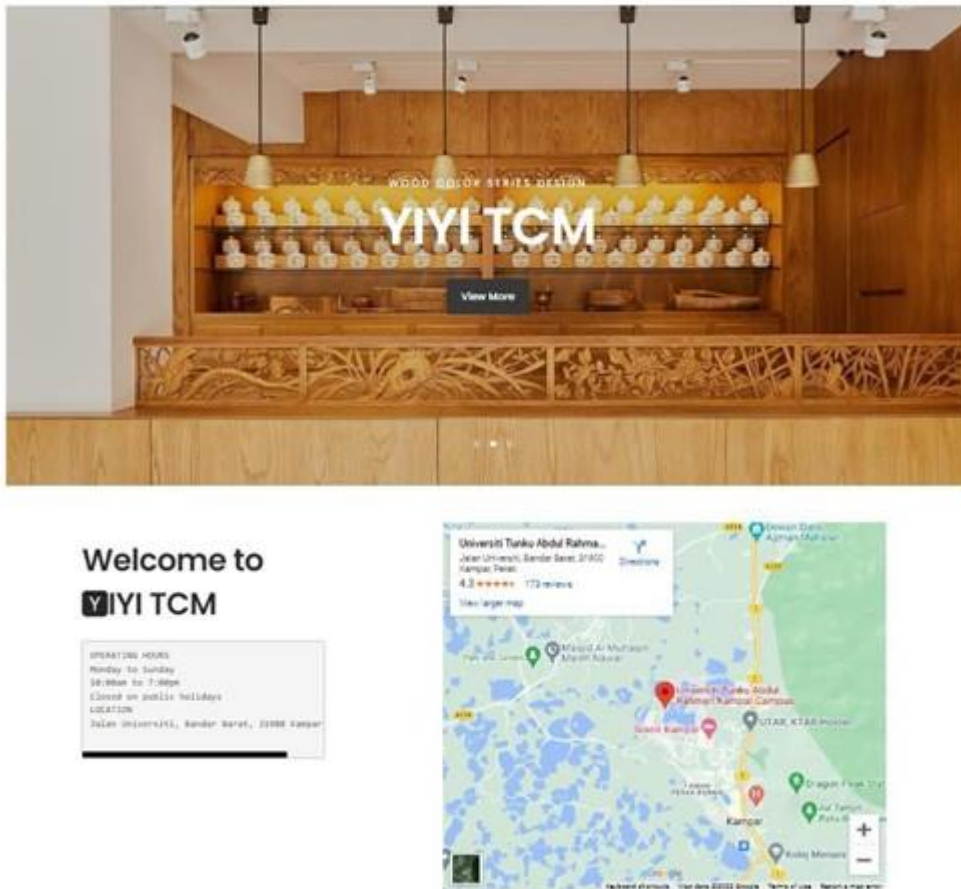
Figure 5 9 Clinic Page

When a user selects the Clinic link found on the navigational header's left side. The user will be routed to the clinic's website via the system. The clinic's images can be seen by the user in a carousel format. The clinic's location and hours of operation are shown on the bottom left side of the page. The precise location of the clinic is shown on a Google Map in the bottom-right corner. Embedded Google Map API was used to implement the Google Map, allowing users to click on the direction button and receive directions directly to the clinic.

5.4.1.8 View Treatment Page
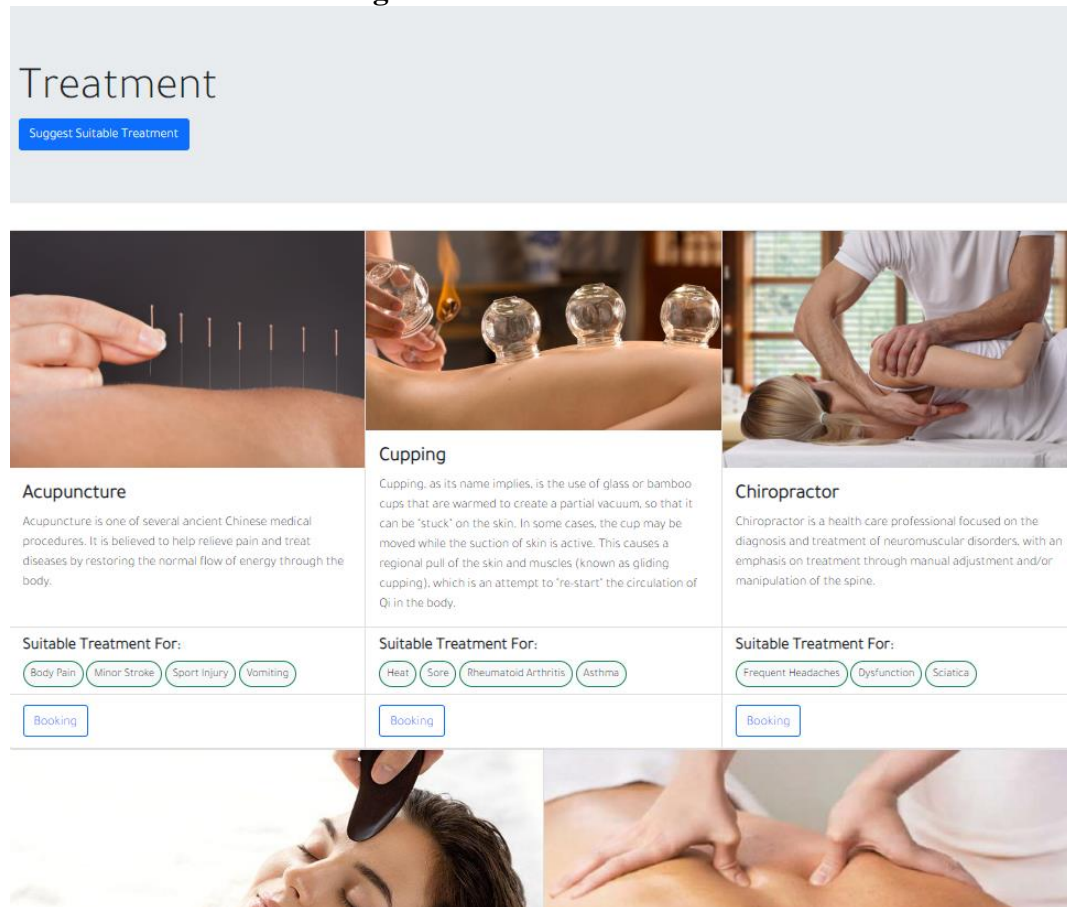
Figure 5 10 View Treatment Page

When a user clicks the Treatment link, which is situated on the left side of the navigational header. The user will see the treatment services this clinic offers. The user can study the therapy's specifics. In addition, the system informs the user of which diseases respond to which treatments so they can choose the one they require. if the user is truly unsure of the suitable treatment to take. They can select the button that suggests a therapy option. The user will see a pop-up form that they must fill out with their disease information. The user will be taken directly to the Google search results page after pressing the submit button. The system will use the Google search engine because it has a much more advanced algorithm than the other search engines. When a user has chosen their preferred course of treatment, they can book an appointment by clicking the booking button, which will take them to the booking page. The user must provide the appointment time and date. The software system will look up the practitioner's schedule using a random practitioner selection. If the user-selected date and time were available for the specific practitioner, the appointment booking would be successful. The scheduling algorithm matched the fast-scheduling algorithm. As it

searches for the practitioner to assign to the user, the system will verify each existing practitioner's schedule. A notification warning the user that their reservation failed will appear if all practitioners have full schedules.

5.4.1.9 View Practitioner Page
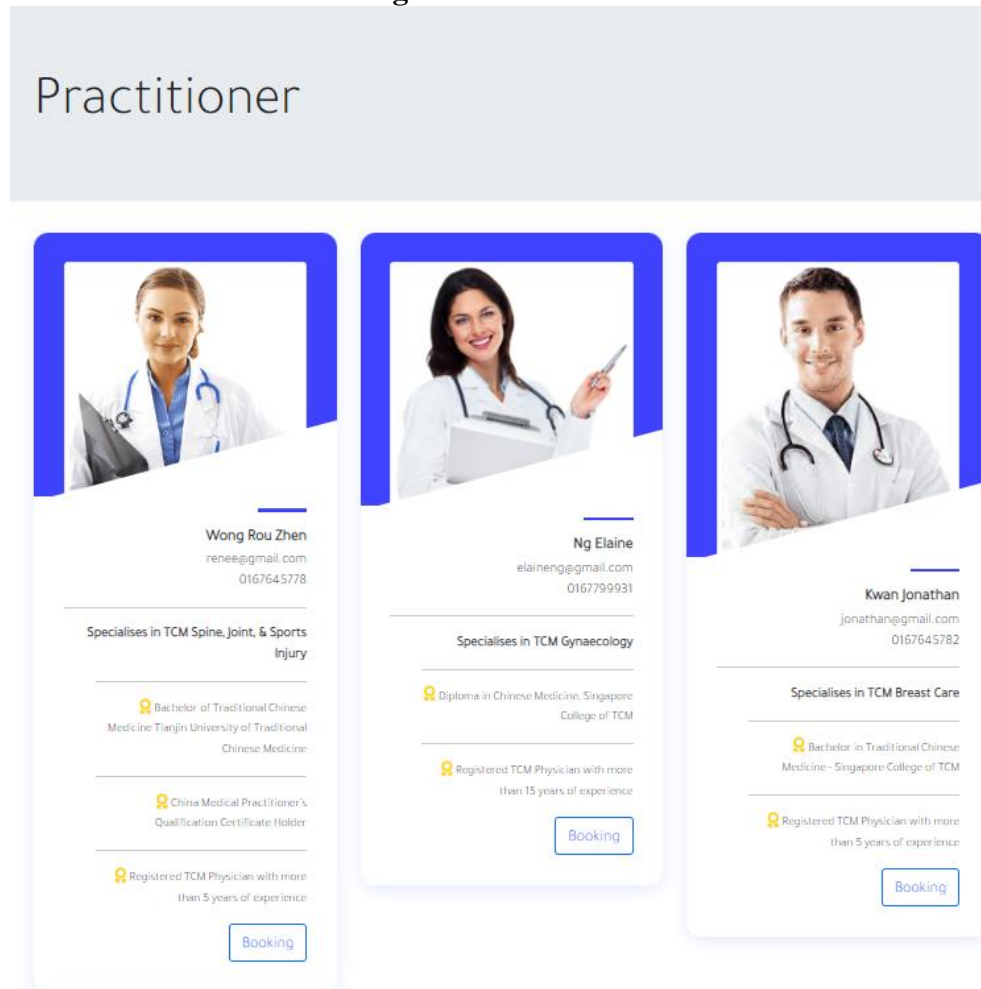
Figure 5 11 View Practitioner Page

When a user clicks the Practitioner link, which is situated on the left side of the navigational header. The user will see the available practitioner in this clinic. The system will provide all the practitioner's details together with background information about them, such as awards received, educational backgrounds, and areas of specialization. As a result, the user will have a clearer idea of the practitioner they want to choose, and this feature can increase the user's trust in both the practitioner and inferred treatment that the practitioner offers. By clicking the booking button, a user can schedule an appointment with the chosen practitioner. The system will verify the user's input and check the schedule of the specific practitioner's appointments. If the specific is available on the day and time the user has specified, the system will present

the user with an appointment booking success message.

5.4.1.10 Trading News & Article Page
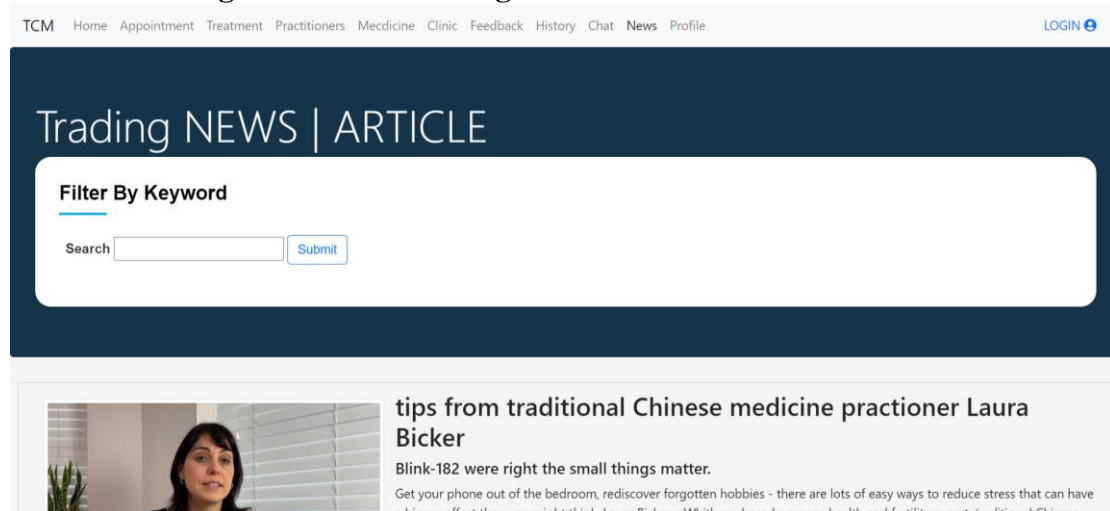
Figure 5 12 Trading News & Article Page 1
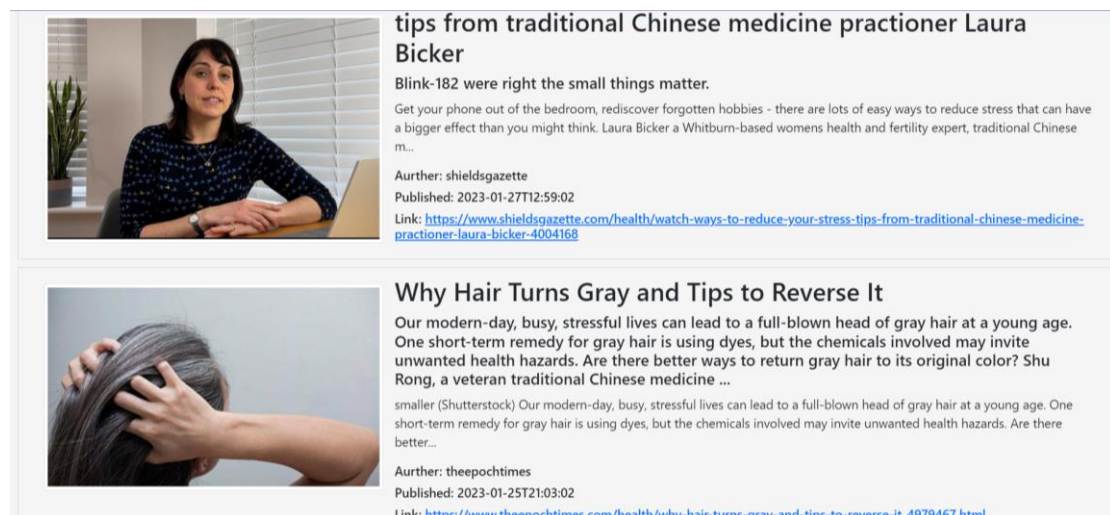
Figure 5 13 Trading News & Article Page 2

When a user clicks the News link, which is situated on the left side of the navigational header. To retrieve the most recent TCM news and articles via CURL, the system will run a third-party contextual web search API. The information will then be displayed to the user using HTML markups when the system has deserialized the JSON body. The user will therefore see the content and news in a basic row-by-row format. A search bar will be shown at the top of the website, allowing users to enter any keyword to do searches. Due to the search bar's inclusion of wildcard searching options, users do not need to enter the entire keyword phrase while performing searches. After pressing the submit button, the article and news results are changed to reflect the user-provided keyword. When a user is interested in an article or piece of news, they can click on the link to view further details.

5.4.1.11 Chat Page
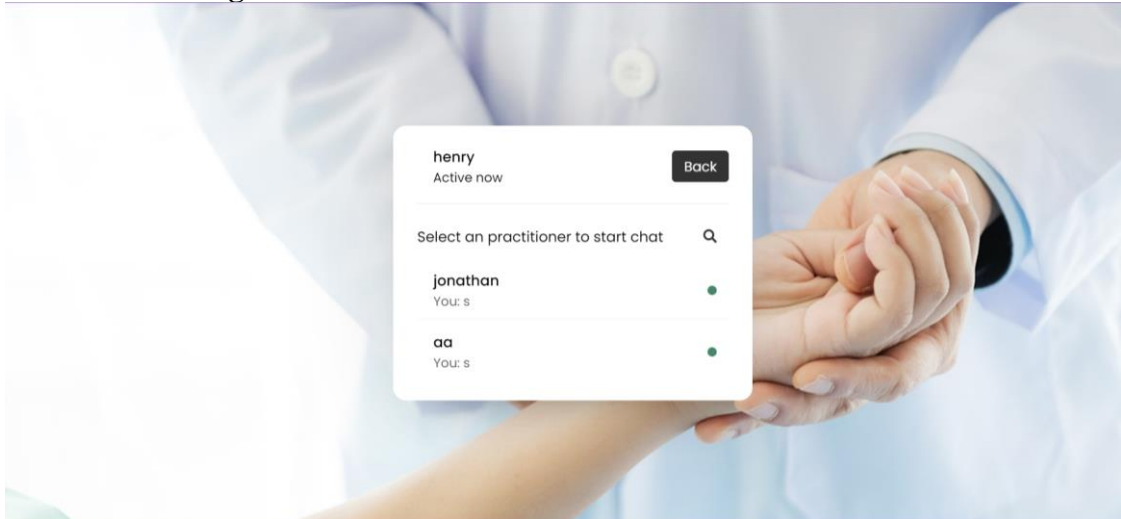
Figure 5 14 Chat Page 1

When the user clicks the Chat link found on the left side of the navigational header. The user will get a list of all active practitioners along with their usernames. The user has the option of selecting the practitioner for their inquiry. Otherwise, the user can return to the home page by clicking the back button.
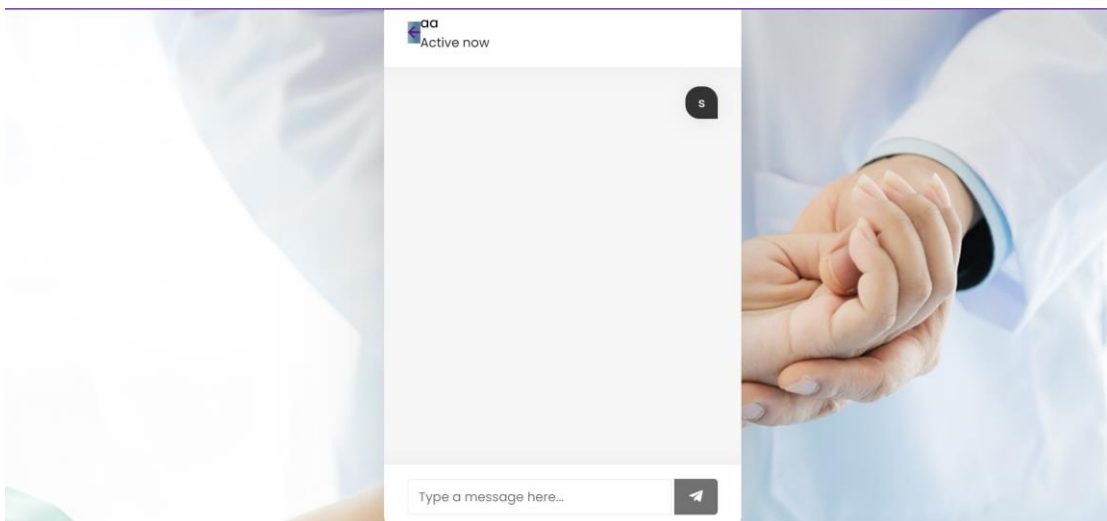
Figure 5 15 Chat Page 2

The user will be directed to the chat box after clicking on the desired practitioner. Users use the middle section to browse through conversation information that has already been posted. Users are represented on the right side, and the practitioner chosen will be represented on the left. An input field will be available in the section below for users to enter their messages. The typed message will be sent in real-time to the selected practitioner after you press the send button.

5.4.1.12 Review and Testimonial
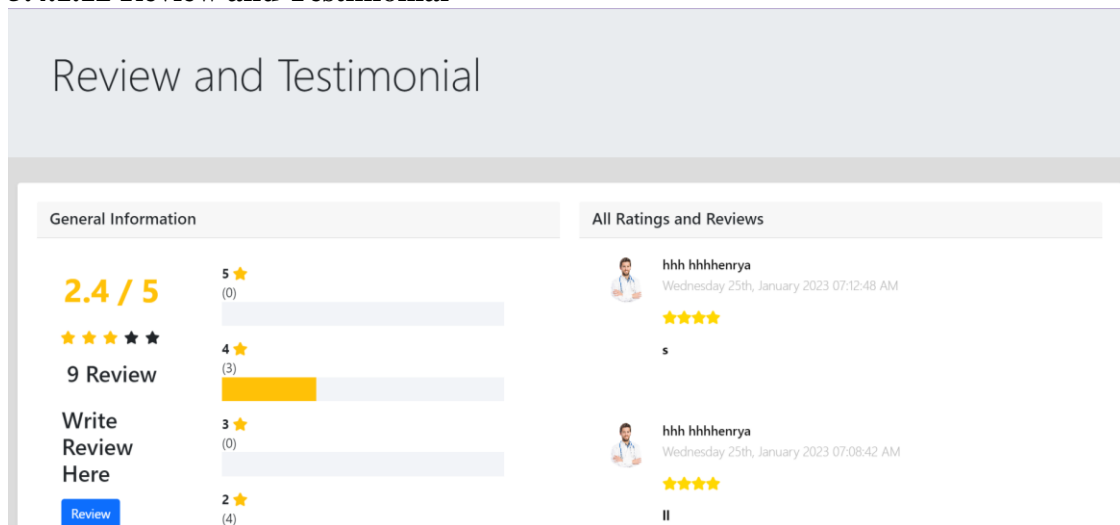
Figure 5 16 Review & Testimonial page 1

When a user clicks on the link entitled "Feedback" in the navigational header on the left. The user will see all the information from the reviews and testimonials. A general overview of the review will be shown on the left side. When a user clicks the review button, a review modal is displayed, and the user can add their star rating and comment. Each patient review and rating information will be displayed in detail on the right side of the page. Because it uses ajax, which enables a small portion of the webpage to be dynamically updated, the star rating status bar will be updated and displayed to the user once the user has submitted the review and star rating.
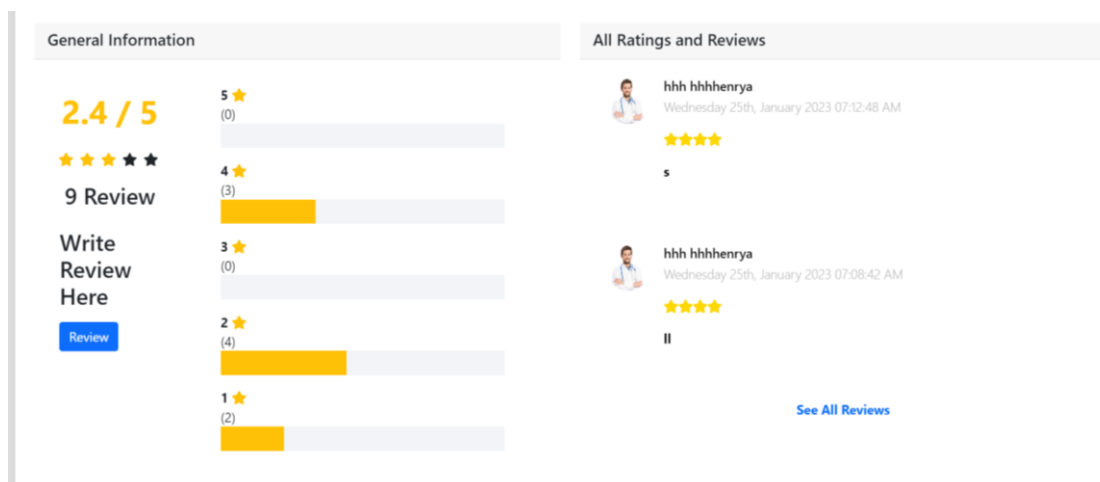
Figure 5 17 Review & Testimonial page 2

Users want to read every review and testimonial since the two most recent ratings and reviews are displayed on the right side of the page. To access all reviews, the user had to click a link.
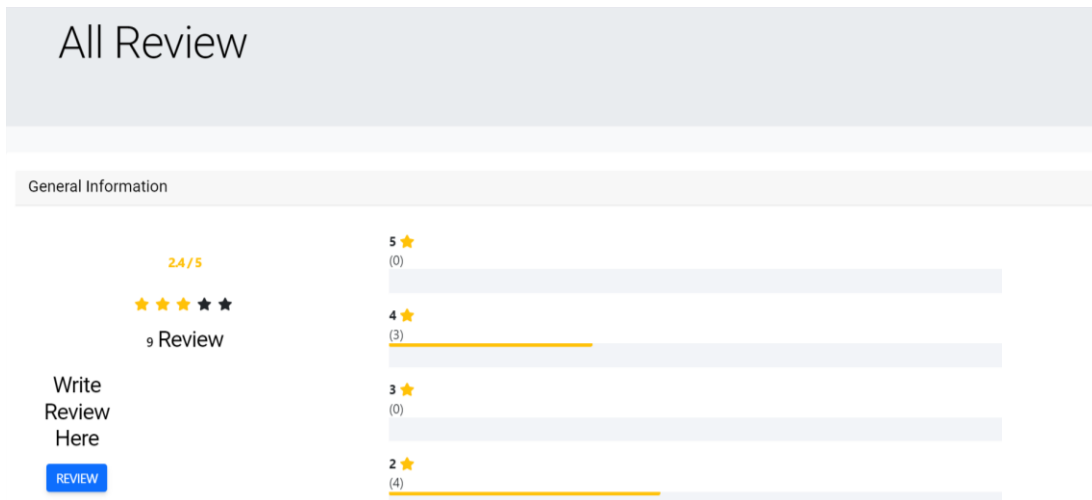
Figure 5 18 Review & Testimonial page 3

When the user clicks on the see all reviews link. User able to view the overview review information and the overview star rating on top of the webpage. And user also able to create new review by clicking the review button and a pop-up form will be displayed.
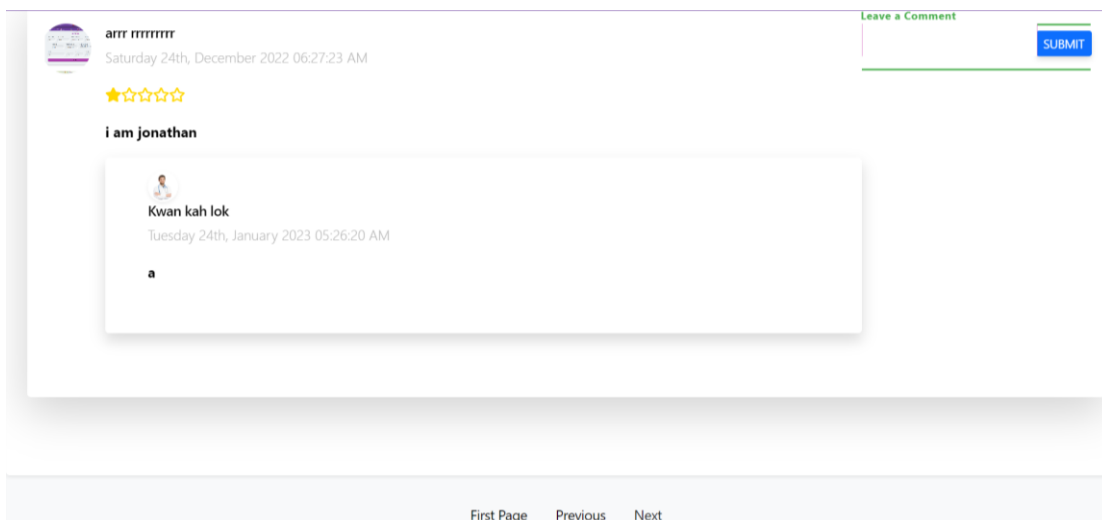
Figure 5 19 Review and Testimonial page 4

When the user selects the link to view all reviews. The user can read all of the patient review information in detail and subsequent comments in pagination form based. A practitioner, a company owner, or another patient may write the following comment. To engage in conversation and contact between other parties, the user can then post a remark by typing their message and clicking the submit button.

5.4.1.13 Manage Account
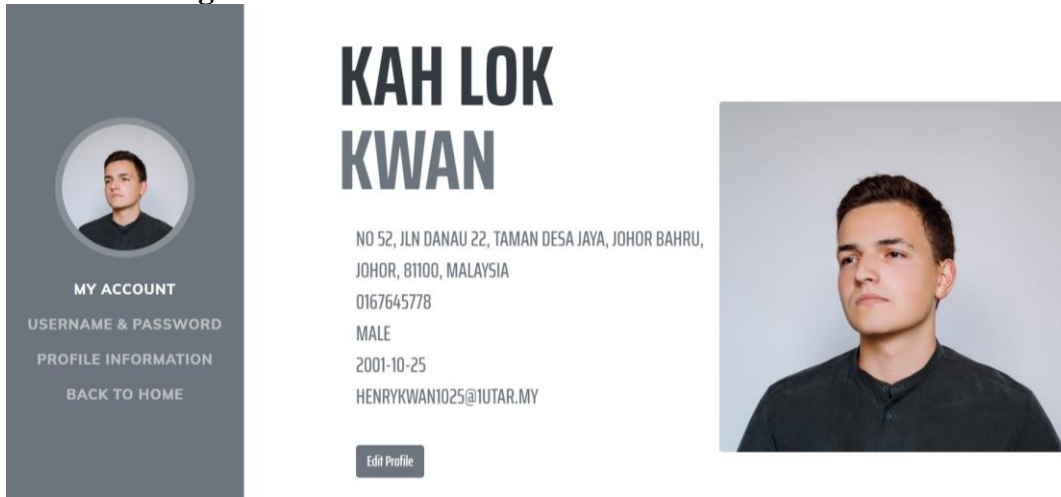
Figure 5 20 Manage Account Page 1

When the user clicks on the Profile link located on the left side of the navigational header. The user account detail will display to the user. User can navigate the content through aside. In first, user able to view his account information such as name, gender, telephone no, date of birth, email address, address, and profile picture. If the user clicks on edit profile button, user will be directed to the profile information section.
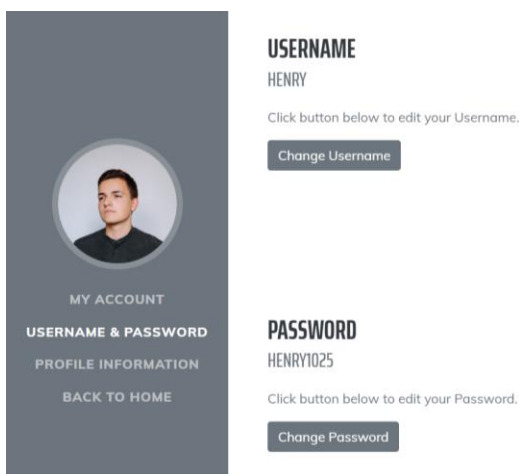
Figure 5 21 Manage Account Page 2
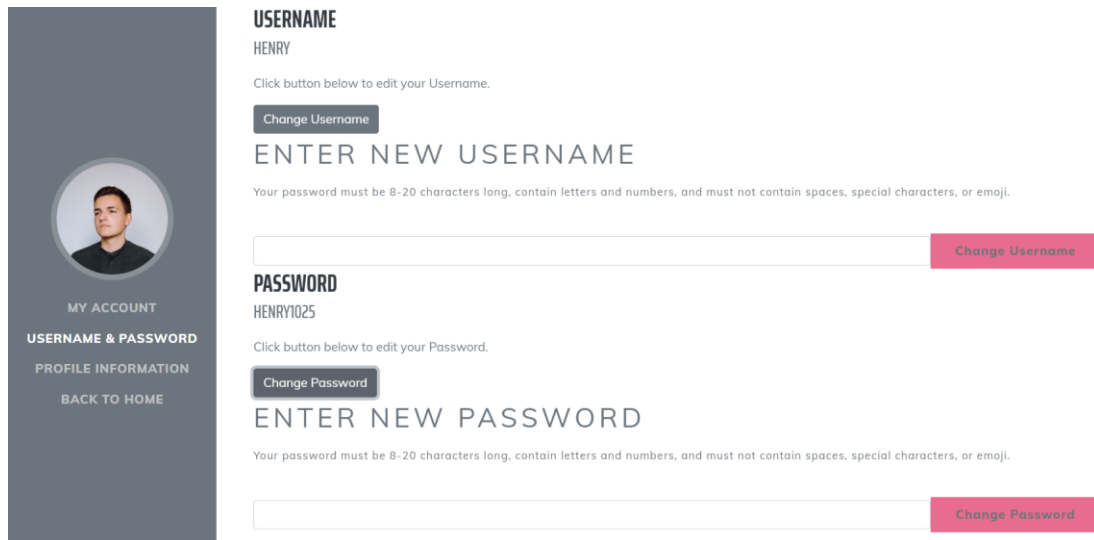
Figure 5 22 Manage Account page 3

When the user navigates to the area for usernames and passwords. A user's current username and password are visible. Additionally, they have the option of changing their username and password. A hidden input form and submit button will appear after the user clicks the change username button or change password button. The user input will be verified by the system once the user enters a new username or password and clicks the submit button. If the user input meets the condition, a success message is displayed by the system.
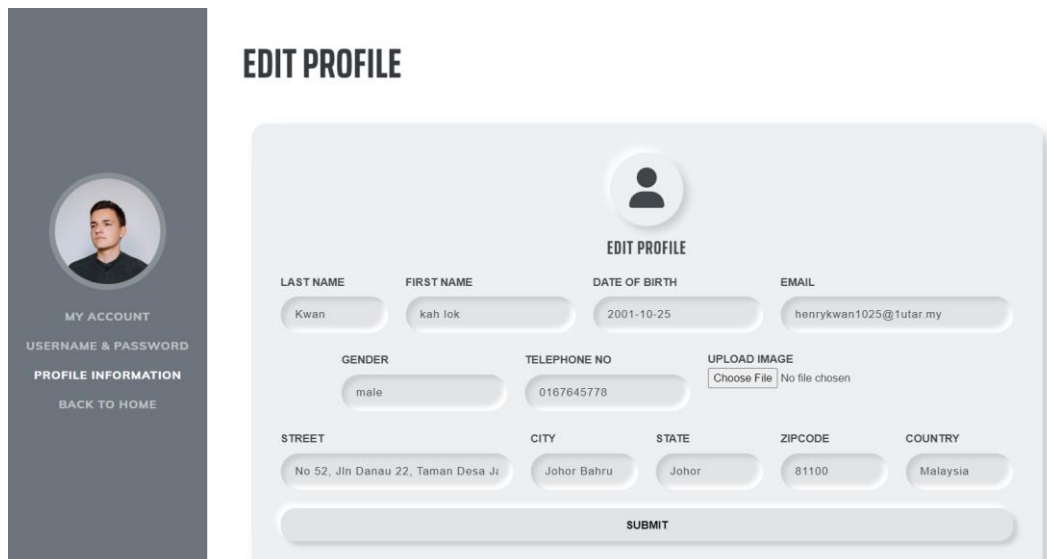
Figure 5 23 Manage Account page 4

When the user accesses the area for profile information. Information from a user's current profile is shown. The user has the option to edit their personal information by altering the input field and clicking the "submit" button. Once the user input satisfies the requirement, the system verifies it and displays a success message to the user. If the requirement is not met, an error message will be displayed.

5.4.1.14 Patient Health Tracking

Figure 5 24 Patient Health Tracking page 1

When a user clicks the History link located on the left side of the navigational header. The system will direct the user to the clinic's website. The filtering area can be viewed by the user initially. The user has two options for doing information filtering, including filtering by month and filtering by appointment date.

Figure 5 25 Patient Health Tracking page 2

Users can view their prior treatment records by scrolling over the website. By most current treatment date, the historical treatment records are arranged. By pressing the "click here" button, the user can view the history treatment record in a clearer way.
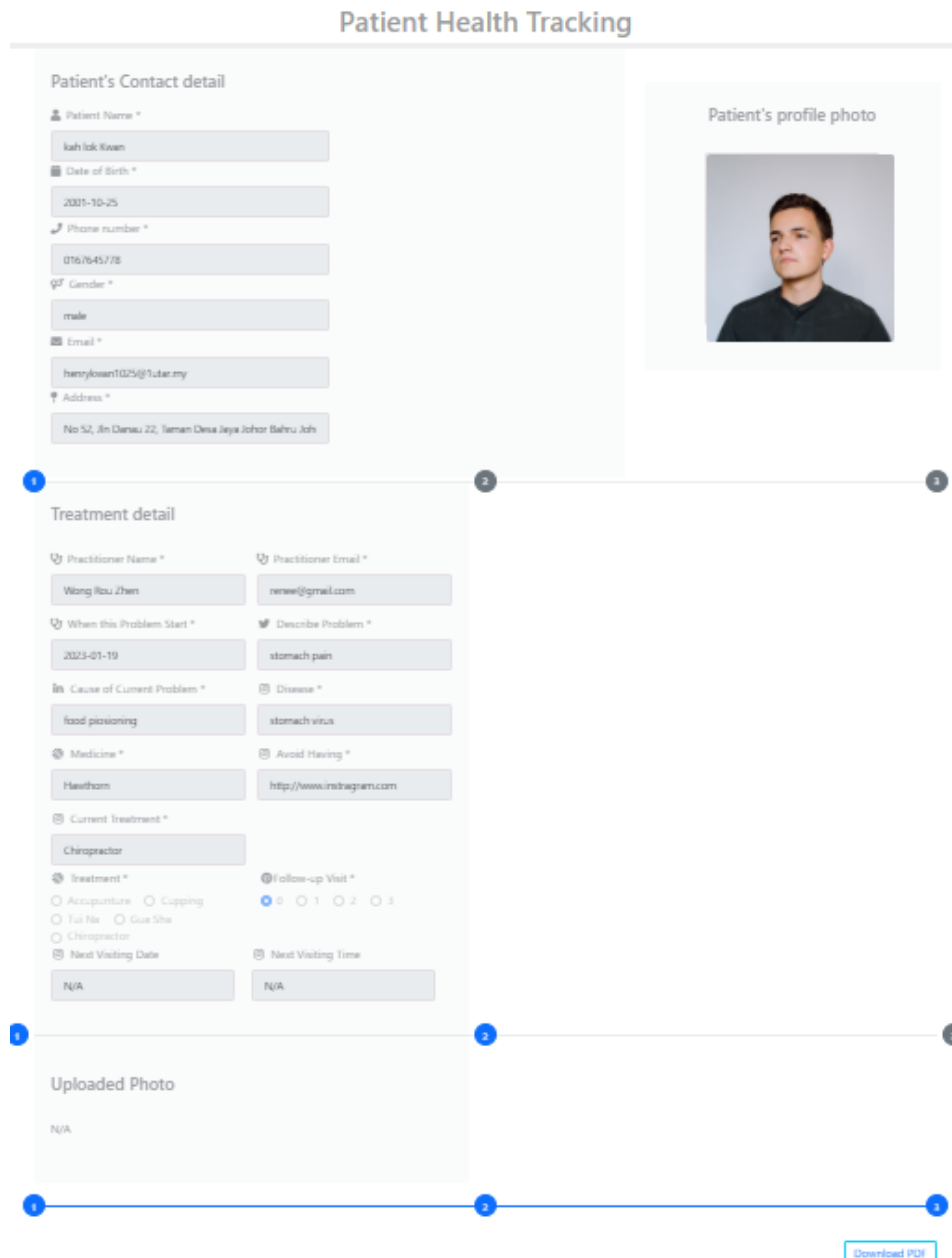
Figure 5 26 Patient Health Tracking page 3

Users can read his historical treatment details more undoubtedly after clicking the "click here" button. The user can read his personal information at the top of the website, along with information on the therapy he is receiving and any subsequent medical care. The user can view the posted treatment photo by the practitioner. The historical treatment record is also available for download in PDF format by clicking the button on the website. The treatment record may be downloaded in PDF format by the user and saved to a file for future reference.

Figure 5 27 Patient Health Tracking page 4
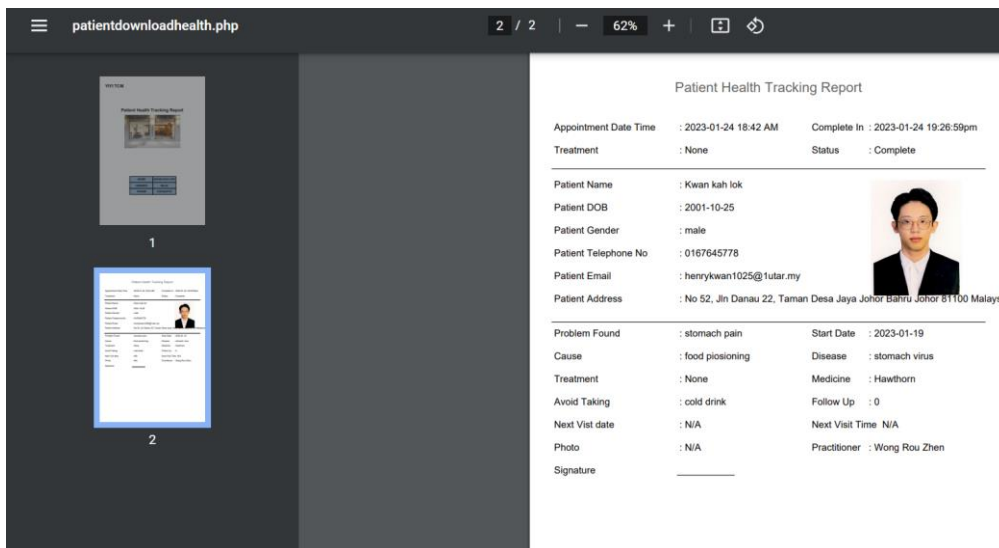
Figure 5 28 Patient Health Tracking page 5

5.4.2 Practitioner Perspective
5.4.2.1 Practitioner Home Page
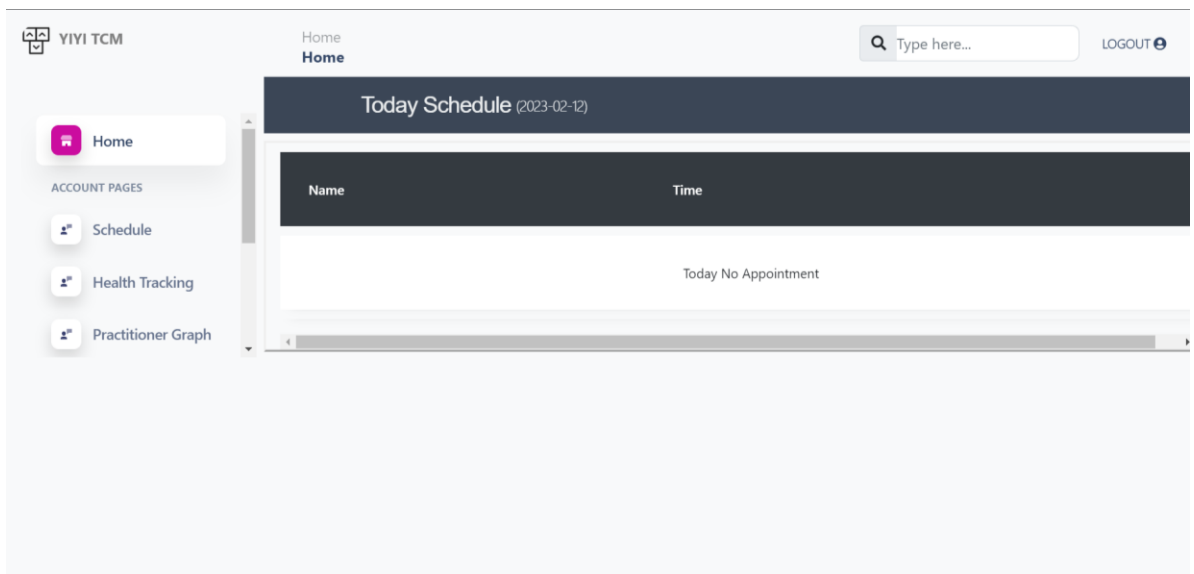
Figure 5 29 Practitioner Home Page

When a user enters a valid URL and successfully login into his/her account. The practitioner home page is displayed to the user. Vertical navigational panel is located at the left of the practitioner home page that allows users to freely navigate inside the context of the web application.

5.4.2.2 Practitioner Daily Schedule
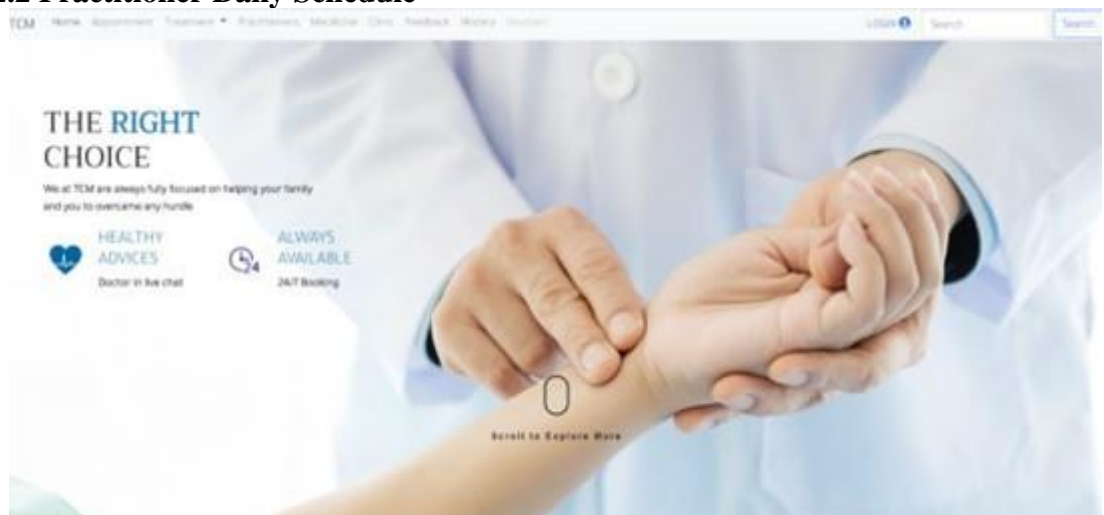
Figure 5 30 Practitioner Daily Schedule Page

When the user clicks on the home link on the vertical navigational panel. The user will be directed to the practitioner's daily schedule webpage by the system. The

user can first examine their daily schedule which is ordered by appointment time in the table review. The patient's name and appointment time are included in the column of the daily schedule table so the practitioner will know which patient will visit and receive treatment at that time. A "click here" button will be present in each record row. When a user clicks a button, the system directs them to a specific patient health report. The user can enter information about the disease, the problem's beginning date, the source of the disease, the allocated medication, follow-up visit details, and submit a photo of the patient receiving treatment. Once the user completes all the treatment information and clicks the submit button, this treatment will be considered completed. This report's data will be stored in a database, and the patient can access it through the patient health tracking page.

5.4.2.3 Practitioner Schedule Page
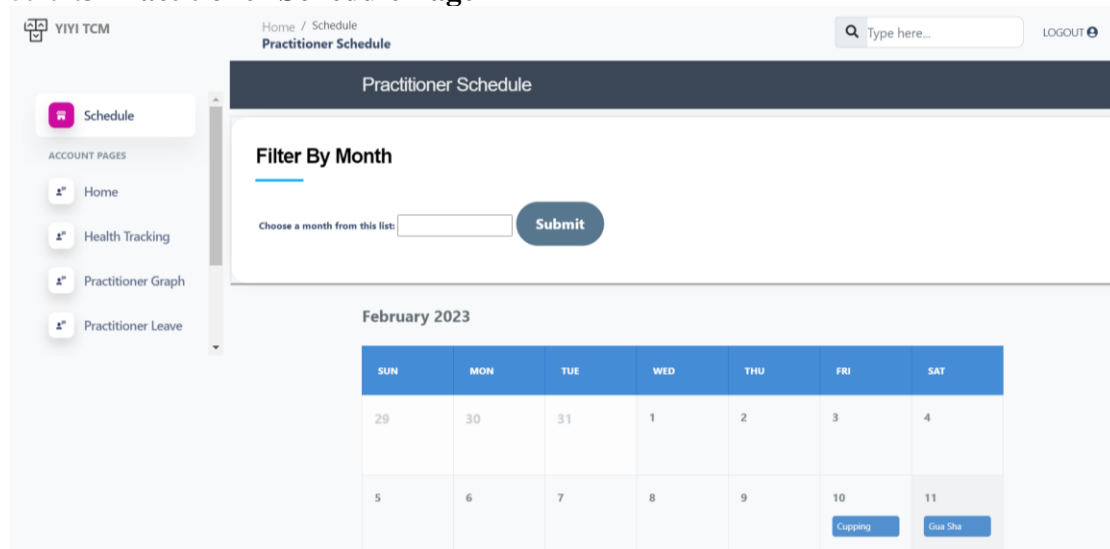
Figure 5 31 Practitioner Schedule Page

When the user clicks on the Schedule link on the vertical navigational panel. The user will be directed to the practitioner schedule webpage by the system. The user can first examine their schedule as a calendar. The planned treatment activities are listed in each date's column. The user can view the information for the upcoming and past month's schedule by clicking on the "prev" and "next" buttons. To lessen the user's burden of viewing a vast quantity of information, a filter bar will also be displayed on top of the monthly calendar. This bar will allow the user to filter the practitioner schedule output by month. after clicking the filter input area. The user will see a dropdown list of options from the system. And the months on that list are the ones the patient had booked. When the date column has been clicked by the user, a modal will

prompt out. The modal will display the daily patient appointment information such as patient information, schedule date, schedule day, start time, end time, duration of treatment, type of treatment, approve button and delete button. Users can click on approve button when he/she accept the patient appointment request. The system will update the appointment status from pending to approved and display a success message to the user. In contrast, the user can click on the delete button when he/she rejects the patient appointment request. The system will remove the appointment record from the database and display a delete success message to the user.

5.4.2.4 Practitioner Leave
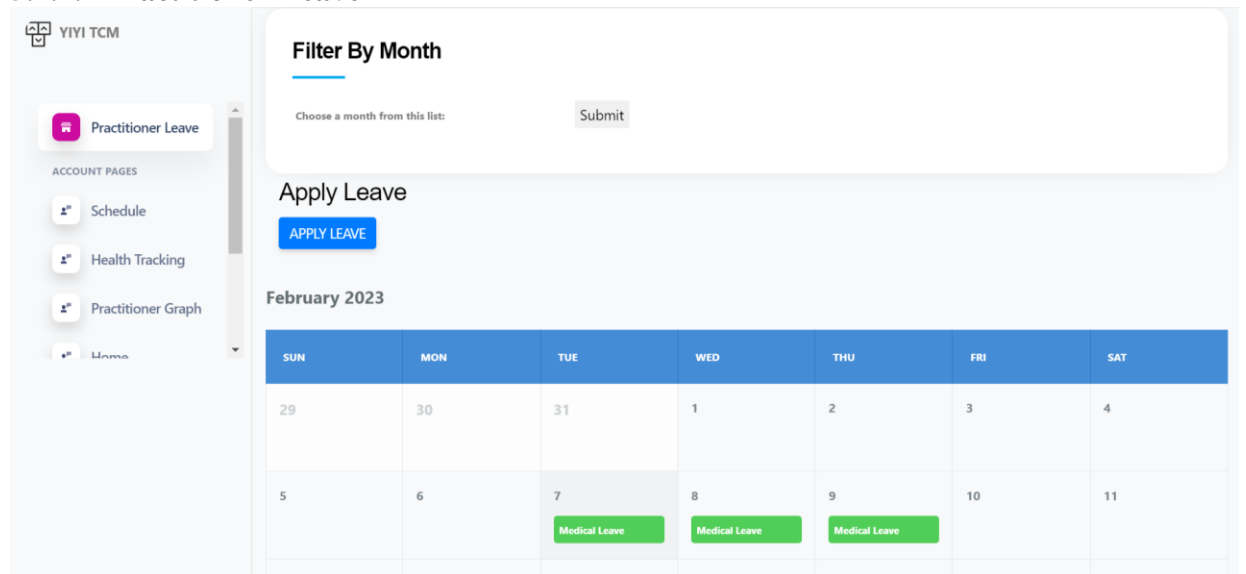
Figure 5 32 Practitioner Leave page 1
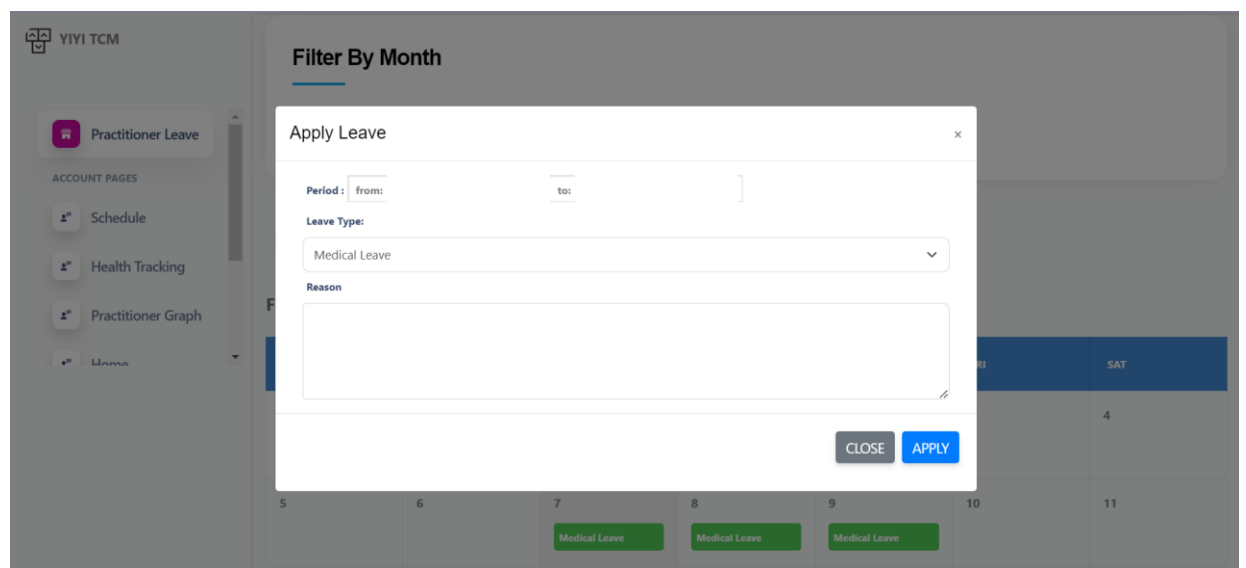
Figure 5 33 Practitioner Leave page 2

When the user clicks on the Practitioner Leave link on the vertical navigational panel.

The user will be directed to the practitioner leave management webpage by the system. The user can first examine their applied leave information as a calendar. The leave type information is listed in each date's column. The user can view the information for the upcoming and past month's leave schedule by clicking on the "prev" and "next" buttons. To lessen the user's burden of viewing a vast quantity of information, a filter bar will also be displayed on top of the monthly calendar. This bar will allow the user to filter the applied leave information output by month. after clicking the filter input area. The user will see a dropdown list of options from the system. And the months on that list are the ones the practitioner had applied for leave. The user will be prompted with a popup after clicking the date column. The user will be able to see information about the leave, including the start date, termination date, kind of leave, reason, and status. Next, the user can click the "apply leave" button to request a leave of absence, at which point a modal form will appear. The leave period, leave type, and reason fields are required to be filled up by the user. The application information is sent to the database after the "apply" button is clicked, and the practitioner thereafter must wait for the business owner to approve the leave.

5.2.4.5 Graph and KPI
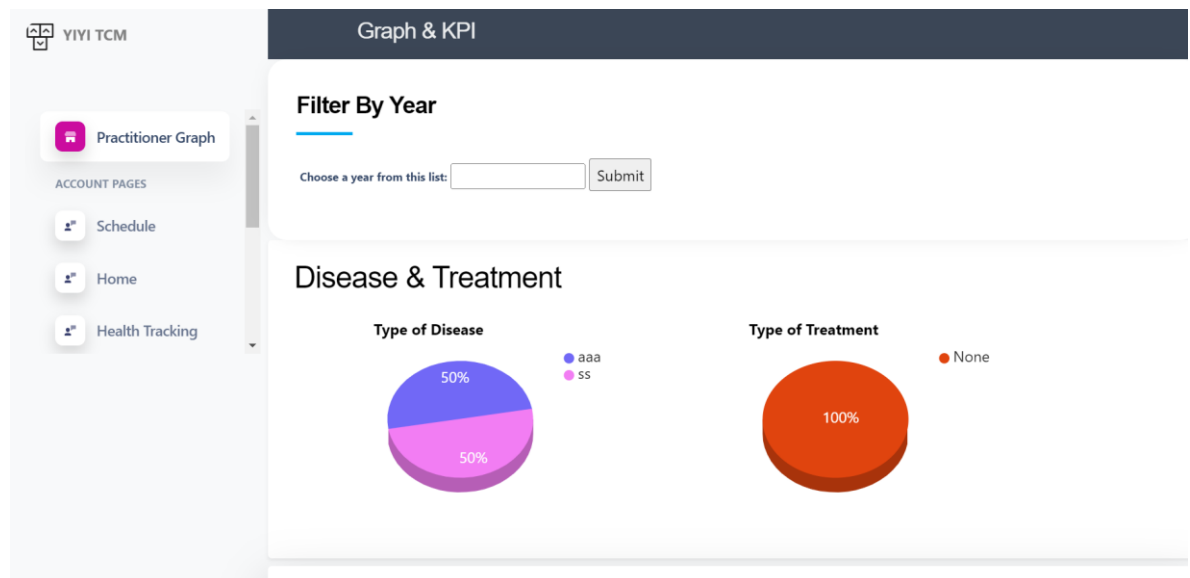
Figure 5 34 Graph & KPI page

When the user clicks on the Practitioner Graph link on the vertical navigational panel. The user will be directed to the graph and KPI webpage by the system. User able to view the type of disease pie chart, type of treatment pie chart, total number of patients

for each practitioner in bar chart, type of medicine pie chart, and type of the disease cause in bar chart to perform further analysis. Next, the user can filter the output by entering the year as an input value. The user will see a drop-down data list after clicking the input field. The user needs to do is choose a year and click the submit button. According to user input, the system will produce the graph and KPI data.

5.2.4.6 Patient Health Tracking
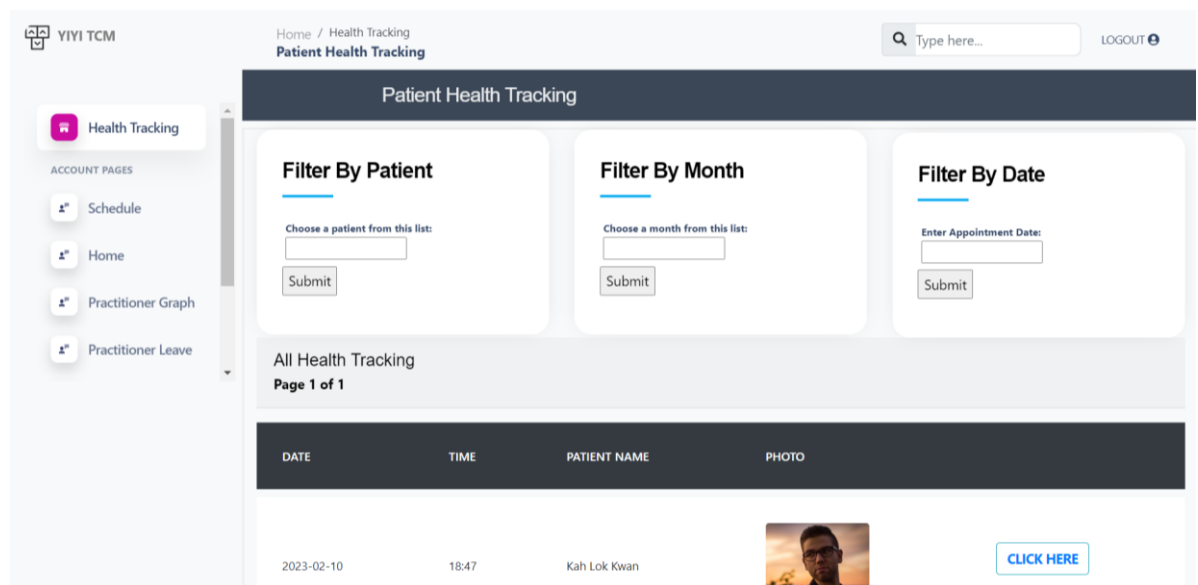
Figure 5 35 Patient Health Tracking Page (Practitioner)

When a user clicks the Health Tracking link located on the left side of on the vertical navigational panel. The system will direct the user to the patient health tracking website. The filtering area can be viewed by the user initially. The user has three options for doing information filtering, including filtering by month, filtering by appointment date and filter by patient's full name. Users can view their prior patient's treatment records by scrolling over the website. Next, user able to view the record in pagination form. The information such as treatment date, treatment time, patient's name, and patient' profile image will be show to user in table form. By pressing the "click here" button, the user can view the patient's history treatment record in a clearer way. Users can read his/her patient's historical treatment details more undoubtedly after clicking the "click here" button. The user can read his personal information at the top of the website, along with information on the therapy he is receiving and any subsequent medical care. The user can view the posted treatment photo by the practitioner. The

historical treatment record is also available for download in PDF format by clicking the button on the website. The treatment record may be downloaded in PDF format by the user and saved to a file for future reference.

5.2.4.7 Chat with Patient
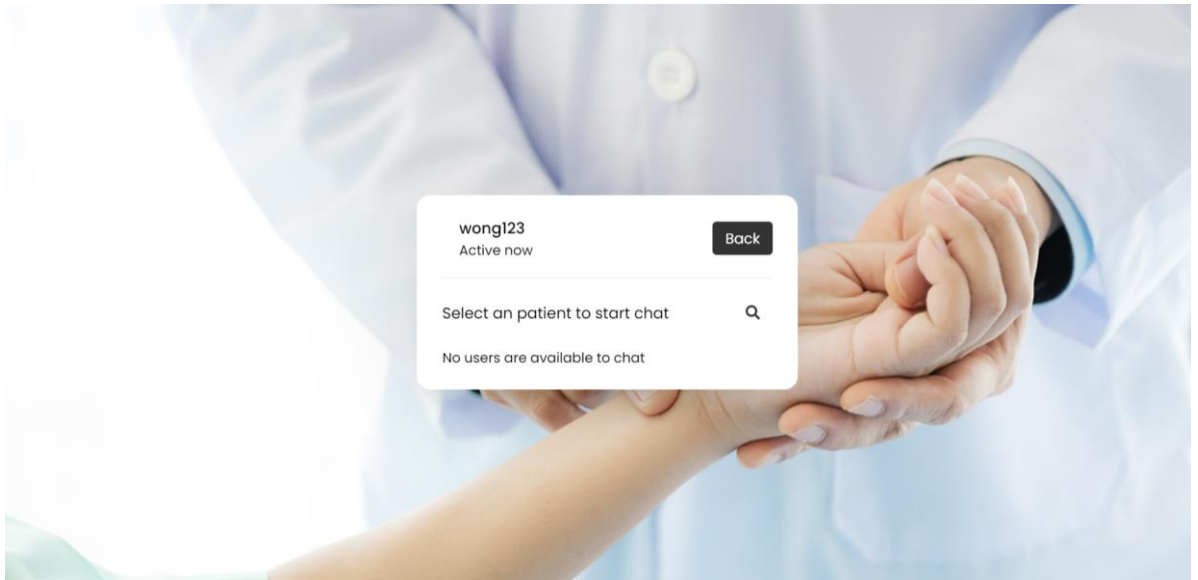
Figure 5 36 Chat with Patient page 1
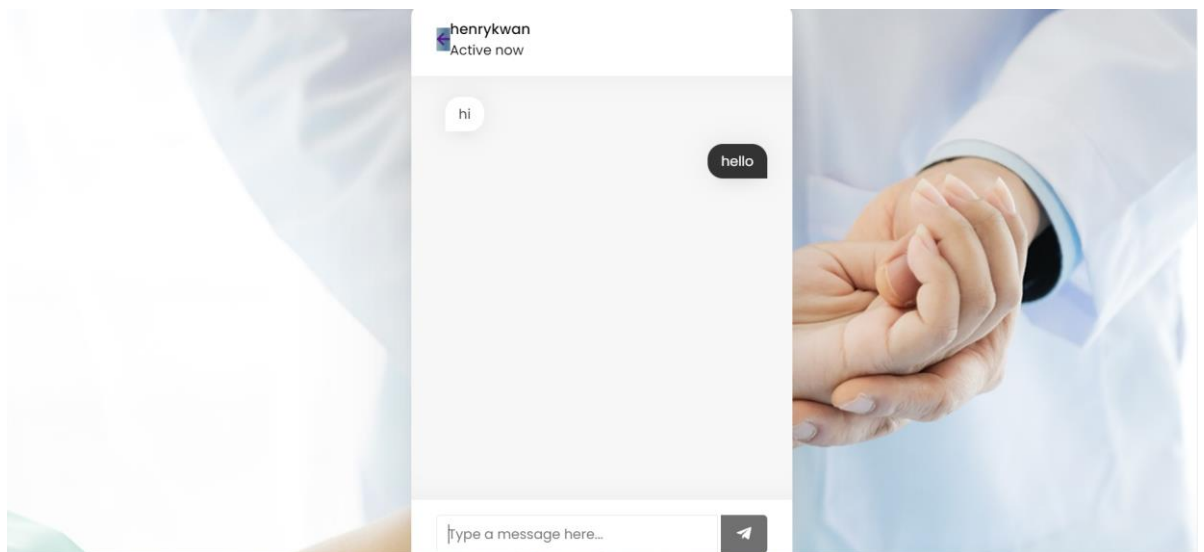
Figure 5 37 Chat with Patient page 2

When the user clicks the Chat link found on the left side of the left side of on the vertical navigational panel. The user will get a list of all active patient along with their usernames. The user has the option of selecting the patient for replying to them. Otherwise, the user can return to the home page by clicking the back button. Next, user can perform searching for desire patient to communicate by clicking the search icon. The user will be directed to the chat box after clicking on the desired patient. Users use

the middle section to browse through conversation information that has already been posted. Users are represented on the right side, and the patient chosen will be represented on the left. An input field will be available in the section below for users to enter their messages. The typed message will be sent in real-time to the selected patient after you press the send button.

5.2.4.8 Manage Practitioner Account

Figure 5 38 Manage Practitioner Account

When the user clicks on the Profile link located on the left side of the left side of on the vertical navigational. The user account detail will display to the user. User can navigate the content through aside. In first, user able to view his account information such as name, gender, telephone no, date of birth, email address, address and profile picture. If the user clicks on edit profile button, user will be directed to the profile information section. When the user navigates to the area for usernames and passwords. A user's current username and password are visible. Additionally, they have the option of changing their username and password. A hidden input form and submit button will appear after the user clicks the change username button or change password button. The user input will be verified by the system once the user enters a new username or password and clicks the submit button. If the user input meets the condition, a success message is displayed by the system. When the user accesses the area for profile information. Information from a user's current profile is shown. The user has the option to edit their personal information by altering the input field and clicking the "submit" button. Once the user input satisfies the requirement, the system verifies it and displays a success message to the user. If the requirement is not met, an error message will be displayed. Next, user can scroll the webpage until meet the specialty and award section

to view their personal award and specialty toward the TCM field.

5.2.4.9 Practitioner Review
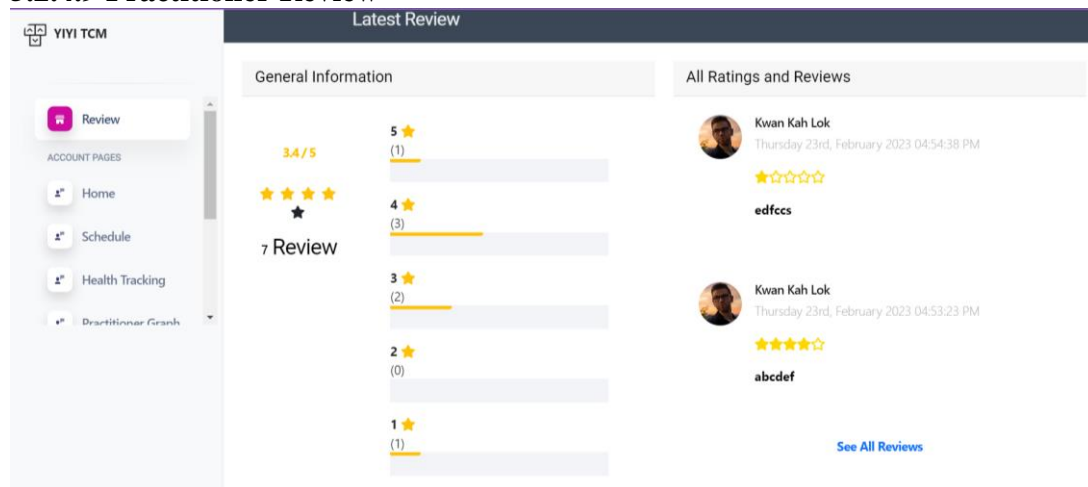
Figure 5 39 View Review Page (Practitioner)

When a user clicks on the link entitled "Review" on the left side of the left side of on the vertical navigational. The user will see all the information from the reviews and testimonials. A general overview of the review will be shown on the left side. Each patient review and rating information will be displayed in detail on the right side of the page. Because it uses ajax, which enables a small portion of the webpage to be dynamically updated, the star rating status bar will be updated and displayed to the user once the patient has submitted the review and star rating. Users want to read every review and testimonial since the two most recent ratings and reviews are displayed on the right side of the page. To access all reviews, the user had to click a link. When the user clicks on the see all reviews link. User able to view the overview review information and the overview star rating on top of the webpage. When the user selects the link to view all reviews. The user can read all of the patient review information in detail and subsequent comments in pagination form based. A practitioner, a company owner, or another patient may write the following comment. To engage in conversation and contact between other parties, the user can then post a remark by typing their message and clicking the submit button.

5.4.3 Business Owner Perspective

5.4.3.1 All Patient Page
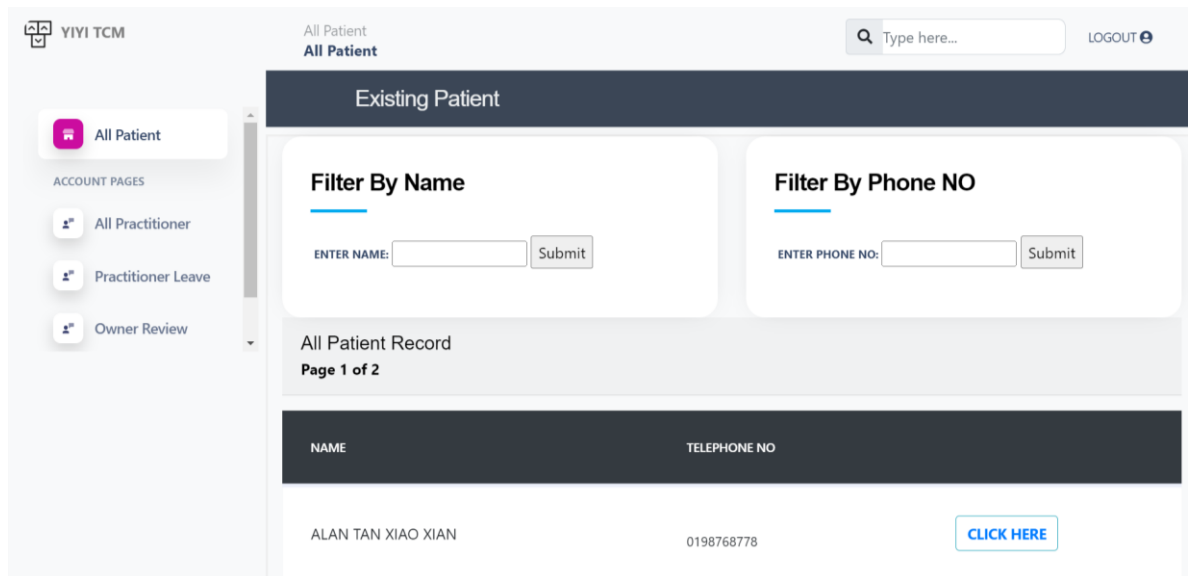
Figure 5 40 View All Patient Page 1

When the user clicks the "All Patient" link that is positioned at the left side of the webpage. All the exist patient record will display to user in table format and in pagination form. First, the user can execute the record -filtering function by patient's name and patient's phone number. User can enter either patient's last name, patient's first name, or patient's full name to perform filtering function. The user can click "click here" button to view the particular patient information in detail.

Figure 5 41 View All Patient page 2

When a user clicks the "click here" button, the system directs them to a specific patient information homepage. The user can see the patient information in a cleaner, more organized way. After that, by selecting the "edit" icon, the user can also change the patient account details. Every input field will be converted from read-only to editable. The "save profile" button must be clicked when the user has completed all the required fields. Server-side verification will be done after the system receives the information. if the user's input does not contradict the specification. The database's patient account information will be updated in accordance with user input. By pressing the "change status" button, the user can then modify the patient account status. This feature's goal is to give users the option to momentarily deactivate the patient's accounts if they are not currently active.

5.4.3.2 All Practitioner Page
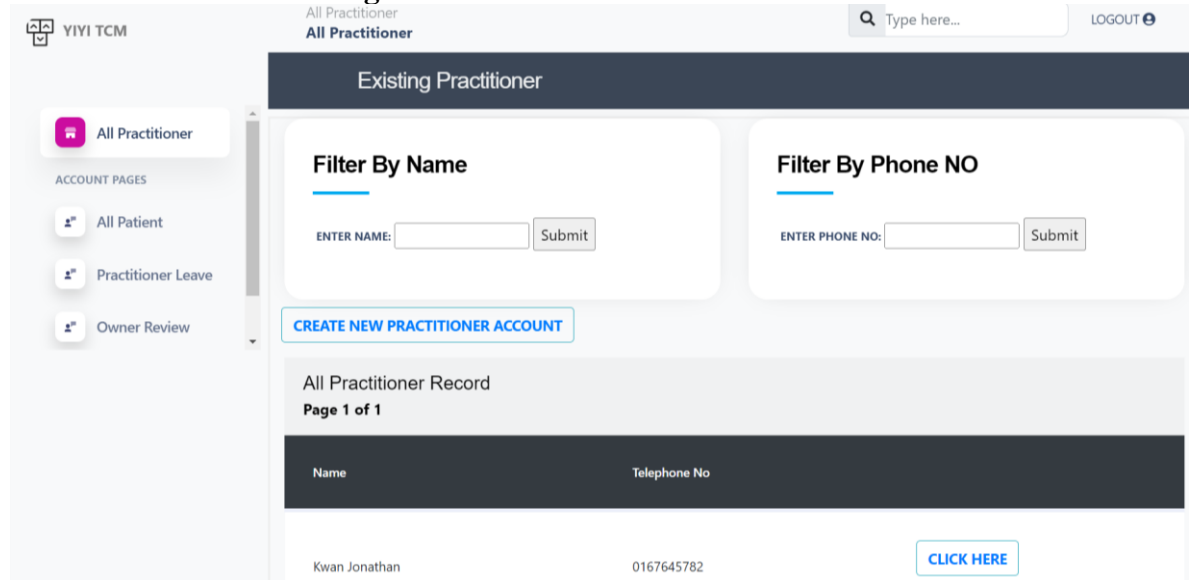
Figure 5 42 View All Practitioner page 1

When the user clicks the "All Practitioner" link that is positioned at the left side of the webpage. All the exist practitioner's record will display to user in table format and in pagination form. First, the user can execute the record -filtering function by practitioner's name and practitioner's phone number. User can enter either practitioner's last name, practitioner's first name, or practitioner's full name to perform filtering function. Furthermore, user also able to create an account for the new onboard practitioner by click the "create new practitioner account" button. The system will redirect user to the practitioner account registration page. After user fill in all the detail and press the submit button. The system will perform server-side verification. If the user input is fulfill all the requirement, the user input will store in the database and a success message will prompt to the user. Next, the user can click "click here" button to view the particular practitioner information in detail.

Figure 5 43 View All Practitioner page 2

When a user clicks the "click here" button, the system directs them to a specific practitioner information homepage. The user can see the practitioner information in a cleaner, more organized way. After that, by selecting the "edit" icon, the user can also change the practitioner account details. Every input field will be converted from read-only to editable. The "save profile" button must be clicked when the user has completed all the required fields. Server-side verification will be done after the system receives the information. if the user's input does not contradict the specification. The database's practitioner account information will be updated in accordance with user input. By pressing the "change status" button, the user can then modify the practitioner account status. This feature's goal is to give users the option to momentarily deactivate the practitioner accounts if they are not currently active.

5.4.3.3 Practitioner Leave
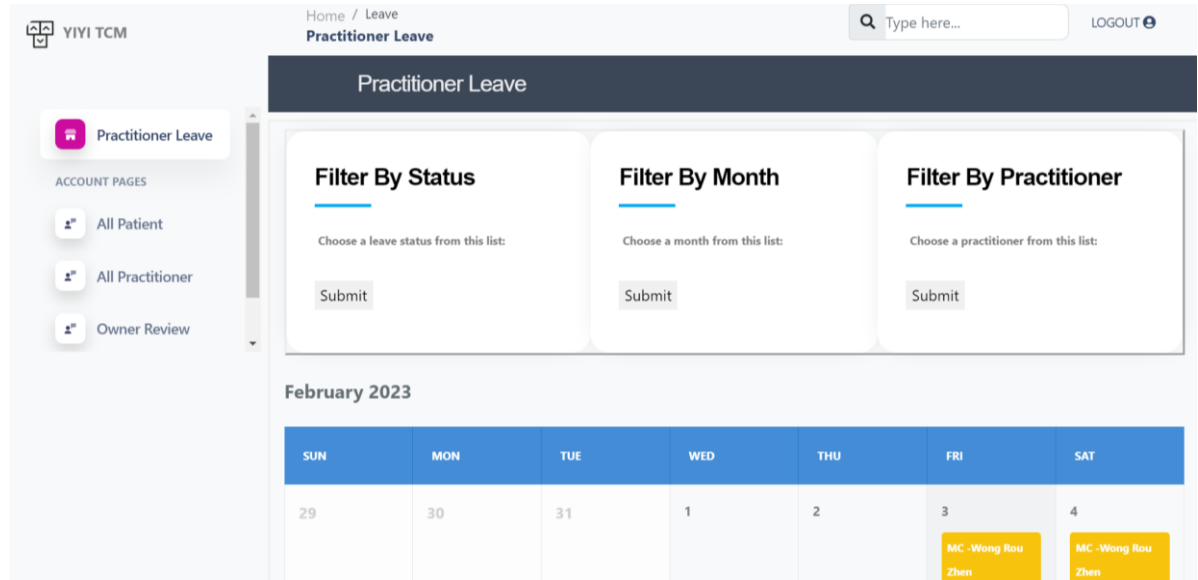
Figure 5 44 Manage Practitioner Leave page 1
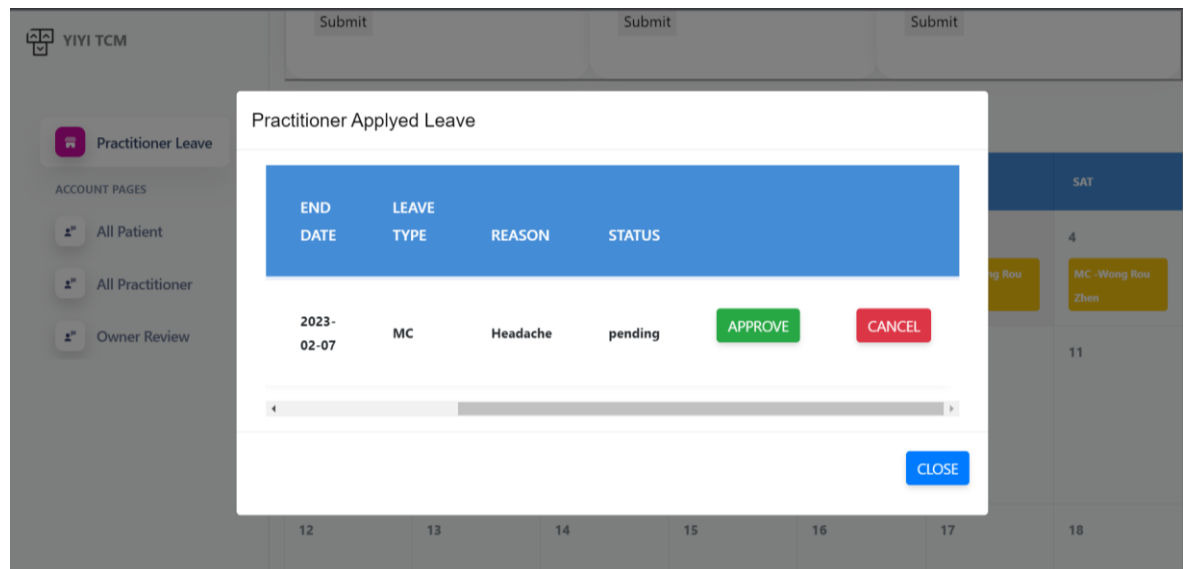
Figure 5 45 Manage Practitioner Leave page 2

When the user clicks the "Practitioner Leave" link that is positioned at the left side of the webpage. Viewing approved and pending practitioner leave in calendar format is available to the user. First, the user can execute record-filtering functions by leave status, month, and practitioner name. And because the input fields use drop-down selection to provide users a choice, users do not need to figure what value should be entering. There are two buttons, one each of the hues green and yellow, on the calendar. Yellow denotes the practitioner leave status that is still pending. Green denotes the practitioner leave that the business owner has allowed. When the date column has been clicked by the user, a modal will prompt out. The modal will display the practitioner applied leave information such as practitioner information, leave start date, leave end

day, leave type, leave status, approve button and delete button. Users can click on approve button when he/she accept the practitioner leave request. The system will update the leave status from pending to approved and display a success message to the user. In contrast, the user can click on the delete button when he/she rejects the practitioner leave request. The system will remove the leave record from the database and display a delete success message to the user.

5.4.3.4 Owner Review Page
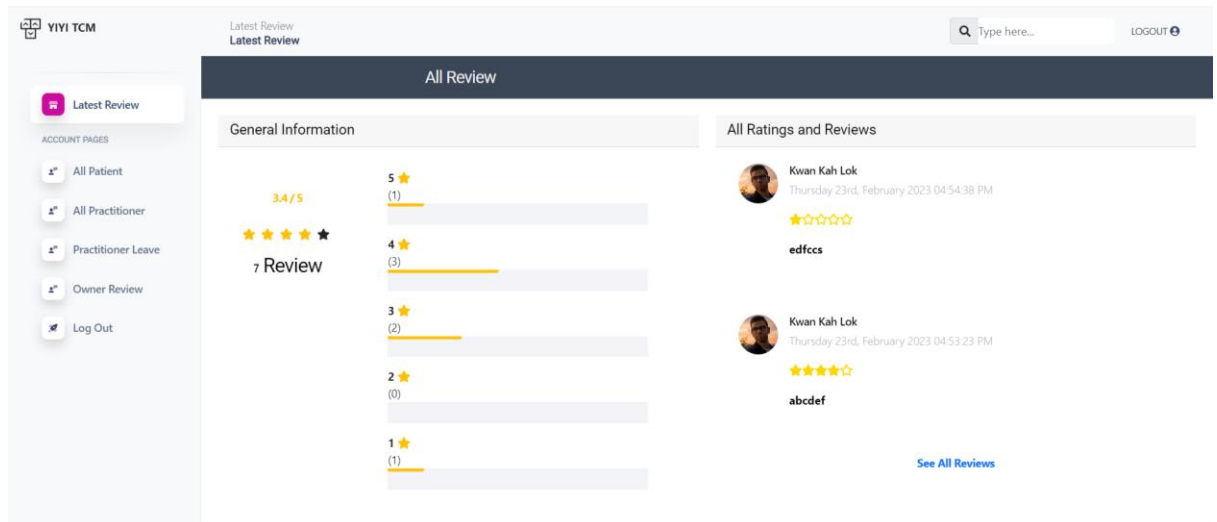
Figure 5 46 Review Page 1 (Owner)
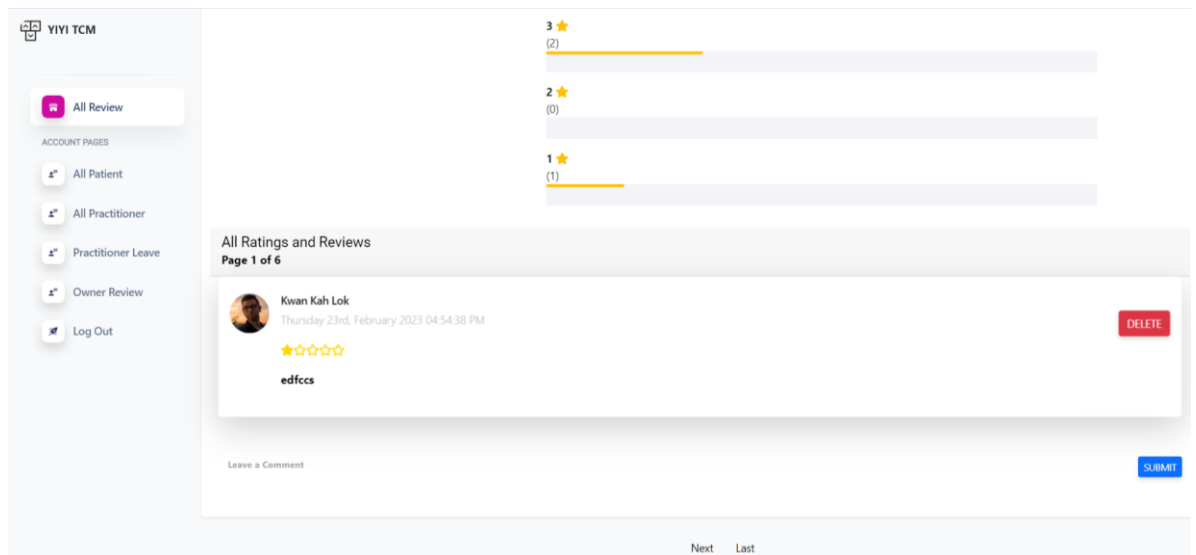
Figure 5 47 Review Page 2 (Owner)

when a user clicks on the link entitled "Review" in the navigational aside on the left of the webpage. The user will see all the information from the reviews and testimonials. A general overview of the review will be shown on the left side. Each patient review and rating information will be displayed in detail on the right side of the page. Users want to read every review and testimonial since the two most recent ratings

and reviews are displayed on the right side of the page. To access all reviews, the user had to click a link.

When the user clicks on the see all reviews link. User able to view the overview review information and the overview star rating on top of the webpage.

When the user selects the link to view all reviews. The user can read all the patient review information in detail and subsequent comments in pagination form based. A practitioner, a company owner, or another patient may write the following comment. To engage in conversation and contact between other parties, the user can then post a remark by typing their message and clicking the submit button. The user can then remove the patient review and any subsequent comments to preserve the clinic's positive reputation.

5.3 Implementation Issue and Challenges

Every project has various requirements and issues at various phases. While gathering requirements, I stumbled into the issue with the initial inquiry. The purpose of this step is to prove that the user demand as seen through the designer's perspective is the actual requirement as seen through the minds of the customers. After conducting a literature review and researching secondary sources, I will create a questionnaire with a list of requirements that will be evaluated. The primary issues encountered when conducting interviews with the interviewees are cross-domain barriers and communication issues. Language obstacles, incorrect assumptions, poorly defined vocabulary, and excessive use of professional jargon all fall under this challenge and might result in misunderstandings between the developer and the interviewee. Domain knowledge is expertise in a particular, specialized topic or field, as opposed to generic knowledge. Knowledge individuals are frequently considered specialists or experts in their area. My target audience will come from various fields and domains. As a result, during the interview, if the candidate is not in the field of information technology, they won't comprehend the questions or their titles. To achieve the most accurate survey responses, I take more time and effort to consider various layman phrases and do a further explanation of the theory to help some interviewers who only have a basic understanding of the information system comprehend my proposed system requirement questionnaire question more clearly. In the end, I received a number of the most accurate and genuine questionnaire responses, which helped me stand out in the upcoming functional and non-functional requirement analysis and guarantee that the proposed solution will conquer the public's approval and address their grumblings and frustrations.

I have successfully completed and implemented the algorithm for scheduling appointments in my proposed system. According to the user-provided date and time, this algorithm's specific mechanism determines which practitioner's schedule is available. It is essential to have strong database administration skills to make the algorithm of the algorithm effective. The random function will be used by the algorithm to first determine a practitioner's practitioner id. Next, I will compare the user-provided time and date with the practitioner's schedule. The following practitioner's schedule will be used for the next comparison if the comparison result is the same. Each treatment has a predetermined treatment duration. If the user's date and time input fall within the

treatment duration, the user won't be able to arrange an appointment during that time. For instance, patient A has scheduled his appointment for Sunday, August 27, at 1 pm. Additionally, patient A had the option of cupping. As determined by the algorithm, patient B was unable to arrange an appointment for Sunday, August 27, from 1 pm until 1:30 pm since the cupping treatment required an additional 30 minutes. Unless there is availability in another practitioner's schedule.

The OAUTH will be my next obstacle to overcome. First, I know nothing about this technology and am unaware of it. Thank you to the internship provider for teaching me this valuable lesson. I needed a solid understanding of OAUTH's background. and discover how to give the client an access token. I used the identity server4 technologies and OAUTH throughout my internship. Therefore, I had to learn how to integrate my proposed system with the GoogleApiClient OAUTH technology because my proposed system does not utilize the identity server 4 technology. Integrating with third-party APIs will be the next challenge I must overcome. The only option to interface with the third-party API will be via CURL, as I discovered that I am not using the HTPP Client in my proposed system. The JSON body had to be deserialized into a PHP array when I received the response from the Third-Party API. And as I had no prior experience in this field, I had to research how to convert JSON body to PHP array. Finally, I was able to transform the JSON body into a PHP array and show the user the results using HTML markup.

CHAPTER 6 SYSTEM EVALUATION AND DISCUSSION

6.1 Black Box Testing

6.1.1 Test Scenario: Check account login functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid username and password	1. Enter Correct URL. 2. Fill in correct username & password. 3. Click on login button.	The user will direct to the user home page and the correct username will be listed on the top right corner of the navigational bar	As Expected	Pass
Check result on entering invalid username and password	1. Enter Correct URL. 2. Fill in incorrect username & password. 3. Click on login button.	The user will redirect to the login page and the error message will be shown on top of the login form	As Expected	Pass
Check result on sign in with Google account	1. Enter Correct URL. 2. Click on sign in with Google Account.	1. The system will validate the google account and checking the client id and client secret. 2. The system will issue user an	As Expected	Pass

	3. Select the Google Account.	access token and redirect user to the user home page.		

Table 6. 1 Check account login functionality - Black Box Testing

6.1.2 Test Scenario: Check account registration functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid user input	1. Enter Correct URL. 2. Click on "Sign Up Here" button. 3. Fill in valid user input. 4. Click on submit button.	1. The system will validate the user input, and the record will store into database and message id will be generate. 2. The user will be redirect to the login page and the account registration successfully message will be shown. 3. New User able login to the user home page	As expected	Pass
Check result on entering invalid user input	1. Enter Correct URL. 2. Click on "Sign Up Here" button. 3. Fill in invalid user input.	1. The system will validate the user input, and no message id will be generated. 2. The user will be redirect to the login page and the account registration unsuccessfully	As expected	Pass

	4. Click on submit button.	message will be shown. 3. New User unable login to the user home page		

Table 6. 2 Check Account Registration Functionality - Black Box Testing

6.1.3 Test Scenario: Check forgot password functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid new password	1. Enter Correct URL. 2. Click on the "Forgot your Password" button. 3. Fill in valid email address. 4. Click on the link which received via email. 5. Enter new password. 6. Click on "reset password" button.	1. The user will be redirect to the login page and the reset password success message will be shown. 2. The user able login to the user home page with using the new password.	As Expected	Pass
Check result on entering invalid email address	1. Enter Correct URL. 2. Click on the "Forgot your Password" button.	The system will redirect user to the reset password page and error message will show.	As Expected	Pass

	3. Fill in invalid email address.			
Check result on entering old password	1. Enter Correct URL. 2. Click on the "Forgot your Password" button. 3. Fill in valid email address. 4. Click on the link which received via email. 5. Enter old password. 6. Click on "reset password" button.	The system will display an error message and "back to login" button will be shown.	As Expected	Pass

Table 6. 3 Check Forgot Password Functionality - Black Box Testing

6.1.4 Test Scenario: Check fast appointment booking functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid input field	1. Enter the correct URL. 2. Login into his/her account. 3. Fill in the treatment type,	The system will redirect user back to the user home page and appointment booking success message will be shown	As expected	Pass

	appointment date and time. 4. Click on "make appointment" button.			
Check result on entering invalid input field	1. Enter the correct URL. 2. Login into his/her account. 3. Fill in the treatment type, appointment date and time which does not fulfil the requirements and constraints. 4. Click on "make appointment" button.	The system will redirect user back to the appointment booking form and appointment booking unsuccessful message will be shown	As expected	Pass
Check result on entering valid input field and cause practitioner is fully book error message shown	1. Enter the correct URL. 2. Login into his/her account 3. Fill in the treatment type, appointment date and time. 4. Click on "make appointment" button. 5. Repeat step 1-4 by login with different	The system will redirect user back to the appointment booking form and practitioner was fully book error message are shown	As expected	Pass

	patient account and the appointment date and time make it constant.			

Table 6. 4 Check Fast Appointment Booking Functionality - Black Box Testing

6.1.5 Test Scenario: Check suggests treatment functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on suggest treatment functionality	1. Enter the correct URL. 2. Click on treatment link which located on the top-left navigation header. 3. Click on "suggest treatment via disease" button. 4. Fill in the disease name. 5. Click on "find" button.	User will be redirect to the google search result page and the result shown is correct and corresponding to the user input	As expected	Pass

Table 6. 5 Check Suggests Treatment Functionality - Black Box Testing

6.1.6 Test Scenario: Check appointment booking functionality in treatment page

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering	1. Enter the correct URL.	1. The treatment type will be	As Expected	Pass

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valid user input	2. Click on treatment link which located on the top-left navigation header. 3. Select the intended treatment type and click on the "booking" button. 4. Fill in the valid appointment date and time. 5. Click on "check availability" button.	shown in the appointment booking form according to which treatment chosen by user. 2. The appointment booking success message will be shown to the user The user able to view the appointment booking detail.		
Check result on entering valid user input	1. Enter the correct URL. 2. Click on treatment link which located on the top-left navigation header. 3. Select the intended treatment type and click on the "booking" button. 4. Fill in the invalid	1. The treatment type will be shown in the appointment booking form according to which treatment chosen by user. 2. The appointment booking unsuccessful message will be shown to the user.	As Expected	Pass

	appointment date and time which does not fulfill with the requirement and constraint. 5. Click on "check availability" button.			

Table 6. 6 Check Appointment Booking Functionality in Treatment Page - Black Box Testing

6.1.7 Test Scenario: Check suggests practitioner functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on suggest treatment by practitioner's specialty functionality	1. Enter the correct URL. 2. Click on the practitioner link which located on the top-left navigation header. 3. Click on "filter by specialty" button. 4. Fill in the specialty. 5. Click on "find" button.	User will able the view the practitioner information which the practitioner's specialty match with user input value.	As expected	Pass

Table 6. 7 Check Suggests Practitioner Functionality - Black Box Testing

6.1.8 Test Scenario: Check the appointment booking functionality in the practitioner page

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check the appointment booking functionality in the practitioner page if the practitioner schedule is free	1. Enter the correct URL. 2. Click on practitioner link which located on the	1. The practitioner's name will be shown in the appointment booking form	As Expected	Pass

	top-left navigation header. 3. Select the intended practitioner and click on the "booking" button. 4. Fill in the treatment type, appointment date and time. 5. Click on "check availability" button.	according to which practitioner chosen by user. 2. The appointment booking success message will be shown to the user. 3. The user able to view the appointment booking detail .		
Check the appointment booking functionality in the practitioner page if the practitioner schedule is not free	1. Enter the correct URL. 2. Click on practitioner link which located on the top-left navigation header. 3. Select the intended practitioner and click on the "booking" button. 4. Fill in the treatment type,	1. The practitioner's name will be shown in the appointment booking form according to which practitioner chosen by user. 2. The practitioner schedule fully book message will be shown to the user.	As Expected	Pass

	appointment date and time. 5. Click on "check availability" button.			

Table 6. 8 Check Appointment Booking Functionality in Practitioner Page - Black Box Testing

6.1.9 Test Scenario: Check the appointment management functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on enter valid user input	1. Enter the correct URL. 2. Login into account. 3. Click on the "appointment" link located on top left of the navigational header. 4. Click on the "edit" icon. 5. Fill in new appointment booking detail. 6. Click on submit button. 1. Enter the correct URL. 2. Login into account 3. Click on the "appointment" link located on top left of the	1. After the edit button is clicked, the input field will change from read only to editable. 2. The system will validate the user input when user click on submit button. 3. The system will prompt appointment information updated success message to user if the user input is valid. 1. After the edit button is clicked, the input field will	As expected	Pass

	navigational header. 4. Click on the "edit" icon. 5. Enter "delete" keyword into input field. 6. Click on submit button.	change from read only to editable. 2. The system will validate the user input when user click on submit button. 3. The system will prompt appointment information deleted success message to user .		
Check result on enter invalid user input	1. Enter the correct URL. 2. Login into account. 3. Click on the "appointment" link located on top left of the navigational header. 4. Click on the "edit" icon. 5. Fill in new appointment booking detail. 6. Click on submit button.	1. After the edit button is clicked, the input field will change from read only to editable. 2. The system will validate the user input when user click on submit button. 3. The system will prompt invalid user input message to user .	As Expected	Pass

	1. Enter the correct URL. 2. Login into account. 3. Click on the "appointment" link located on top left of the navigational header. 4. Click on the "edit" icon. 5. Not enter "delete" keyword into input field. 6. Click on submit button.	1. After the edit button is clicked, the input field will change from read only to editable. 2. The system will validate the user input when user click on submit button. 3. The system will prompt invalid user input message to user.		

Table 6. 9 Check Appointment Management Functionality - Black Box Testing

6.1.10 Test Scenario: Check on the review and testimonial functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid user input	1. Enter the correct URL. 2. Login into account. 3. Click on the "feedback" link which located on top-left of the navigational header.	1. When the user clicks on the "review" button, a pop-up form will be shown. 2. After user press the submit button, the system will validate the user input. And prompt	As expected	Pass

	4. Click on "review" button. 5. Enter the comment and star rating. 6. Click on submit button.	feedback success message will show. 3. The star rating bar chart will update dynamically.		
Check result on entering invalid user input	1. Enter the correct URL. 2. Login into account. 3. Click on the "feedback" link which located on top-left of the navigational header. 4. Click on "review" button. 5. Enter the comment and star rating. 6. Click on submit button.	1. When the user clicks on the "review" button, a pop-up form will be shown. 2. After user press the submit button, the system will validate the user input. And prompt invalid user input message will show. 3. The star rating bar chart will update dynamically.	As expected	Pass

Table 6. 10 Check Review and Testimonial Functionality - Black Box Testing

6.1.11 Test Scenario: Check on the placing child comments (replies) functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on placing	1. Enter the correct URL.	1. The system will receive the user input and	As expected	Pass

| child comments | 2. Login into account.
3. Click on the "feedback" link which located on the top-left navigational header.
4. Click on "see all reviews" button.
5. Fill in the comment in "leave a comment" input field.
6. Press the submit button. | validate the user input. If the user input is fulfilling the requirement, the feedback success message will show to the user.
2. User able to view the child comment which located in the below of the corresponding parent comment. | | |

Table 6. 11 Check Placing Child Comments - Black Box Testing

6.1.12 Test Scenario: Check on the filtering by month functionality in patient health tracking webpage

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filter by month functionality in the patient health tracking webpage	1. Enter the correct URL. 2. Login into account. 3. Click on the "history" link which located on the top-left navigational header. 4. Select the month from the option list.	1. When the user clicks on the input field, an option list will show, the option list value will look up from the database patient health tracking table. 2. The system will display	As Expected	Pass

	5. Click on the submit button.	correct patient health tracking information according to the month chosen by the user.		

Table 6. 12 Check Filtering by Month Functionality in Patient Health Tracking Webpage - Black Box Testing

6.1.13 Test Scenario: Check on the filtering by appointment date functionality in patient health tracking webpage

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filter by appointment date functionality in the patient health tracking webpage	1. Enter the correct URL. 2. Login into account. 3. Click on the "history" link which located on the top-left navigational header. 4. Enter the appointment date in the input field. 5. Click on the submit button.	1. The system will receive the user input and retrieve the patient health tracking information according to the user input.	As Expected	Pass

Table 6. 13 Check Filtering by Appointment Date Functionality in Patient Health Tracking Webpage - Black Box Testing

6.1.14 Test Scenario: Check on the patient health tracking function

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the view patient health tracking	1. Enter the correct URL.	The system will redirect user to the patient	As expected	Pass

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	2. Login into account. 3. Click on the "feedback" link which located on top-left of the navigational header. 4. Select a historical treatment record and click on "click here" button.	health tracking web page and display all the treatment and practitioner detail to the user.		
information functionality				

Table 6. 14 Check Patient Health Tracking Functionality - Black Box Testing

6.1.15 Test Scenario: Check on the download patient health tracking report functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the download patient health tracking functionality	1. Enter the correct URL. 2. Login into account. 3. Click on the "feedback" link which located on top-left of the navigational header. 4. Select a historical treatment record and click on "click here" button.	The system displays the patient health historical record in PDF format and giving user the right to download it.	As expected	Pass

	5. Click on "download PDF" button which located on the bottom-right of the webpage.			

Table 6. 15 Check Download Patient Health Tracking Report - Black Box Testing

6.1.16 Test Scenario: Check on the trading TCM news and article function

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the view trading news and article functionality	1. Enter the correct URL. 2. Click on the "News" link which located on the top-right navigational header.	1. The system will retrieve the data in JSON format from the WebNews Api. 2. The system able to deserialize the JSON date into PHP array and display the result to the user via HTML markup.	As expected	Pass

Table 6. 16 Check Trading TCM News and Article

6.1.17 Test Scenario: Check on the search trading TCM news and article functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the searching functionality in	1. Enter the correct URL.	1. The system will retrieve the data in	As Expected	Pass

the trading news and article webpage	2. Click on the "News" link which located on the top-right navigational header. 3. Fill the search keyword in the input field and press on the submit button.	JSON format from the WebNews Api according to the keyword which user provided. 2. The system able to deserialize the JSON date into PHP array and display the result to the user via HTML markup		

Table 6. 17 Check Search Trading TCM News and Article - Black Box Testing

6.1.18 Test Scenario: Check on the manage account functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid user input	1. Enter correct URL. 2. Login into account. 3. Click on the "Profile" link which located on the top-left navigational header. 4. Scroll the webpage to the profile	1. The system will receive the user input and validate the user input. 2. The updated profile information will record into database and display an update profile success	As expected	Pass

	information section. 5. Fill in the profile information with the user input which does not violate the requirement and constraint. 6. Click on the submit button.	message to the user. 3. The updated profile information will show to the user .		
Check result on entering invalid user input	1. Enter correct URL. 2. Login into account. 3. Click on the "Profile" link which located on the top-left navigational header. 4. Scroll the webpage to the profile information section. 5. Fill in the profile information with the user input which violate the requirement and constraint.	1. The system will receive the user input and validate the user input. 2. The display an invalid user input message to the user.	As expected	Pass

	6. Click on the submit button.			

Table 6. 18 Check Manage Account Functionality - Black Box Testing

6.1.19 Test Scenario: Check on the manage username and password functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on enter valid username and password	1. Enter correct URL. 2. Login into account. 3. Click on the "Profile" link which located on the top-left navigational header. 4. Scroll the webpage to the username & password section. 5. Click on the change username or change password button. 6. Fill in the valid new username or new password. 7. Click on the submit button.	1. When the user clicks on the change username or change password button, the input field will change from hidden to visible. 2. The system will receive the user input and validate the user input. 3. The new username and password will record into database and display an update username or password success message to the user. 4. The updated username and	As expected	Pass

		password information will show to the user.		
Check result on enter invalid username and password	1. Enter correct URL. 2. Login into account. 3. Click on the "Profile" link which located on the top-left navigational header. 4. Scroll the webpage to the username & password section. 5. Click on the change username or change password button. 6. Fill in the invalid new username or new password. 7. Click on the submit button.	1. When the user clicks on the change username or change password button, the input field will change from hidden to visible. 2. The system will receive the user input and validate the user input. 3. The system will display invalid username or invalid password message to user.	As expected	Pass

Table 6. 19 Check Manage Username and Password Functionality - Black Box Testing

6.1.20 Test Scenario: Check on the appointment reminder email functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL

Check on the automated appointment reminder functionality	1. Create a task scheduler action in local window. 2. The system will automatically read the automated reminder email PHP file and distributed the reminder email.	The system able to distribute reminder email to the correct user when the appointment schedule date in 3 days before.	As expected	Pass

Table 6. 20 Check Appointment Reminder Email Functionality - Black Box Testing

6.1.21 Test Scenario: Check on the chat functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the chat functionality	1. Enter the correct URL. 2. Click on the "chat" link which located on the top-left navigational header. 3. Select the intended practitioner. 4. Type message and click on send button.	1. The system able to display current active practitioner list The system able to receive the user message and display to the practitioner in real time basic	As expected	Pass

Table 6. 21 Check Chat Functionality - Black Box Testing

6.1.22 Test Scenario: Check on the view today schedule functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on view today schedule functionality	1. Enter the correct URL. 2. Login into account.	1. After user login into account, the system will redirect user to the practitioner homepage. 2. Today schedule information will display to user in ascending order and order by the schedule time.	As Expected	Pass

Table 6. 22 Check View Today Schedule Functionality - Black Box Testing

6.1.22 Test Scenario: Check on the view treatment report functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the write treatment report functionality	1. Enter the correct URL. 2. Login into account. 3. Select an appointment schedule record and click on "click here" button.	1. After user login into account, the system will redirect user to the practitioner homepage. 2. Today schedule	As expected	Pass

	4. Fill in the treatment information. 5. Click on submit button.	information will display to user in ascending order and order by the schedule time. 3. The system will display the write treatment form according to the appointment schedule selected. 4. The system will validate the user input, if the user input did not violate any requirement and constraint, the input will store into database. 5. The system will direct user to the view complete treatment web page and		

		prompt a success message to the user.		

Table 6. 23 Check View Treatment Report Functionality - Black Box Testing

6.1.24 Test Scenario: Check on the mange practitioner schedule functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the manage practitioner schedule functionality	1. Enter the correct URL. 2. Login into account. 3. Click on the "practitioner schedule" link which located on the left of the aside. 4. Click on the button on the calendar. 5. Click approve button. 1. Enter the correct URL. 2. Login into account. 3. Click on the "practitioner schedule" link which located on the left of the aside.	1. The system will receive the user input and update the practitioner schedule status from pending to approve. 2. The system will prompt out a success message to user. 1. The system will receive the user input and delete the practitioner schedule record. 2. The system will prompt out a record deletion	As Expected	Pass

	4. Click on the button on the calendar. 5. Click delete button.	success message to user.		

Table 6. 24 Check Manage Practitioner Schedule Functionality - Black Box Testing

6.1.25 Test Scenario: Check on the filter by month functionality in practitioner schedule webpage

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filter by month functionality in the practitioner schedule webpage	1. Enter the correct URL. 2. Login into account. 3. Click on the "Health Tracking" link which located on the left aside. 4. Select the month from the option list. 5. Click on the submit button.	The system will receive the user input and display the correct result according to the value provided by the user	As expected	Pass

Table 6. 25 Check Filter by Month Functionality in Practitioner Schedule Webpage - Black Box Testing

6.1.26 Test Scenario: Check on the apply leave functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid user input	1. Enter the correct URL. 2. Login into account. 3. Click on "Practitioner	1. When the user clicks on the "practitioner leave" button, a pop-up form modal will	As Expected	Pass

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	Leave" button which located at the left aside. 4. Click on Apply Leave Button. 5. Fill in all the detail with the user input meets the requirement and fulfill the constraint and press on submit button.	show to the user. 2. The system will validate the user input. 3. The system will record the practitioner leave information into database. 4. The system will display an apply leave success message to the user. 5. The system will show the practitioner leave information in calendar format to the user.		
Check result on entering invalid user input	1. Enter the correct URL. 2. Login into account. 3. Click on "Practitioner Leave" button which located at the left aside. 4. Click on Apply Leave Button.	1. When the user clicks on the "practitioner leave" button, a pop-up form modal will show to the user. 2. The system will validate the user input.	As Expected	Pass

	5. Fill in all the detail with the user input does not meets the requirement and does not fulfill the constraint, and press on submit button.	3. The system displays invalid user input message to user.		

Table 6. 26 Check Apply Leave Functionality - Black Box Testing

6.1.27 Test Scenario: Check on the filter by month functionality in practitioner leave webpage

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filter by month functionality in the practitioner leave webpage	1. Enter the correct URL. 2. Login into account. 3. Click on the "Health Tracking" link which located on the left aside. 4. Select the month from the option list. 5. Click on the submit button.	The system will receive the user input and display the correct result according to the value provided by the user.	As expected	Pass

Table 6. 27 Check Filter by Month Functionality in Practitioner Leave Webpage - Black Box Testing

6.1.28 Test Scenario: Check on the filter by year functionality in graph and KPI webpage.

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filtering by year function in graph and KPI webpage	1. Enter the correct URL. 2. Login into account. 3. Click on "practitioner graph" link which located on the left of the aside. 4. Click on the filtering input field. 5. Select an option from the drop-down menu.	The system will be able to execute the google graph and chat api and generate the result to user according to the year's user chosen.	As expected	Pass

Table 6. 28 Check Filter by Year Functionality in Graph and KPI Webpage - Black Box Testing

6.1.29 Test Scenario: Check on the graph and KPI functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the graph and KPI functionality	1. Enter the correct URL. 2. Login into account. 3. Click on "practitioner graph" link which located on the left of the aside.	The system will be able to execute the google graph and chat api and generate the result to user	As expected	Pass

Table 6. 29 Check Graph and KPI Functionality - Black Box Testing

6.1.30 Test Scenario: Check on the manage account functionality in practitioner perspective.

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid user input	1. Enter correct URL. 2. Login into account. 3. Click on the "Profile" link which located on the left aside. 4. Scroll the webpage to the profile information section. 5. Fill in the valid profile information. 6. Click on the submit button.	1. The system will receive the user input and validate the user input. 2. The updated profile information will record into database and display an update profile success message to the user. 3. The updated profile information will show to the user.	As expected	Pass
Check result on entering invalid user input	1. Enter correct URL. 2. Login into account. 3. Click on the "Profile" link which located on the left aside. 4. Scroll the webpage to the profile	1. The system will receive the user input and validate the user input. 2. The system displays an update profile unsuccessful message to the user.	As expected	Pass

	information section. 5. Fill in the invalid profile information. 6. Click on the submit button.			

Table 6. 30 Check Manage Account Functionality in Practitioner Perspective - Black Box Testing

6.1.31 Test Scenario: Check on the manage username and password functionality in practitioner perspective

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid username and password	1. Enter correct URL. 2. Login into account. 3. Click on the "Profile" link which located on the left aside. 4. Scroll the webpage to the username & password section. 5. Click on the change username or change password button. 6. Fill in the valid new username or	1. When the user clicks on the change username or change password button, the input field will change from hidden to visible. 2. The system will receive the user input and validate the user input. 3. The new username and password will record into database and display an update	As expected	Pass

	new password. 7. Click on the submit button.	username or password success message to the user. 4. The updated username and password information will show to the user.		
Check result on entering invalid username and password	1. Enter correct URL. 2. Login into account. 3. Click on the "Profile" link which located on the left aside. 4. Scroll the webpage to the username & password section. 5. Click on the change username or change password button. 6. Fill in the invalid new username or new password.	1. When the user clicks on the change username or change password button, the input field will change from hidden to visible. 2. The system will receive the user input and validate the user input. 3. The system will display update username and password fail message to the user.	As expected	Pass

	7. Click on the submit button.			

Table 6. 31 Check Manage Username and Password Functionality in Practitioner Perspective - Black Box Testing

6.1.32 Test Scenario: Check on the delete child comment and reply parent comment functionality in business owner perspective.

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the delete child comments (replies) or parent comments functionality	1. Enter the correct URL. 2. Login into account. 3. Click on the "feedback" link which located on the left aside. 4. Click on "see all reviews" button. 5. Click on the delete button.	1. The system will receive the user input and delete the corresponding comment and the delete feedback record success message will show to the user.	As expected	Pass

Table 6. 32 Check Delete Child Comment and Reply Parent Comment Functionality in Business Owner Perspective - Black Box Testing

6.1.33 Test Scenario: Check on the manage patient's account and practitioner's account functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid user input	1. Enter correct URL. 2. Login into account. 3. Click on the "Patient Profile" link or "Practitioner Profile" which	1. The system will receive the user input and validate the user input. 2. The updated profile information will record	As expected	Pass

	located on the left aside. 4. Select a patient or practitioner record and click on "click here" button. 5. Click on the edit button. 6. Fill in the valid profile information. 7. Click on the submit button.	into database and display an update profile success message to the user. 3. The updated profile information will show to the user .		
Check result on entering invalid user input	1. Enter correct URL. 2. Login into account. 3. Click on the "Patient Profile" link or "Practitioner Profile" which located on the left aside. 4. Select a patient or practitioner record and click on "click here" button. 5. Click on the edit button. 6. Fill in the invalid profile information.	1. The system will receive the user input and validate the user input. 2. The system will prompt invalid user input message to the user.	As expected	Pass

	7. Click on the submit button.			

Table 6. 33 Check Manage Patient's Account and Practitioner's Account Functionality - Black Box Testing

6.1.34 Test Scenario: Check on the manage patient's username and password or practitioner's username and password functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check result on entering valid username and password	1. Enter correct URL. 2. Login into account. 3. Click on the "Patient Profile" link or "Practitioner Profile" which located on the left aside. 4. Select a patient or practitioner record and click on "click here" button. 5. Click on the edit button. 6. Fill in the valid new username or new password. 7. Click on the submit button.	1. When the user clicks on the change username or change password button, the input field will change from hidden to visible. 2. The system will receive the user input and validate the user input. 3. The new username and password will record into database and display an update username or password success message to the user. 4. The updated username and	As expected	Pass

		password information will show to the user.		
Check result on entering invalid username and password	1. Enter correct URL. 2. Login into account. 3. Click on the "Patient Profile" link or "Practitioner Profile" which located on the left aside. 4. Select a patient or practitioner record and click on "click here" button. 5. Click on the edit button. 6. Fill in the invalid new username or new password. 7. Click on the submit button	1. When the user clicks on the change username or change password button, the input field will change from hidden to visible. 2. The system will receive the user input and validate the user input. 3. The system will display invalid username and password message to the user	As expected	Pass

Table 6. 34 Check manage Patient's Username and Password or Practitioner's Username and Password Functionality - Black Box Testing

6.1.35 Test Scenario: Check on the mange account status functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the manage patient's and practitioner's	1. Enter correct URL. 2. Login into account	The system will receive the	As expected	Pass

account status functionality	3. Click on the "Patient Profile" link or "Practitioner Profile" which located on the left aside. 4. Select a patient or practitioner record and click on "click here" button. 5. Click on the "change status" button.	user input and change the account status and update the database record. The system will display a status change success message to user		

Table 6. 35 Check Manage Account Status Functionality - Black Box Testing

6.1.36 Test Scenario: Check on the filter patient's name and practitioner's name functionality.

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filter by patient's name and practitioner's name functionality	1. Enter correct URL. 2. Login into account. 3. Click on the "Patient Profile" link or "Practitioner Profile" which located on the left aside. 4. Fill in last name/ first name/ full	The system will receive user input and display the correct result to user according to the user given value	As expected	Pass

	name in the input field. 5. Click on submit button.			

Table 6. 36 Check Filter Patient's Name and Practitioner's Name Functionality - Black Box Testing

6.1.37 Test Scenario: Check on the filter by patient's phone number and practitioner's phone number functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filter by patient's phone number and practitioner's phone number functionality	1. Enter correct URL. 2. Login into account. 3. Click on the "Patient Profile" link or "Practitioner Profile" which located on the left aside. 4. Fill in phone number in the input field. 5. Click on submit button.	The system will receive user input and display the correct result to user according to the user given value	As expected	Pass

Table 6. 37 Check Filter by Patient's Phone Number and Practitioner's Phone Number Functionality - Black Box Testing

6.1.38 Test Scenario: Check on the mange practitioner leave functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the manage practitioner	1. Enter the correct URL. 2. Login into account.	1. When the user clicks on the button which located	As Expected	Pass

| leave functionality | 3. Click on "Practitioner Leave" button which located at the left aside.
4. Click on the button which located in the calendar.
5. Click on approve button.
1. Enter the correct URL.
2. Login into account.
3. Click on "Practitioner Leave" button which located at the left aside.
4. Click on the button which located in the calendar.
5. Click on approve button. | in the calendar, a correct leave detail modal will show to user.
2. The system will update the database record which the leave status from pending to approve and display a success message to user.

1. When the user click on the button which located in the calendar, a correct leave detail modal will show to user.
2. The system will delete the particular leave record and display practitioner leave delete | | |

		successfully message.		

Table 6. 38 Check Manage Practitioner Leave Functionality - Black Box Testing

6.1.39 Test Scenario: Check on the filter by practitioner's leave status functionality in owner manage leave webpage

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filter by practitioner's leave status functionality	1. Enter correct URL. 2. Login into account. 3. Click on "Practitioner Leave" button which located at the left aside. 4. Select the status value from the option list. 5. Click on submit button.	1. The system will look up the database and generate option list value to let user select. 2. The system will receive user input and display the correct result to user according to the user given value.	As expected	Pass

Table 6. 39 Check Filter by Practitioner's Leave Status Functionality in Business Owner Manage Leave Webpage - Black Box Testing

6.1.40 Test Scenario: Check on the filter by practitioner's applied leave month functionality in owner manage leave webpage

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filter by month functionality in practitioner leave page	1. Enter correct URL. 2. Login into account.	1. The system will look up the database and generate	As expected	Pass

	3. Click on "Practitioner Leave" button which located at the left aside. 4. Select the month value from the option list. 5. Click on submit button.	option list value to let user select. 2. The system will receive user input and display the correct result to user according to the user given value .		

Table 6. 40 Check Filter by Practitioner's Applied Leave Month Functionality in Business Owner Manage Leave Webpage - Black Box Testing

6.1.41 Test Scenario: Check on the filter by practitioner's name functionality in owner manage leave webpage

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the filter by practitioner's name functionality	1. Enter correct URL. 2. Login into account. 3. Click on "Practitioner Leave" button which located at the left aside. 4. Select the practitioner's name value from the option list. 5. Click on submit button.	1. The system will look up the database and generate option list value to let user select. 2. The system will receive user input and display the correct result to user according	As expected	Pass

		to the user given value.		

Table 6. 41 Check Filter by Practitioner's Name Functionality in Business Owner Manage Leave Webpage - Black Box Testing

6.1.42 Test Scenario: Check on the logout functionality

TEST CASE	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	PASS/FAIL
Check on the logout functionality	1. Enter the correct URL. 2. Login into account. 3. Click on "logout" link.	1. The system will change the account status into offline and kill the session. 2. User will be redirect to the login page.	As Expected	Pass

Table 6. 42 Check Logout Functionality - Black Box Testing

6.2 System Review

The demo of the project application, YIYI TCM, will be presented to the 20 respondents via the Microsoft Teams platform after the project development is complete. The 20 respondents include the department director for software engineering at Web Bytes Company, Mr. Chan; the programmer analyst at Jabil, Mrs. Wong; eight adults who are computer illiterate; and ten adolescents and students. The respondents can then test the application after it has been explained and shown. Finally, after the respondents have tested the system, I will send them an evaluation survey form so they can give me feedback and their thoughts on the system. Consequently, they completed a total of 20 full evaluation forms and Mr. Chan gave an insightful opinion that will serve as the basis for my future plan.

6.2.1 User Testing

6.2.1.1 Patient Perspective

How satisfied were you with YIYI TCM online appointment booking and patient health tracking system?

20 responses
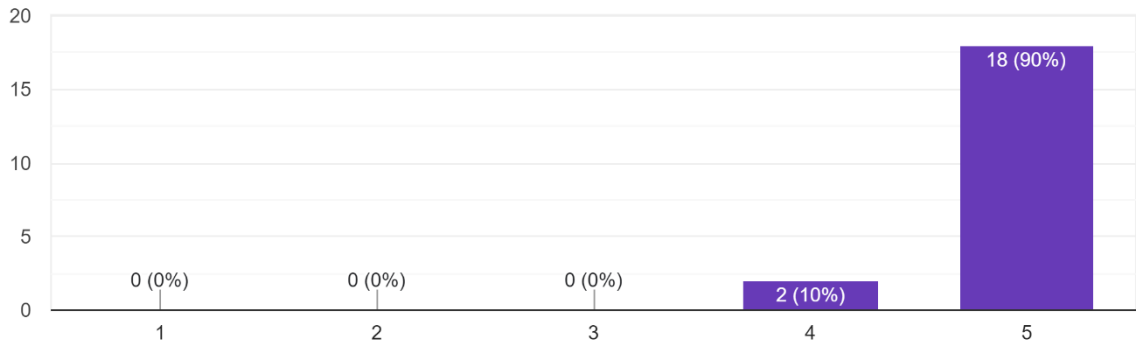
Figure 6. 1 User Testing Response 1

The respondents' satisfaction with the YIYI TCM online appointment booking and patient health tracking system is displayed in the bar graph above. 10% of the respondents, totaling 2 respondents, said they were satisfied with the system. Additionally, 18 respondents—or 90% of respondent said they were extremely satisfied with the YIYI TCM online system for scheduling appointments and monitoring patients' health. This had the additional effect of making the majority of respondents comfortable with and accepting of the TCM services offered by the YIYI TCM online appointment booking and patient health tracking system.

What TCM services do you like best provided by YIYI TCM?

20 responses
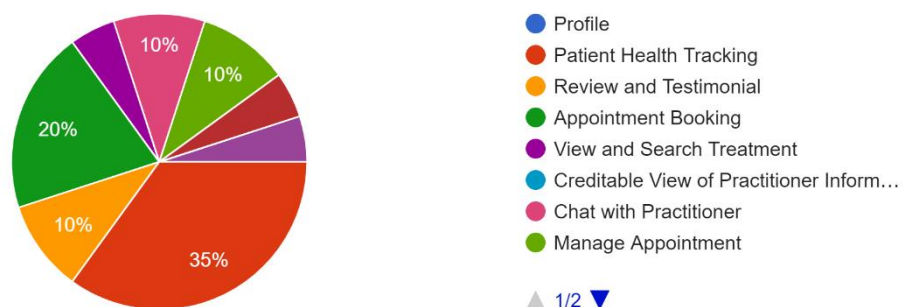
Figure 6. 2 User Testing Response 2

The pie chart above shows the respondents' favorite TCM services provided by

YIYI TCM. The TCM services in the options include my account, patient health tracking, review and testimonial, appointment booking, view and search treatment, creditable view of practitioner information, chat with practitioner, manage appointment, view trading TCM News and article, download patient health tracking report, and appointment reminder email. Based on the pie chart above, found that 35% of them mentioned that they like patient health tracking the most in YIYI TCM. As a result, the objective of this system's implementation has been accomplished. Users have been propelled to the next level of TCM service by this feature. Users have electronic access to and viewing of their prior medical records. Therefore, they do not need to be concerned that the historical treatment record's hard copy is lost. Additionally, users can access the record at any time and from anywhere with the use of the internet. While there are also another 20% of respondents claim that they like the appointment booking function. The booking algorithm is thus appropriate to be utilized by the public. There are two options available for the user to make an appointment. The user will only be able to choose the sort of treatment in the first option, and a random practitioner will be assigned to the user. The following option gives the user the freedom to arrange an appointment with a specific practitioner they like. Additionally, 10% of respondents said that they enjoy managing appointments, chatting with a practitioner, and reviews and testimonials. It is accurate to say that YIYI TCM allows for user engagement and two-way communication. In the review and testimonial function, users can post a comment and respond to it. A breakthrough for traditional TCM services is also the ability to communicate with the practitioner online. The manage appointment option allows users to modify their appointment date and time without having physically visit the clinic. Last but not least, 5% of respondents said that their favorite features of the YIYI TCM system are the functions that send email reminders for appointments, view, and search treatments, and view trading TCM news and articles.

Does YIYI TCM enhanced your user experience towards TCM system?
20 responses
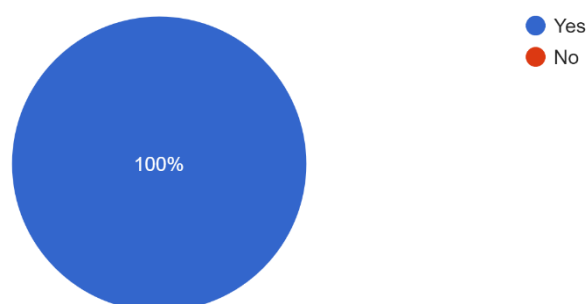
Figure 6. 3 User Testing Response 3

The user experience of responders with the TCM system has improved, as seen by the pie chart above. There were 20 responders, and each one of them said that using the YIYI TCM system had improved their engagement with it. This demonstrates how the YIYI TCM system has improved the respondent's user experience due to the new system's favorable user experience (UX). Additionally, the TCM system's great user experience will persuade more individuals to adopt and use the online appointment booking and patient health tracking system.

Do you think the appointment booking function is usable and effective?
20 responses
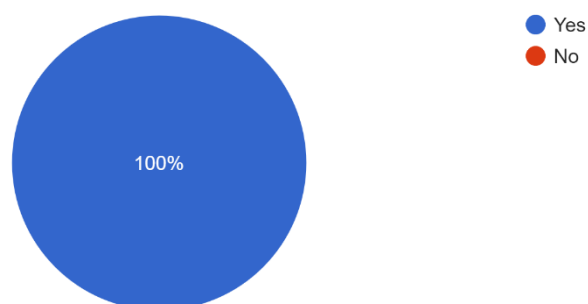
Figure 6. 4 User Testing Response 4

Based on the pie chart above, all of the respondent claim that the appointment booking function in the YIYI TCM system is usable and effective. This information is accurate given the hectic schedules of the present users, who are unable to take time away from their busy schedules to visit the clinic to schedule an appointment. So, users can schedule appointments online using this feature. The user's mood will be severely harmed if they go to the clinic and the staff informs them that the appointment is full

today. Users can therefore utilize this service to determine whether a practitioner is available at that particular time and day. In addition to this feature, learning to operate this function is simply because the user interface is simple and precise and follows the three-click rule. This indicates that a user may book an appointment within three clicks.

Do you find it easy and convenient to contact the practitioner in the system?
20 responses

● Yes
● No

100%
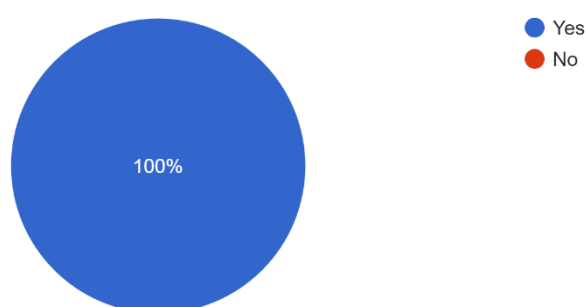
Figure 6. 5 User Testing Response 5

The respondents' perceptions of how simple it is to communicate with the practitioner using TCM system are depicted in the pie chart above. There were 20 respondents, and all of them (100%) said that the YIYI TCM system's chatting with the practitioner feature was simple to use. This result that user search from the chat webpage is sufficient. This feature allows users to look for current online and offline practitioners to engage in conversation. Additionally, the user interface adheres to the design idea that the user list should be in the center of the page. As a result, it can reduce the cognitive load of the user, allowing them to pay attention to the middle information and choose the appropriate practitioner for dialogue.

Do you think chatting with the practitioner able to reduce the doubt for selecting the suitable treatment?
20 responses
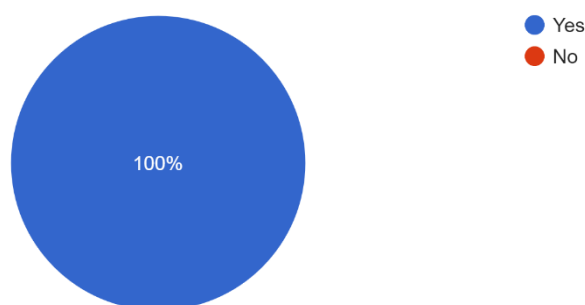
Figure 6. 6 User Testing Response 6

The respondents' perceptions of chatting with the practitioner able to reduce the doubt for selecting the suitable treatment by using TCM system are depicted in the pie chart above. There were 20 respondents, and all of them (100%) said that chatting with the practitioner able to reduce the doubt for choosing the suitable treatment. The user's ability to communicate with the practitioner without physically visiting the clinic may be the reason. The practitioner can give the patient a list of appropriate traditional Chinese medicines in real-time dialogue if the patient has a simple disease. Users will gain a number of benefits, including less confusion about their own health and time saved for practitioner visits. The ability to communicate with practitioner at different times and locations will be convenient for users.

Do you think the search function in trading TCM news and article is effective and usable?
20 responses
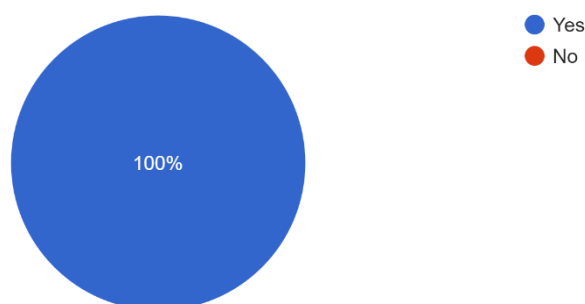
Figure 6. 7 User Testing Response 7

The respondents' perceptions of search function in trading TCM news and article is effective and usable by using TCM system are depicted in the pie chart above.

There were 20 respondents, and all of them (100%) said the search function in the trading TCM news and article is effective and usable. The motivation is comparable to a user reading a newspaper. To filter out material that is unrelated or that the user does not wish to read, the user will first read the heading information. The search function works similarly to how it was previously explained. The user can choose to view only the desired information by filtering out the thousands or millions of trading TCM news and articles.

Do you think the manage appointment function is usable and effective?
20 responses

● Yes
● No

100%
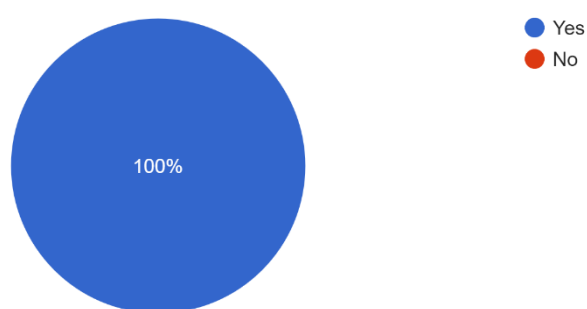
Figure 6. 8 User Testing Response 8

The respondents' perceptions of online manage appointment function is effective and usable by using TCM system are depicted in the pie chart above. There were 20 respondents, and all of them (100%) said the online manage appointment function in the trading TCM news and article is effective and usable. There is an online appointment management feature that enables patients to reschedule or cancel appointments without going to the clinic in person. Additionally, it gives users a platform to examine information about their scheduled appointments, including the name and photograph of the practitioner.

Do you think the review and testimonial function able to gain the trust from the patient toward the treatment provide by the clinic?
20 responses

● Yes
● No

100%
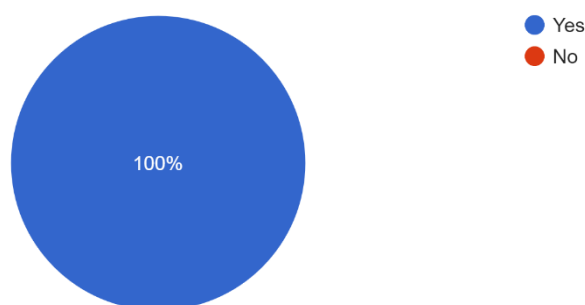
Figure 6. 9 User Testing Response 9

The respondents' perceptions of the review and testimonial function can gain the trust from the patient toward the treatment provide by the clinic are depicted in the pie chart above. There were 20 respondents, and all of the (100%) said that the review and testimonial function are able to gain the trust from the patient toward the treatment provide by the clinic. Understanding the communication and information exchange between patients and clinicians is a necessary precursor effectively engaging patients with their care. By reading the reviews posted by previous clients and the physician's response, users may determine whether the clinic is trustworthy. Additionally, the YIYI TCM system's review system enables patients, practitioners, and owners to write comments beneath the post. As a result, the likelihood of a clinic removing negative comments is significantly decreased because every user has the freedom to share their ideas.

Do you think the PDF type of format for the patient health tracking report is suitable and appropriate for reading and viewing?
20 responses
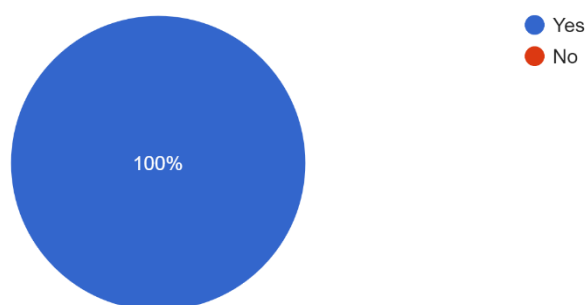
Figure 6. 10 User Testing Response 10

The pie chart above shows the respondents' perceptions of whether PDF patient health tracking reports are adequate and suitable for reading and viewing are depicted in the pie chart above. There were 20 responders, and all of them (100%) agreed that reading and seeing the patient health tracking report in PDF format is suitable and appropriate. True, the PDF file type is quite portable. Without having to worry about any dependencies, users can transfer or relocate files between computers. The PDF file format is also reliable. No matter where you are viewing a PDF file that you have created, it will always display any amount of data including paragraphs, photos, and tablet data in the exact same way.

Do you think it is easy to update your personal information in the application?
20 responses
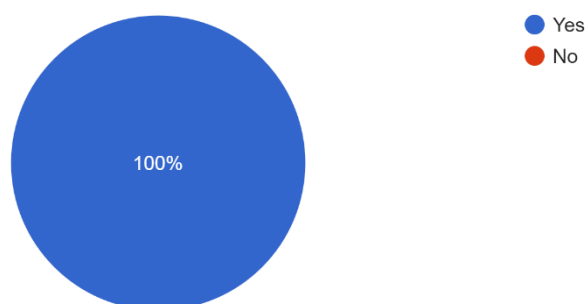
Figure 6. 11 User Testing Response 11

The pie chart above shows the respondents' perceptions of think that is easy to update patient's personal information in the application are depicted in the pie chart above. There were 20 responders, and all of them (100%) agreed that is easy to update

patient's personal information in the application. The initial section of the manage patient personal information system allows users to examine their account information. The user may change his username and password in the second section. The user may edit this personal information in the final section. Therefore, the user only needs to concentrate on each section to minimize the possibility of inputting inaccurate information. Next, if a user accidentally enters erroneous user input, an error notice will be displayed so that the user may identify which information was entered incorrectly.

Do you think placing child comment below the parent review is sufficient and able to improve two way communication?
20 responses

● Yes
● No

100%

Figure 6. 12 User Testing Response 12

The pie chart above shows the respondents' perceptions of think that placing child comment below the patent review is sufficient and able to improve two-way communication are depicted in the pie chart above. There were 20 responders, and all of them (100%) agreed that placing child comment below the parent review is sufficient and able to improve the two-way communication between parties. It is created visual platform for each different parties to discuss topic. With the help of these features, it allows for building stronger, long-lasting relationships with different parties. Next, each of the parties will be authorized to leave their child's comment below the parent's comment, sometimes it able to solve other user doubt so which can reduce the burden for the customer service staff it is because another user might have the same inquiry.

Do you think that the difficult and messy paper-based report can be resolved by an electronic patient health tracking report?

20 responses

Figure 6. 13 User Testing Response 13

The pie chart above shows the respondents' perceptions of think that difficult and messy paper-based report can be resolved by an electronic patient health tracking report. There were 20 responders, and all of them (100%) agreed that electronic patient health tracking report is better than traditional paper-based patient health tracking report. As true, paper medical records necessitate a manual writing process that is time-consuming and more prone to inaccuracy. If you've ever tried to read a practitioner's notes, you know the writing isn't always clear and can be challenging to understand. In contrast, a traditional paper-based report might be disorganized and messy. When using a standard paper-based report, a patient in a rush who has to examine the report quickly is unable to do so because they require time to retrieve it in the file cabinet. With the help of the electronic-based patient health tracking report, just single click on the button, user able to view their historical treatment record.

Do you think that mailing out appointment reminder emails can prevent people from forgetting to visit the clinic for treatment as a result of their busy schedules?
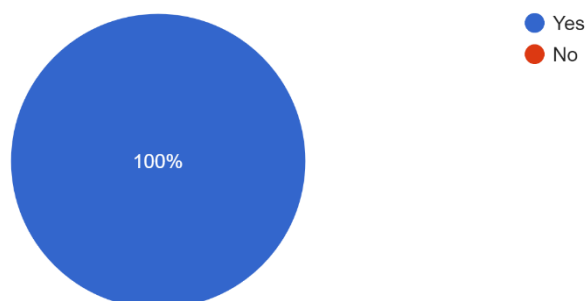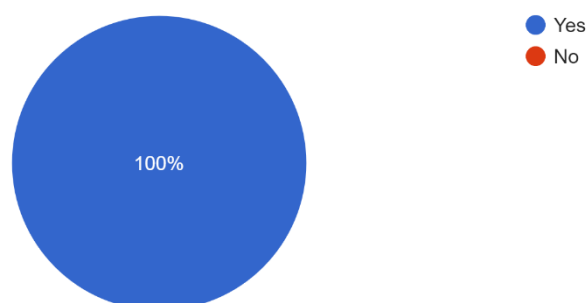
20 responses
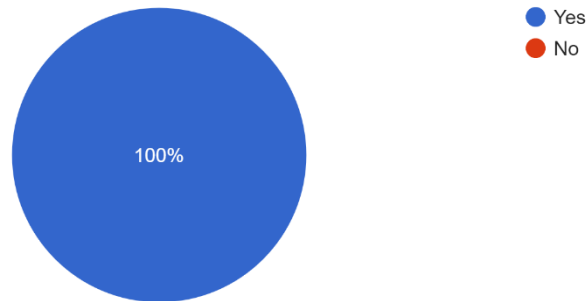
Figure 6. 14 User Testing Response 14

The pie chart above shows the respondents' perceptions of think that mailing out appointment reminder emails can prevent user from forgetting to visit the clinic for treatment as a result of their busy schedules. There were 20 responders, and all of them (100%) agreed that appointment reminder email able to solve that issue. Not every user uses a phone or a computer every day because of the busy schedule. Reminders sent via email let your clients know about upcoming appointments wherever they are. Next, reminders for appointments decrease the likelihood of missed appointments.

What other TCM services do you suggest that is need to be added to improve your experience
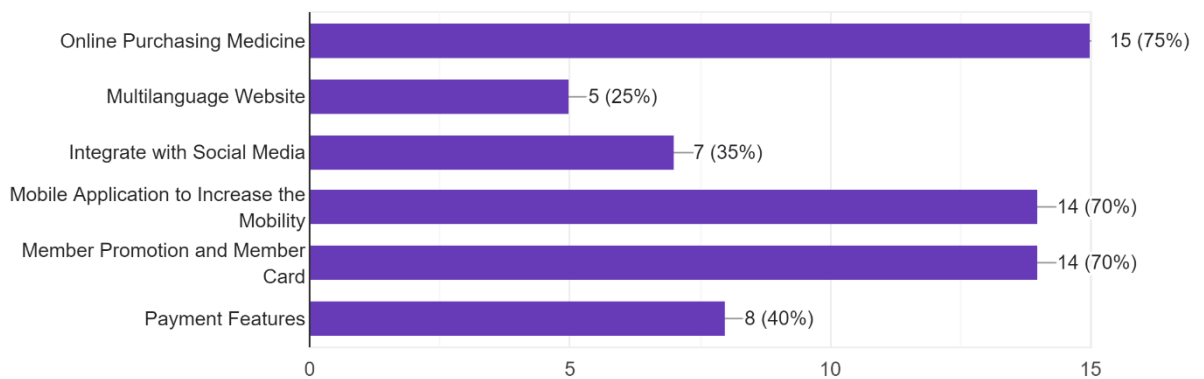
20 responses

Figure 6. 15 User Testing Response 15

The above list displays the needs and expectations of the respondents for the new TCM services they recommend YIYI TCM adding to enhance their experience with TCM services in the future. Most of the respondents (75%) suggest that the online purchasing medicine function is needed to improve their TCM service experience. The

ability to buy medicine online has several benefits, but one of the most significant is time savings. You may simply get your medication online and receive your prescription medications. All you need to do is use the internet to place an order by entering the prescription. You are not required to visit the clinic, and there will be no need for you to stand in line there. Next, there were 70% of respondents claimed that implementing a mobile application, member promotion, and member card function is needed to improve their experience with the TCM system. Everyone in today's society always has a cell phone on them when they leave the house. To promote mobility, a mobile application for the YIYI TCM system needs to be developed. Furthermore, there were 40% of respondents choose payment features and 35% percent of respondents think that integrating the system with social media able to enhance their experience when they use the system. Rather than that, 25% of respondent claims that a multilanguage website is needed to improve their experience with the TCM system.

6.2.1.2 Practitioner Perspective

Figure 6. 16 User Testing Response 16

The respondents' satisfaction with the YIYI TCM online appointment booking and patient health tracking system is displayed in the bar graph above. 10% of the respondents, totaling 2 respondents, said they were satisfied with the system. Additionally, 18 respondents—or 90% of respondent said they were extremely satisfied with the YIYI TCM online system for scheduling appointments and monitoring patients' health. This had the additional effect of making the majority of respondents comfortable with and accepting of the TCM services offered by the YIYI TCM online appointment booking and patient health tracking system.

Do you think that the patient health tracking report can decrease the likelihood of a misdiagnosis?
20 responses
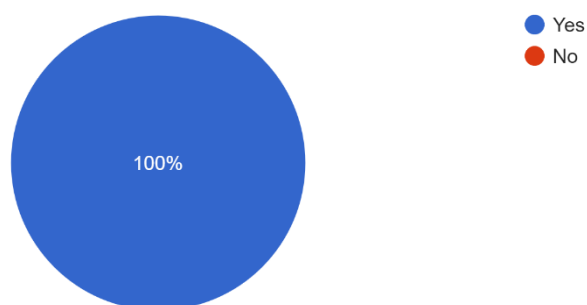
Figure 6. 17 User Testing Response 17

The pie chart above shows the respondents' perceptions of think that patient health tracking report can decrease the likelihood of a misdiagnosis. There were 20 responders, and all of them (100%) agreed that patient health tracking report can decrease the likelihood of a misdiagnosis. By giving a complete picture of a patient's medical history, including present symptoms, previous medical conditions, and drugs. By providing them with a greater picture of the patient's general health status and any potential underlying diseases, this information can aid healthcare professionals in making an accurate diagnosis. Healthcare professionals can avoid bad reactions and incorrect diagnoses by identifying any potential drug interactions or allergies with the aid of the patient health tracking report. Additionally, by tracking a patient's symptoms and medical background over time, healthcare professionals can assess the efficacy of therapies and make appropriate modifications to guarantee the best outcomes for the patient.

Do you think that performing additional analysis utilizing a pie chart of the disease and type of treatment is more effective?
20 responses

Yes
No

100%
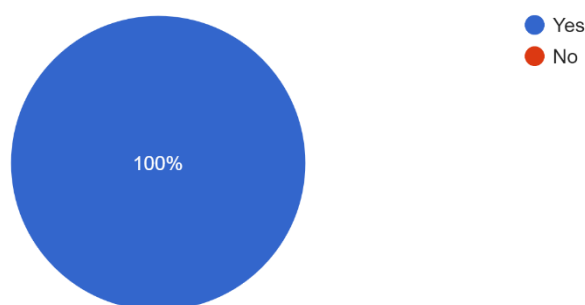
Figure 6. 18 User Testing Response 18

The pie chart above shows the respondents' perceptions of think that the additional analysis utilizing a pie chart of the disease and type of treatment is more effective. There were 20 responders, and all of them (100%) are agreed that analysis data in graph and chart format is more effective. Data in graph and chat formats are preferable to raw data because they give the data a visual representation, making it simpler to comprehend and analyze. Charts and graphs reveal patterns and trends while facilitating fast comparisons across different data pieces. As a result, decisions may be made more quickly and accurately, and communication of findings to others may also improve. Additionally, linkages and insights that might not have been immediately clear from raw data can frequently be found through visual display of data.

Do you think that apply leave function is usable and effective?
20 responses

Yes
No

100%
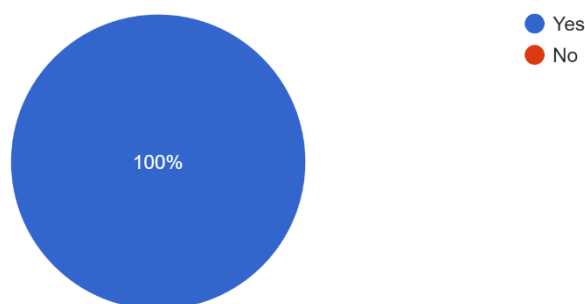
Figure 6. 19 User Testing Response 19

The pie chart above shows the respondents' perceptions of think that the apply

leave function is usable and effective. There were 20 respondent and all of them (100%) are agreed what apply leave function in YIYI TCM system is usable and effective. It is true that the practitioner leave information is shown in calendar style so that the user may get a full picture of the information. Next, the user simply needs to click on the click button to be presented with a leave application form which they are not needed to create an email in order to apply for leave. When compared to the conventional method of applying for leave, the feature makes it possible for leave requests to be sent in real-time.

Do you think that manage schedule function is sufficient and usable?
20 responses
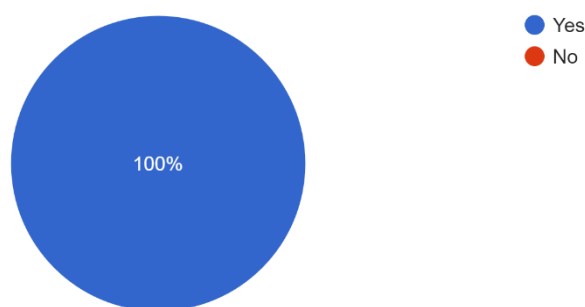
Figure 6. 20 User Testing Response 20

The pie chart above shows the respondents' perceptions of think that the online manage practitioner's schedule function is sufficient and usable. There were 20 respondent and all of them (100%) are agreed that the online manage practitioner's schedule function in YIYI TCM system is sufficient and usable. It is because online scheduling saves time and increases productivity since it eliminates the need for manual scheduling and lowers the possibility of scheduling mistakes. Next, online scheduling helps practitioners be more productive and concentrate on other crucial duties by saving them time.

Do you think that placing child comment below the patient review is sufficient and usable?
20 responses

● Yes
● No

100%
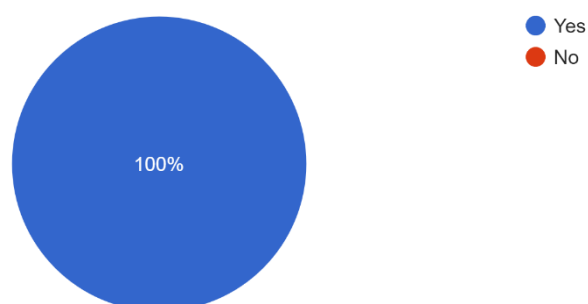
Figure 6. 21 User Testing Response 21

The pie chart above shows the respondents' perceptions of think that placing child comment below the patent review is sufficient and able to improve two-way communication are depicted in the pie chart above. There were 20 responders, and all of them (100%) agreed that placing child comment below the parent review is sufficient and able to improve the two-way communication between parties. It is created visual platform for each different parties to discuss topic. With the help of these features, it allows for building stronger, long-lasting relationships with different parties. Next, each of the parties will be authorized to leave their child's comment below the parent's comment and allow the practitioner to solve the doubt from the patient. Patients' feedback might aid practitioners in establishing trust with their patients and clients. It develops a healthy relationship and promotes trust between the practitioner and the patient when they can see that their feedback is valued and used to enhance services.

What other TCM services do you suggest that is need to be added to improve your experience
20 responses
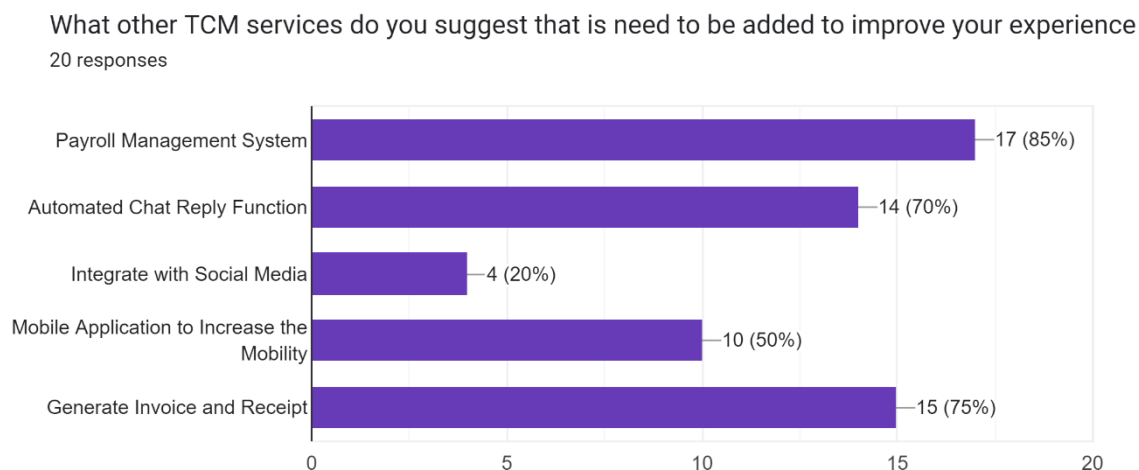
Figure 6. 22 User Testing Response 22

The above list displays the needs and expectations of the respondents for the new TCM services they recommend YIYI TCM adding to enhance their experience with TCM services in the future. Most of the respondent (85%) are claim that payroll management system is needed to enhance their experience toward the YIYI TCM system. It is because that electronic payroll solutions improve record-keeping and lower the possibility of data loss by storing payroll data and provide secure, immediate access to it by the practitioner. Next, automated chat reply function had been chosen by 75% of the respondent. The reason behind will be practitioner might be busy on doing the treatment therefore the automated chat reply function is needed to solve the patient enquiry within a second. Next, 50% of respondent are require mobile application for YIYI TCM system in order to improve their experience while using the application. Everyone in today's society always has a cell phone on them when they leave the house. To promote mobility, a mobile application for the YIYI TCM system needs to be developed. Moreover, there were 20% of respondent mention that integrate the system with social media can enhance the experience while using the application. Some practitioners more prefer using WhatsApp as a platform to communicate with the patient.

6.2.2 System Review via Email
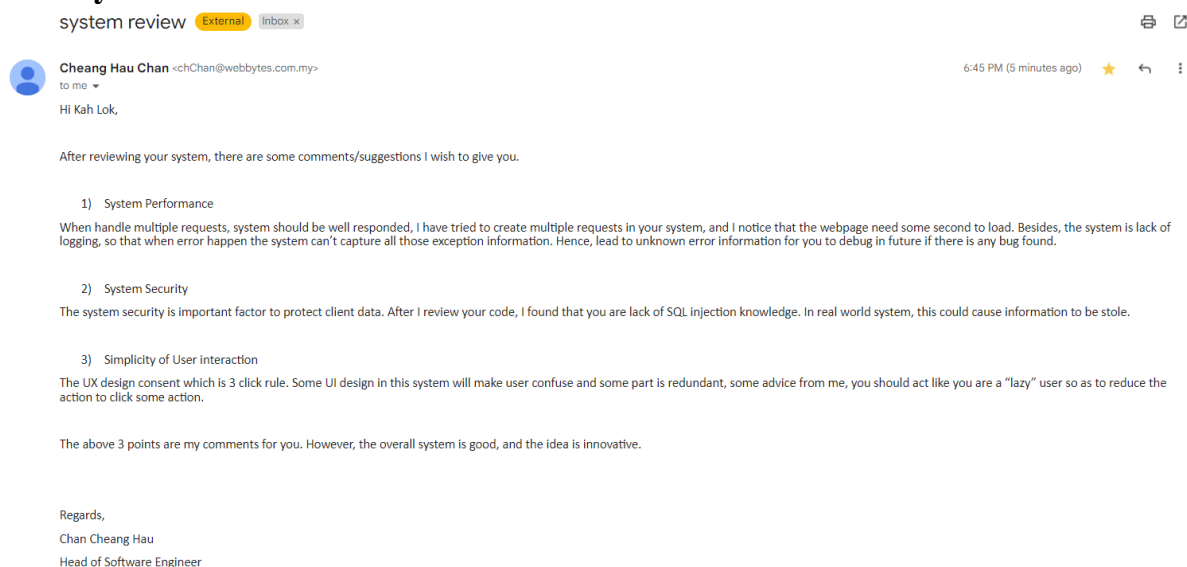
Figure 6. 23 System Review from Head of Software Engineer - WebBytes Organization

6.3 Objective Evaluation

6.3.1 To provide online TCM services that can meet or exceed customer expectations and are accessible anytime and anywhere.

By giving users access to a highly portable and user-friendly web-based application, this objective had been accomplished. The environment in which my proposed solution was developed and deployed is a web-based platform. Once the user has properly configured XAMPP, import the project file into Htdocs and the SQL script into a local database. The user can use the TCM services offered by my suggested system at any time and from any location. While attaining portability is crucial for a wide range of application types, it is especially crucial in the creation of Web applications. Many TCM services can be performed online with the aid of the internet, eliminating the requirement for geographical boundaries. Online appointment booking is an extremely convenient option for people who living in the hustle and bustle of the city, and they don't need to travel far and wide to go to traditional Chinese medicine branches to make an appointment during working hours. Next, the appointment scheduling and management features in my suggested system operate around-the-clock, allowing users to complete tasks whenever the time they choose although beyond business hours. This accomplishment was proven by a survey form in which every responder stated that the appointment scheduling feature of the system I proposed is practical in terms of portability and convenience. The next breakthrough in TCM service was the ability to access electronic patient health tracking reports online. One

of the main advantages is without a doubt that you can access your electronic patient health tracking record online without going to the doctor or sitting in a waiting area. Instead, you may examine the report anywhere in the world by just clicking a single button to access it at any time. to develop a highly customer-driven value system that would meet or surpass the expectations of the user. The user should always come first, which is what user-centric design means. Some patients feel uncomfortable and embarrassed sharing their private medical symptoms and health issues, even in the privacy of their doctor's office. Unfortunately, a lot of people put off visiting the doctor because they feel embarrassed to discuss their condition. Delaying medical attention for a long time, though, can be risky and unhealthy. When using an online chat service, people are more likely to seek help sooner since they may speak with a skilled practitioner from the comfort of their own home. It's important to feel comfortable talking about your issues because doing so can enable you to pinpoint the problem's root cause. Online conversations with practitioner allow patients to discuss their medical issues in confidence and without embarrassment. The survey form had provided evidence of this accomplishment. There were 20 respondents, and each one of them acknowledged that implementing the system I proposed had increased their interaction with it and given them a wonderful user experience.

6.3.2 To develop an online TCM system to store and manage database records.

MySQL had been used in my proposed system to attain this objective. The local database can be used to resolve a variety of problems in a number of areas, including security, consistency, and manageability. For the traditional TCM service, all user information and reports are kept on paper. When an unauthorized party comes into contact with a paper-based report, it can be problematic and dangerous because they can retrieve the data and information. With the aid of the system and database, it is possible to prevent unauthorized individuals from viewing and manipulating the data. Because the files may have been created by several parties, the consistency of the resource will be a major problem with the traditional TCM service. And will make it more difficult for the practitioner and the business owner to arrange and purge the unnecessary files. Moreover, retrieving patient records traditionally involves opening a file cabinet without the aid of a database. When the filing cabinet is full of files, it is impossible to obtain the information in a timely manner. Users of the YIYI TCM system will be able to quickly browse, add to, modify, and delete data from the database. Users

will be given visual representations of the data via the graphical user interface, making it simpler for them to comprehend and interpret. Users will also be able to find certain information quickly and effectively by sorting, filtering, and searching the data. Additionally, the web-based application will offer practitioner a range of chart and graph options so they may visualize the data in a more interesting and engaging way. The user will have a strong tool for managing, analyzing, and displaying their data in a user-friendly way with this database and graphical user-interface combination.

6.3.3 To design a clear and credible online TCM system for clinical parties and patients to view and track patient medical records.

The patient health tracking report feature in my proposed system had succeeded in achieving this goal. Reviewing the patient's medical history frequently is essential while evaluating the patient. An extensive medical history can reveal details that could either save or jeopardize a person's life. My proposed system's innovation is the ability to track patient health. The website for patient health tracking will display the necessary data, including the disease type, medicine type, cause of the disease, and information about follow-up visits. With the aid of this feature, users can see their past treatment records at any time and from any location without having to be concerned about the practitioner's illegible handwriting or their report being missing. Since the report is a PDF on a computer therefore can create a clearer view of content to the user. From the standpoint of the practitioner, being able to review the patient's prior medical history before administering treatment can help to lower the likelihood of a mistaken diagnosis therefore improve the trust between patient and practitioner. Instead of that, features for tracking patient health might also enhance practitioner collaboration. The reports provide a practitioner with a concise and clear summary of the patient's current health status and medical history, which can be shared for better communication. The function allows for the organization of the patient health tracking report in decreasing order, with the most recent report appearing first. The user will be able to easily get the report they want by using the filtering and searching functions to eliminate the bulk of the reports. The survey form had provided evidence of this accomplishment. Which the patient health tracking function getting the largest categories among all the TCM services provide by YIYI TCM. 35% of the respondent acknowledged that they like most the patient health tracking function among all the TCM services.

CHAPTER 7: CONCLUSION AND RECOMMENDATION

7.1 Conclusion

The goal of the proposed project was to create a traditional Chinese medicine (TCM) web-based system for Malaysia. The application's functions included online appointment scheduling for patients and patient health monitoring for Chinese medicine practitioners (CMP). Additionally, all the features and services offered by this project were designed to enable users to experience and benefit from less costly, superior, and real-time services through web applications, elevating their overall customer experience.

Appointment scheduling, patient health monitoring, patient and Chinese medicine practitioners (CMP) database management, and TCM inventory management were the main functions of the suggested system. Additionally, the system created and integrated certain other features to offer users more comprehensive services, like real-time chat and reminders. All medical records were also computerized so that users could access and see data from the system with ease. As a result, with the help of such a TCM system, all previously manual procedures were online and automated, enabling users to access TCM services whenever and wherever they liked.

Similar online TCM systems, including those from the Eu Yan Sang Clinic, Thomson TCM and Refresh Group TCM, Sunway TCM, and PRTCM Centre, were analyzed, evaluated, and reviewed in order to identify and clarify the fundamental system requirements and user behaviors that would affect users' perceptions of the usefulness of the TCM system. As a result, the findings were utilized as references to help improve the features and functionalities of the proposed system based on the analytical results of the literature review. Additionally, this improved the proposed project's collection of user requirements and expectations, enabling the final product to better meet those needs and expectations when users accessed the system's functions.

Additionally, prototyping was the methodology applied to the proposed project. As many needs and resources as feasible were gathered in the initial phase in order to identify potential issues and user expectations. The system was then quickly designed based on the data gathered, but the system did not have completed all the functions or

have gone through all of its testing. As a result, it made it easier for consumers to comprehend it and receive feedback from them. The issue was identified through user feedback, allowing me to go back to the requirements analysis step and keep rebuilding the prototype until the user accepted it.

Finally, some application programming interfaces were created to ensure the project's success (APIs). Although API was implemented in this project, several methods were still missing. Therefore, research and self-study were done to develop features that APIs could not provide for free. Next, an algorithm for scheduling appointments was successfully implemented in this project, which allocated the practitioner who had the availability to the patient and ensured that their schedule wouldn't crash. Finally, this project was evaluated by users who were eager to use it, provided feedback, and commented on its usability, user interface, and other pertinent areas that could use improvement. The application was fixed if any technical issues were detected.

7.2 Future Plan & Recommendation

The system or program may be made more effective and efficient by identifying these areas and giving recommendation for how to enhance it. When there are more users, system performance will become a major concern. The user will experience latency and a lack of patience as the response time lengthens. For instance, the system had to wait a brief period before processing a user request while numerous users are making appointments simultaneously. Real-time experience should be offered to users by a great system. I would thus like to host the system in Azure and implement the Azure Service Bus message queue in the future. First In, First Out (FIFO) message delivery is provided via queues to one or more competing customers. In other words, messages are normally processed and received by receivers in the order that they were added to the queue. Additionally, each message is received and processed by a single message consumer. The ability to enable temporal decoupling of application components is a fundamental advantage of employing queues and reduce the burden of the system when handling multiple concurrent requests.

The level of difficulty for maintenance will also rise as a result of the absence of exception handling. To prevent bad request errors, I must integrate some third-party APIs into this system. If the API is busy, it won't be accessible. Without writing down

every exception message, it will be difficult for the developer to identify the problem and fix the bug. As a result, I could incorporate Logger into my system for my future plans. With the aid of the logger, it is possible to automatically create log files and attach any exception messages to them.

Next the security issue also must take note. Without using ORM is easily cause SQL injection issue. The database could be destroyed using the code injection technique known as SQL injection. An excellent strategy for preventing SQL injection is to use prepared statements and object-relational mapping (ORM). Object relational mapping is a nice approach to leverage a relational database as a back end and make it appear like a collection of objects. This is useful for things like MVC and JSON.

The user interface design should also adhere to the three-click rule. This implies that the user must finish their assignment in three clicks. Additionally, for a pleasing appearance, the user interface's color should be in the same color family. By adhering to the user interface design concept, I might modify the user interface in my future development plan and produce a user interface that puts the user at the forefront.

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APPENDIX

FINAL YEAR PROJECT WEEKLY REPORT

FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: Y3S3	Study week no.:2
Student Name & ID: Kwan Kah Lok 1902221	
Supervisor: Dr Suthashini a/p Subramaniam	
Project Title: Online Appointment Booking and Patient Health Tracking System for Traditional Chinese Medicine	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

The Work I had done is the trading new and article function. And this function is utilizing the third parties API to get latest news and article which related to the TCM. And I had implemented the Google O-Auth features for the login part. So that user able to sign in by using their google account

2. WORK TO BE DONE

I plan to complete the chatting features and manage personal account functionality

3. PROBLEMS ENCOUNTERED

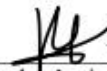The problem encounter will be implementing third parties api, because the result I get which in JSON body so I had to serialize it to PHP array.

4. SELF EVALUATION OF THE PROGRESS

The progress quite slow, I will keep moving on

_____
Supervisor's signature

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Student's signature

Bachelor of Information Systems (Honours) Business Information Systems
Faculty of Information and Communication Technology (Kampar Campus), UTAR

A-1

FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: Y3S3	Study week no.:4
Student Name & ID: Kwan Kah Lok 1902221	
Supervisor: Dr Suthashini a/p Subramaniam	
Project Title: Online Appointment Booking and Patient Health Tracking System for Traditional Chinese Medicine	

1. WORK DONE
[Please write the details of the work done in the last fortnight.]
The work I had completed which is the Chatting features and the manage personal account function. The chatting features is real time basis and need to utilize a lot of Ajax in the coding. And for manage personal account function I had implement it for 3 of the actor which is patient, practitioner, and the business owner

2. WORK TO BE DONE

I plan to completing the practitioner leave management function for practitioner and for the business owner
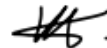
3. PROBLEMS ENCOUNTERED

The problem I had encounter which is Chatting features, I can claim this features is the most hardest in my entire system. Because need to assign each user unique chatting id to ensure message is sending to correct user.

4. SELF EVALUATION OF THE PROGRESS

The progress quite slow, I will keep moving on

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Supervisor's signature

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Student's signature

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A-2

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S3	**Study week no.:6**
Student Name & ID: Kwan Kah Lok 1902221	
Supervisor: Dr Suthashini a/p Subramaniam	
Project Title: Online Appointment Booking and Patient Health Tracking System for Traditional Chinese Medicine	

1. WORK DONE
[Please write the details of the work done in the last fortnight.]
I had completing the practitioner leave management function. Practitioner able to view their historical leave application in calendar format. And practitioner able to apply leave. For the business owner, they able to view and manage the practitioner's leave application.

2. WORK TO BE DONE

I plan to complete is view treatment and search suitable treatment by disease function. And view practitioner and search suitable practitioner by specialty

3. PROBLEMS ENCOUNTERED

The progress is quite smooth, I don't encounter any problem

4. SELF EVALUATION OF THE PROGRESS

The progress quite slow, I will keep moving on

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Supervisor's signature

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Student's signature

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FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: Y3S3	Study week no.:8
Student Name & ID: Kwan Kah Lok 1902221	
Supervisor: Dr Suthashini a/p Subramaniam	
Project Title: Online Appointment Booking and Patient Health Tracking System for Traditional Chinese Medicine	

1. WORK DONE
[Please write the details of the work done in the last fortnight.]
I had completing the view treatment and practitioner function. And I had utilizing google search engine to assisting for suitable treatment suggestion by entering the disease name.

2. WORK TO BE DONE

I plan to complete is review and testimonial function and patient health tracking features. In the patient health tracking features will able to download the report in PDF format. And I will also implement the Google Chart to the view graph features which let practitioner to do further analysis.

3. PROBLEMS ENCOUNTERED

The progress is quite smooth, I don't encounter any problem.

4. SELF EVALUATION OF THE PROGRESS

The progress quite slow, I will keep moving on

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Supervisor's signature

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Student's signature

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A-4

FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: Y3S3	Study week no.:9
Student Name & ID: Kwan Kah Lok 1902221	
Supervisor: Dr Suthashini a/p Subramaniam	
Project Title: Online Appointment Booking and Patient Health Tracking System for Traditional Chinese Medicine	

1. WORK DONE
[Please write the details of the work done in the last fortnight.]
I had completed the review and testimonial function. And well implementing the child comment under the parent comment. Next, the patient health tracking features and download PDF report in successfully implemented. And I had styling the google pie and bar chart for the view graph features.

2. WORK TO BE DONE

I plan to complete the report. Which is blackbox testing and user testing and the following chapter.

3. PROBLEMS ENCOUNTERED

The progress is quite smooth, I don't encounter any problem.

4. SELF EVALUATION OF THE PROGRESS

The progress quite slow, I will keep moving on

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Student's signature

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A-5

FINAL YEAR PROJECT WEEKLY REPORT
(Project II)

Trimester, Year: Y3S3	**Study week no.: 10**
Student Name & ID: Kwan Kah Lok 1902221	
Supervisor: Dr Suthashini a/p Subramaniam	
Project Title: Online Appointment Booking and Patient Health Tracking System for Traditional Chinese Medicine	

1. WORK DONE
[Please write the details of the work done in the last fortnight.]
I had done all the user testing and black box testing. Which I invite 30 user to test and review my system and in the end they fill in the user testing survey form.

2. WORK TO BE DONE
I plan to complete the rest of the part of my report.

3. PROBLEMS ENCOUNTERED
The progress is quite smooth, I don't encounter any problem

4. SELF EVALUATION OF THE PROGRESS
The progress quite slow, I will keep moving on

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Poster

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Full Name(s) of Candidate(s)	KWAN KAH LOK
ID Number(s)	19ACB02221
Programme / Course	IB
Title of Final Year Project	Online Appointment Booking and Patient Health Tracking System for Traditional Chinese Medicine

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Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

_____
Signature of Supervisor

Name: _Dr Suthashini a/p Subramaniam_

Date: _25 April 2023_

_____
Signature of Co-Supervisor

Name: _____

Date: _____

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Student Name	Kwan Kah Lok
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